



The University of Medicine and Pharmacy
"Victor Babes" Timisoara
Epidemiology Discipline

Types of surveillance

**Dr. Luminița
Bădițoiu**

Epidemiological surveillance

- is the system of systematically collecting, analyzing, interpreting and transmitting data on health / disease status in a population for prevention and control activities;
- The term "epidemiological surveillance" is not synonymous with "medical surveillance" during peak incubation, the contacts of infectious disease, in order to identify the first signs of disease, or during the course of a chronic non-transmissible disease;
- The WHO asks all states to report few current illnesses: cholera, pestilence, yellow fever, HIV. In addition, the Public Health Authorities in each country establish a list of other reportable pathologies as needed.
- Subsequently, this system extended to chronic non-transmissible pathology or to immunization of the

Epidemiological surveillance

The analysis of data collected through epidemiological surveillance serves to:

- Knowing how disease manifests, with the discovery of changes;
- Recognizing the epidemiological link between cases;
- Increasing efficiency of control and prevention measures;
- Establishing public health policy;
- Obtain additional data needed to characterize and understand morbidity phenomena.

- 1 Population and event selection through definition of the case
- 2 Choosing of the oversight method appropriate to the proposed objectives
- 3 Systematic data collection
- 4 Centralize collected data
- 5 Analysis and interpretation of data
- 6 Transmission of results by reference to higher forums and communication to own staff
- 7 Evaluation of the surveillance system

Systematic and regular data collection

- It starts by establishing the case definition as clear, complete, accurate, easy to understand, and distributing it to all medical staff with a role in identifying and reporting cases.
- There are definitions for confirmed cases of illness but also for suspicious cases. The supervised population is also designated in a given geographical area or representative sector.
- Useful sources are multiple :
 - morbidity data **provided by healthcare professionals** (clinicians or representatives appointed by healthcare units for this purpose), official health reports;
 - **mortality data** from population record statistics, legal medicine services, etc. This information is important for high mortality diseases;

Systematic and regular data collection

- The reporting of epidemic outbreaks of clinically typical, atypical, subclinical or sporadic clinical cases may escape the surveillance system;
- Epidemiological surveys on transmissible / non-transmissible diseases and outbreak investigation reports that can actively identify other undeclared cases;
- Laboratory data identifying the etiological agent, its sensitivity characteristics, phenotype, genotype and helping to certify cases;
- Data on animal sources of pathogens, vectors - important especially in zoonoses;
- Demographic data for population characterization - gender, age, profession, economic status, social status, domicile. Even school and job absenteeism data can be useful in supervising some illness;
- Data provided by written or audio-visual media, data on drug use aso.

Systematic and regular data collection

- On the quality of reporting depends the exact determination of the incidence / prevalence of the studied disease but also the quality of the surveillance system.
- Depending on how we get the data we have :
 - **Passive Surveillance** - Through Periodic Reports of the Medical Network on Nominally or Numerically Required Disease;
 - **Active surveillance** - through direct contact, without waiting for regular reporting;
 - **Surveillance based on the sentinel system** by taking data from specially designated medical personnel from a well-defined area and population. One such example is flu surveillance in the pre-epidemic season.

Epidemiological surveillance

- **Traditional surveillance** is based on the reporting of certain cases.
- Lately, **syndromic surveillance** has been developed based on clinical signs and symptoms that are insufficient for the diagnosis of certainty, but which signifies with sufficient probability a case or a beginning of the epidemic, allowing for faster detection, a faster response from the Public Health System and possible decrease in morbidity / mortality.
- The clinician, the official representatives of the sanitary units report cases of transmissible / non-transmissible disease to the local public health authorities and from this the information is disseminated to the Territorial Public Health Institutes and then to the Ministry of Health.

METHOD	DESCRIPTION	BENEFITS	DISADVANTAGES
Passive	- It is done with the help of the medical staff on the wards.	- allows access to some information that is not recorded in medical records; - less expensive.	- staff is not specially trained in hospital surveillance and epidemiology; - can deviate from standard definitions; - is an extra task that adds to many others, causing under-reporting and non-timely reporting.
Active	- It is done with the help of specialized medical personnel in the prevention and control of diseases	- rigorously complies with case definitions; - provides superior quality surveillance from multiple sources.	- requires specialized personnel in this field; - is more expensive; - has fewer chances of continuity, especially in systems with limited resources.
Continuous	- continuous monitoring of some sections over several years.	- determines an overview of the issue; - allows you to store and compare data to capture time trends.	- requires considerable time and effort.
For a limited time (by rotation)	- Periodic or rotation monitoring of hospital departments; - may rotate overall surveillance over a certain period of time with targeted surveillance of certain types of disease in other periods; - or it can be total supervision over a certain period of time successively in each section.	- allows supervision with a small number of specialized personnel; - allows assessment of control measures.	- the short period of supervision may lead to wrong conclusions and the issue may remain unresolved.

GLOBAL	<ul style="list-style-type: none"> - COLLECTION, ANALYSIS AND TRANSMISSION OF ALL DATA ON THE RESPECTIVE PATHOLOGY FROM A MEDICAL UNIT. 	<ul style="list-style-type: none"> - DETERMINES A OVERVIEW OF THE PROBLEM. 	<ul style="list-style-type: none"> - OVERLOADS THE SPECIALTY PERSONNEL, BECAUSE IT IS LESS VIABLE IN PRACTICE.
Targeted	<ul style="list-style-type: none"> - on a particular ward; - on a certain type of pathology; - on a particular patient group. 	<ul style="list-style-type: none"> - increases the accuracy of collected data reflected in the accuracy of the surveillance; - allows the selection of criteria: frequency, mortality, costs, prevention possibilities; - is more efficient by restricting the collection area and saving time; - can be easily combined with other methods. 	<ul style="list-style-type: none"> - is not capable of detecting disease from other unattended areas; - In some high-risk wards, the severity of patients' pathology may lead to increased time for reading the observation sheets; - the specific results obtained can not be compared to the rest of the hospital.
After discharge	<ul style="list-style-type: none"> - contacting the discharged patient by telephone, e-mail, mail; - contacting the physician / surgeon; - Detection of re-admittances; - monitoring of antibiotic therapy in post-operative ambulatory patients. 	<ul style="list-style-type: none"> - allows identification of an important segment of complications, with the permanent reduction of the admission period. 	<ul style="list-style-type: none"> - there is no standard method; - errors made by patients occur in disease identification; - poor adherence of medical staff to reporting to Public Health specialists; - the impossibility of determining clinical status for patients lost during follow-up; - difficulties in monitoring ambulatory antibiotics.
Retrospective	<ul style="list-style-type: none"> - based on medical records after patient discharge; - all new cases from a previous period are 	<ul style="list-style-type: none"> - each patient is investigated once; - is very useful in epidemic situations; 	<ul style="list-style-type: none"> - the quality of surveillance depends on the quality of the clinical documentation; - too much travel in the past

PROSPECTIVE	<ul style="list-style-type: none"> - MONITORING THE PATIENTS BY CONTROL REPEATED IN ALL ADMISSION PERIODS, FROM A CERTAIN MOMENT. 	<ul style="list-style-type: none"> - USES ALL AVAILABLE SOURCES OF DATA; - MAY BE STARTED OTHER INVESTIGATIONS OR ADDITIONAL INTERVENTIONS; - INCREASES VISIBILITY OF SPECIALTY PERSONNEL ON WARDS; - FACILITATES FEEDBACK RESULTS. 	<ul style="list-style-type: none"> - REQUIRES MORE TIME AND SUSTAINED EFFORTS.
By longitudinal study (incidence)	<ul style="list-style-type: none"> - recording all new occurring cases from the tracked pathology and calculating the incidence. 	<ul style="list-style-type: none"> - determines an overview of the issue; - allows analysis of risk factors. 	<ul style="list-style-type: none"> - overload staff; - can not calculate adjusted rates - precise goals can not be pursued. - it does not allow comparison of rates with those of other hospitals.
By cross-sectional study (prevalence)	<ul style="list-style-type: none"> - recording all active (new + old) cases from a population of patients in one day or a certain period and calculating the momentary / periodic prevalence. 	<ul style="list-style-type: none"> - is fast, requires limited time and effort; - quickly done by a trained team - useful when wanting a quick and inexact estimate of a problem; - allows determination of the sensitivity of the surveillance system; - can be used to estimate the problem in an institution where there is no other surveillance system. 	<ul style="list-style-type: none"> - the prevalence rate is influenced by the duration of the disease and overestimates the risk of patients; - the interpretation of the results, with the detection of statistically significant differences, is difficult because of the small number of patients studied; - it does not allow comparison of rates with those of other hospitals.

Types of surveillance

Sentinel	<ul style="list-style-type: none">- collecting pathology data from a geographically representative sample of interested medical institutions.	<ul style="list-style-type: none">- informs about changes in global incidence;- has good sensitivity;- requires limited time and effort;- case reporting is optimal.	<ul style="list-style-type: none">- collects only the number of cases without or with little information about cases;- has little specificity.
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Epidemiological surveillance

- Depending on the reporting, there are several categories of diseases :
 - **With mandatory individual reporting:** cholera, plaque, yellow fever, exanthematic typhus, malaria, polio, tetanus, anthrax;
 - **Periodical numerical reporting:** measles, rubella, varicella, convulsive cough, epidemic parotiditis, non-transmissible diseases.
- **Processing / Centralization** consists of analyzing the data obtained according to the time criterion, the location of the cases and the affected persons. In the end, the data is synthesized in tables, charts, maps.
- **Interpretation** of data includes comparisons with similar periods in the past with other areas, or analysis of cases by gender, age, occupation, background, aso.
- **The communication** of the findings is done both to the medical staff who provided the data and to the decision-makers. In addition, data may be transmitted

Prevention

- ☀ It represents all medical, economic, social, political actions taken to preserve and promote health, to reduce the risk of the occurrence and spread of a disease.
- ☀ All the methods and means used to ensure the knowledge of health risks, to neutralize their action, to detect high-risk population groups, to avoid the establishment of epidemiological processes and the detection of pre-disease and disease states in the earliest stages.
- ☀ Prophylactic medicine (preventive medicine) is the branch of Medicine based on the application by physicians of prophylactic measures.
- ☀ Important in the context of modern medicine, when costs are increasing, elderly people are more and more representative in the population and we are confronted with emergence and reemergence of some diseases.

Prevention

- ☀ Ancient medicine - Greek, Roman, Arabic, Indian, Chinese, has promoted prevention both towards the relationship with natural factors and in terms of everyday human behaviors;
- ☀ In Chinese medicine 2000 years ago, the doctor's activity was appreciated by the effectiveness of preventive practices;
- ☀ In Arab medicine it is considered that: "The purpose of medicine is to maintain and protect the health and sometimes to cure the disease";
- ☀ Hippocrates synthesized the focus on prevention at that time in the saying that remained over millennia: "It is easier to prevent than to treat a disease."
- ☀ There are known effective preventive measures at the time, over-eating, sedentary, alcoholism, pellagra, scurvy, puerperal infections, plaque, aso.

Prevention is the mother of wisdom!

- ✓ *“A dirham for prophylaxis is better than a quintal for treatment ”- Arab proverb;*
- ✓ *“Life can be divided into two periods, not necessarily equal: in the first part we waste our health for money, then spend our money on health ”- Chinese proverb;*
- ✓ *“Every man is the author of his own health or illness” (Buddha);*
- ✓ *“Human nature must not be forced but convinced; and we can convince her if we satisfy the necessary and natural desires, rejecting the harmful ones” (Epicur);*
- ✓ *“Health is a treasure that few know to value, although almost everyone is born with it” (Hippocrate).*



" Nothing is more effective and nothing costs cheaper than prevention.“(Nicolae Opopol)

- ✓ *“Health is like money, we will never have a real idea of its value until we lose it.” (Josh Billings);*
- ✓ *“Certainly health is more valuable than money because health makes money.” (Samuel Johnson);*
- ✓ *“When the time comes to eat right and start doing exercises, there is no time left.” “I’m starting tomorrow.” Tomorrow is the disease.” (V. L. Allineare);*
- ✓ *“To ensure good health, eat superficially, breathe deeply, be moderate and maintain an interest in life.” (William Londen);*
- ✓ *„ In life, we are generously spending years, and in the end we are begging for moments. “ (Nicolae Iorga).*



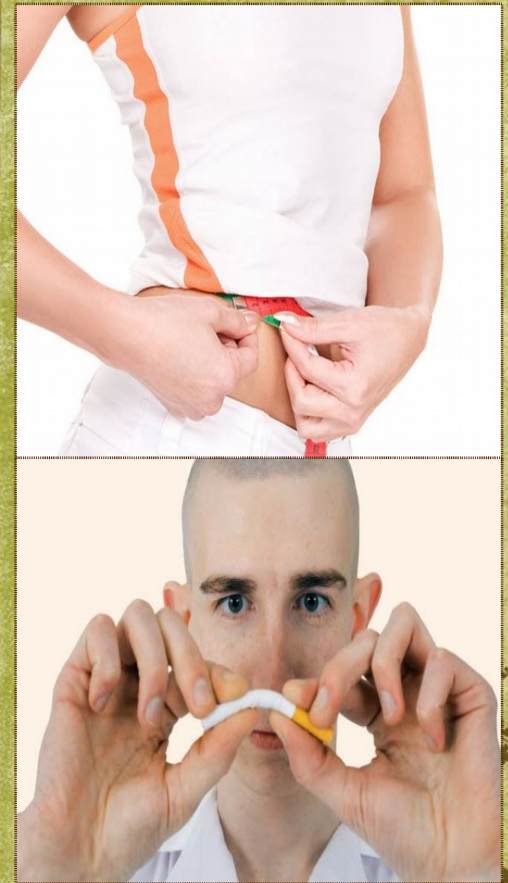
Prevention

- ☀ Initially, the prevention was directed to the transmissible pathology generated by innumerable microbial and parasitic agents, leading to the global eradication of smallpox (1979), bovine plague (2011) and hopefully, of polio (expected for 2018), but also to the control of some diseases, such as plague, cholera, tetanus, diphtheria;
- ☀ Over time, prevention has turned into a struggle for preserving the quality of life - a superior quality being always linked to health, the absence of disease, good physical, mental and social condition, and a harmonious natural development.



Prevention

- ☀ With the modernization of society, to physical and chemical environmental factors, urbanization and industrialization have added psycho-emotional disorder, sedentarism, alcoholism, smoking, unbalanced eating and drug use;
- ☀ All these aggressive factors required the development of prevention in the field of non-transmissible diseases - cardiovascular, respiratory, metabolic, rheumatism, gastro-enteral, dento-periodontal, psychiatric, aso.
- ☀ At present, the idea of health as an individual is increasingly being replaced by **the health of the whole community!**



Prevention

- ☀ The new orientations in contemporary medicine outline a 21st century oriented on prevention, although "people are interested in the technique of curative medicine and less to health and prevention";
- ☀ *"They are generally less willing to participate actively in preventive action, considering that preventive medicine intervenes too much in their lives, creating anxiety, obsession and panic"* (A. Ivan).



Prevention

- ☀ However, "prevention must protect man and human society, life in general, everything that threatens it virtually or imminently. This defense raises many problems and is difficult to solve them, as people realize equally difficult the conscience of immortality and the perishability of life. They are rather inclined to avoid serious questions and postpone the answers and judgments in consequence, thereby ensuring the ephemeral, everyday happiness."(O.Fodor);
- ☀ Even physicians tend to design their profession as a practice of diagnosis and treatment, neglecting prevention.



Prevention steps

- ☀ **Primordial prophylaxis** - to combat the emergence and consolidation of social, cultural, economic habits that increase the risk of illness in the population. It includes improving living conditions, hygiene, ensuring clean drinking water, food, combating smoking and alcohol consumption, speed reduction campaigns;
- ☀ **Primary prophylaxis** controls risk factors in order to prevent disease on the individual or population level. It includes measures to maintain optimal body weight, to combat inactivity, immunize the population for some transmissible diseases, aso. It is done through programs to protect people at risk and population programs.



Prevention steps

- ☀ **Secondary prophylaxis** includes measures of early detection and correction of reversible imbalances occurring before the disease is clinically manifested (during incubation or latency). It is based on screening tests using as accurate as possible for early detection, less invasive, less expensive, population-friendly methods (cervical cancer screening by the Papanicolaou method).
- ☀ **Tertiary prophylaxis** refers to medical activities that prevent or reduce the complications of the disease. It is part of the chronic pathology therapy and includes measures to reduce suffering, injuries, infirmities, adaptation of the patient to his new condition.



Types of prevention

Depending on the degree of specificity, we distinguish:

- ✓ **General prevention** by respecting personal and collective hygiene, sanitary education, decontamination / disinsection / disinfection measures, supervision of risk groups, aso.
- ✓ **Special prevention** by antibacterial, antiviral, standard Ig - post-exposure chemoprophylaxis;
- ✓ **Specific prevention** by active and / or passive specific immunization (specific Ig);



Types of prevention

Depending on the pathology on which we act, we distinguish :

- ☀ **Prevention of transmissible diseases:** influenza, minor childhood viral exanthema, convulsive cough, poliomyelitis, tetanus, rabies, viral hepatitis A and B;
- ☀ **Prevention of non-transmissible diseases:** metabolic, cardiovascular, respiratory, digestive, oncological diseases, aso.
- ☀ The medical specialties with an important role in Preventive Medicine are: Family Medicine, Epidemiology, Public Health, but any clinician has a preventive component in his/her activity.



Dispensary

- **Dispensary or active medical surveillance** of people at risk addresses either categories of people or a population segment. There are 3 types of dispensaries :
- **Protective dispensing**, related to primary prophylaxis, which avoids the illness of people at risk;
- **Dispensarisation for rebalancing** associated with secondary prevention through measures to improve the living and working conditions of those early detected with homeostatic disorders;
- And **the reparatory-rehabilitation dispensary**, addressed to the patients for the prevention of complications and severe evolution.
- Dispensary adapts to the types of risk factors, collectivity, pathology, in the form of programs with

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