Epidemiological investigation

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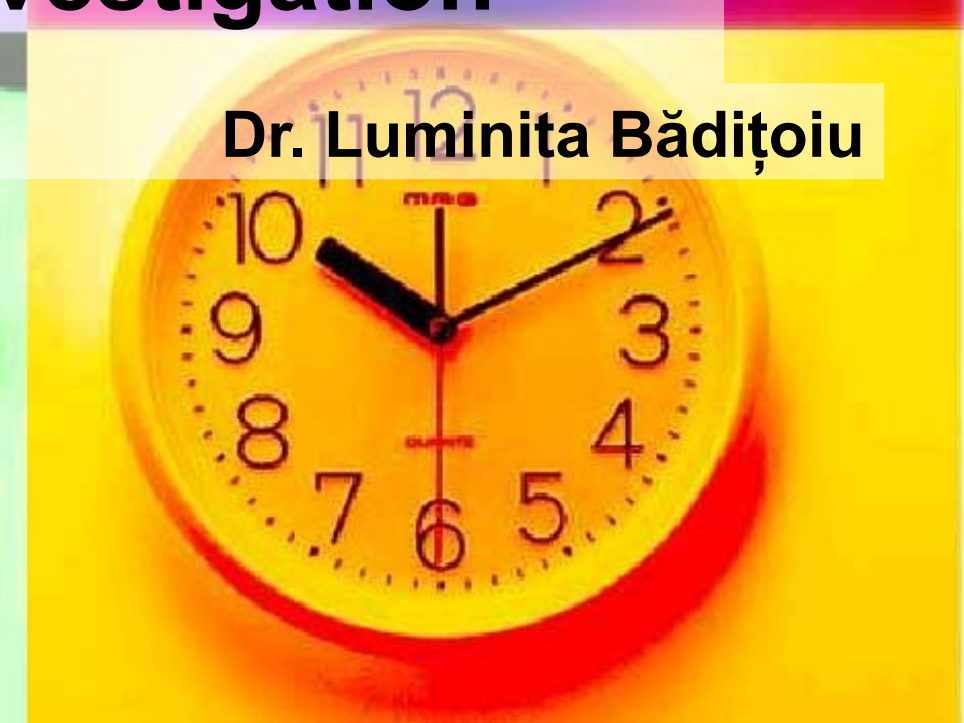


Definition

- It refers to a study and research method of the determining and favorable conditions involved in the occurrence and spreading of transmissible and nontransmissible diseases.
- It also represents an essential method of intervetion against infectious transmissible outbreaks.

Clasification

Epidemiological investigation

operational

1. preventive
2. **combative (emergency)**

research oriented

1.descriptive and analytical

2. retrospective and prospective

3. longitudinal and transversal

4.sero-epidemiological, eco-socio-epidemiological and cost/benefit calculus

Epidemiological survey to combat (emergency)

It mostly applies to transmissible diseases in order to limit the spread of the outbreak.

It consists of 2 steps:

1. individual epidemiological investigation (preliminary)

2. collective epidemiological investigation

Individual epidemiological investigation

- It applies mainly to the ill, but it can also cover other categories, such as:
  - Known bearers;
  - Possible suspects of unerupted clinical infection;
  - Previously ill persons in convalescence;
  - Possibly to deceased individuals

  Conducted by doctors or by trained medium staff;

- **Preexisting forms** may be used, but a **personalized survey** is preferred to each case without the rigidity of standard forms

Objectives:

A detailed anamnesis (from the ill or from the carers), should be obtained:

1. **Personal data:** name, surname, sex, age, residency, place of employment (job);
2. **Identifying the time/place and exact moment of infection**
   - The outbreak moment: Details on first symptoms and first need of consultation;
   - Retroactive identification of the period of incubation (from lowest to highest extreme)
   - Regarding this period, it is searched the exact moment of infectation (whether singular or multiple) and its circumstances (where, when, how)
   - Identifying and neutralizing the core of infection.




Objectives:

2. **Identifying and detailing the moment of infection:**

- Details on the manifestation of the disease
- Previous pathological infectious/non-infectious hereditary occurances,
- Previous personal occurances (Apgar score, natural nutrition, previous vaccines, etc.)
- Anamnesis of travel logs
- Life and work conditions
- Supply, food storage.
- Hygiene and sanitary condition of the water source
- Health education of subjects - personal hygiene and housing
- Details of domestic animals, insects

Objectives:

3. Selecting and registering the contacts:

- Filling a form with the name, age, occupation, moment of infection contact, prophylactic measures applied

Surname	Name	Age	Adress	Occupation	Workplace	Date of infection	Felul	Prophylaxis methods
1. Luca	Alina	22	Str.Crisan, nr.5, TM	studenta	UMF TM	10.09.2008	Familial	Chimioprof.
2.Marin	Anisoara	33	Str.Apateu, nr.3,TM	Asistent social	Primaria TM	10.09.2008	Profes.	-

Objectives:

3. Selecting and registering the contacts:

Will be taken into account :

- Maximum incubation period and period of contagiousness
- Methods of transmission of the suspected infectious agent

In order to:

- Properly determine the prophylaxy method
- Limiting sources of infection
- Prevent the expansion of the outbreak

Objectives:

4. **Determination of contaminated elements from the patient's environment** (in order to interrupt the transmission of the pathogen):

   - The patient's contagious period (from onset to isolation), all possible ways of disposal / resistance of the infectious agent in the external environment;

   - Contaminated environmental elements are searched both at home and at work / collectivity attended by the contagious period;

   - Immediate and emergency (hospital, possibly home) isolation measures are taken for patients, suspects and contacts.

Objectives:

- Applying the disinfection, disinfestation and deratization measures, depending on the pathogenic agent and transmission methods
- Drawing up an individual epidemiological investigation file
- Informing higher medical institutions regarding the existent epidemiological situation and prevention methods

Collective epidemiological investigation of the outbreak

It starts from the data provided by the PEI *(preliminary epidemiological investigation),* checks them and complements them by laboratory investigations and general data on the outbreak

It only ends once the epidemiological process is ended.

- Consists of the following:
  1. Collecting general data on the outbreak
  2. Processing the info
  3. Determining measures to control the outbreak
  4. Practicing these methods and studying its results

Collective epidemiological investigation of the outbreak

1. General data on the outbreak

- Info should be collected through anamnesis, interviews, epidemiological observations, clinical diagnosis of the disease, lab investigations

- The investigation starts based on the clinical anamnesis, without waiting for lab results that could confirm or deny the initial hypothesis.

It is harvested : pharyngeal and nose exudates, urine and blood tests, other pathological products, water and food samples, etc.

Collective epidemiological investigation of the outbreak

Details regarding the epidemiological investigation should identify:

- **The infection source**
- **Transmission means** and possible ways of expansion of the etiological agent
- **The receptivity of the population** - distribution by sexes, age limits, population density, info on morbidity, mortality, natality, population displacements, dominant occupations;

- But also secondary epidemiological factors, with favoring action:
  - Natural environment - climate, geographical placement of the environment, metheorological situation, water sources, etc.
  - Socio-economical - culture, communication means, food supply, water sources, etc.

Collective epidemiological investigation of the outbreak

- It is also possible to follow transmissible diseases in the past 5-10 years:
  - measles epidemics in the past 2-3 years reduce the risk of new infections due to the immunity that they build.
- All these help on determining a more accurate forecast regarding the potentiality of any existent epidemiological expansion and resistance methods.

Collective epidemiological investigation of the outbreak

2. Processing the data:

- All collected data should be organized and processed by:
  - **Drawing up the chronological table of illnesses**– past and current ill individuals in chronological order of the outbreak.
  - clinical state of the disease, its evolution, observations regarding the particularities of the case
  - in the same form one should also list the suspects, contacts, bearers:

Nr. crt.	Nume si prenume	domiciliu	Sex	Vârstă	Profesie	Loc de muncă	Data îmbol.	Data depist.	Data decl.	Data izol.
1	E.C	Crisan, nr.5, TM	F	47	Chelner	CFR	18.06	22.06	23.06	24.06
2	M.N	Gh. Lazar, 40, TM	M	47	Conduct	CFR	20.06	23.06	24.06	25.06

Collective epidemiological investigation of the outbreak

- **Topographic representation of diseases :**
  - On the topographic map of the buildings in which the outbreak took part, one marks a fraction
  - *The numerator* represents the #number from the chronological form
  - *The denominator* consists of the actual day of the outbreak - day and month

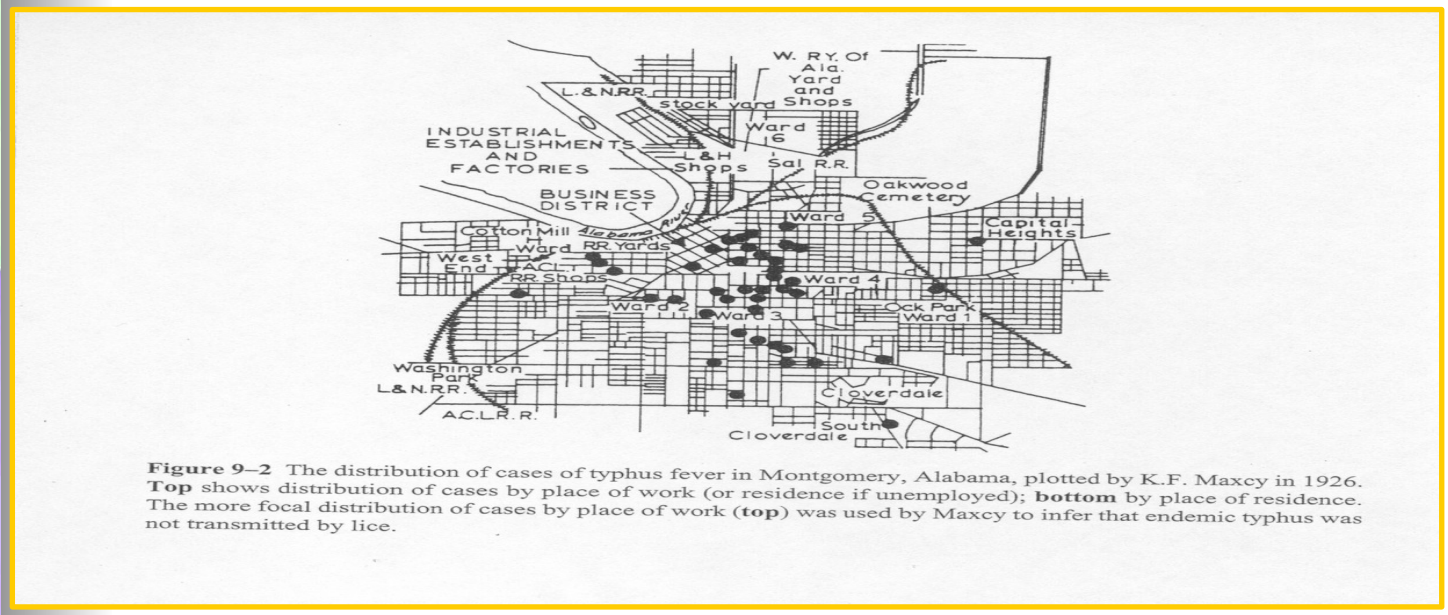


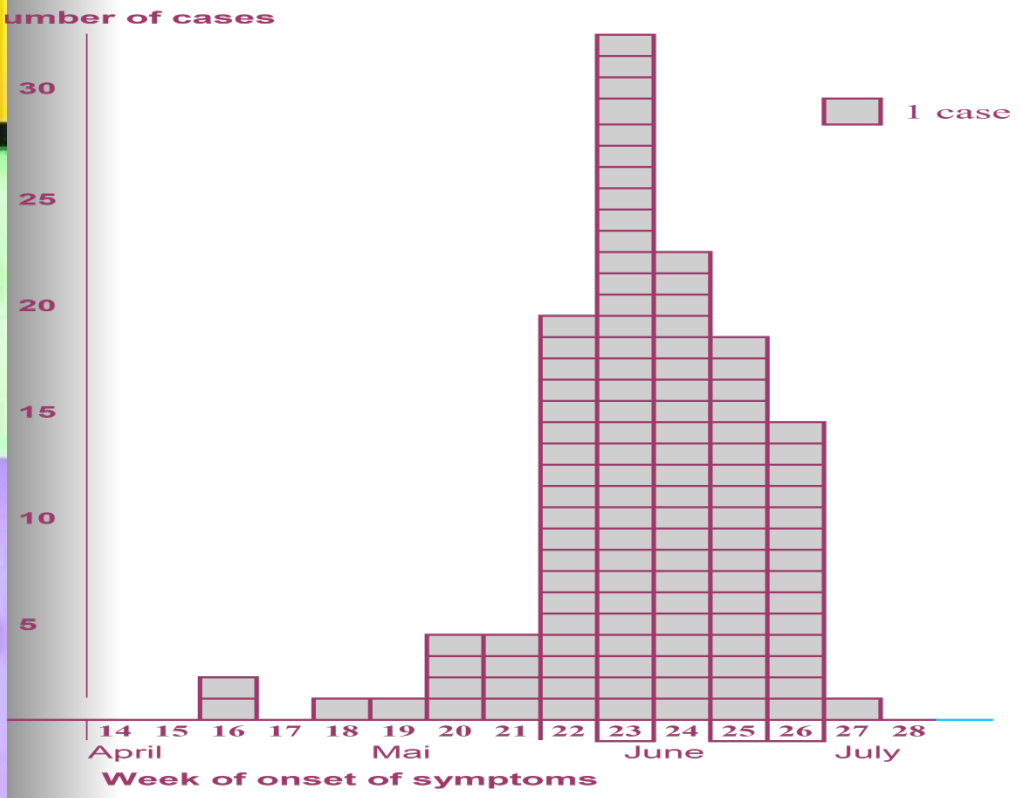
Figure 9–2 The distribution of cases of typhus fever in Montgomery, Alabama, plotted by K.F. Maxcy in 1926. **Top** shows distribution of cases by place of work (or residence if unemployed); **bottom** by place of residence. The more focal distribution of cases by place of work (**top**) was used by Maxcy to infer that endemic typhus was not transmitted by lice.


PUMP B
WORK HOUSE
POLAND STREET
MARSHALL STREET
CARNABY STREET
PUMP A
BROAD STREET
BERWICK STREET
SILVER STREET
REGENT STREET
GREAT PULTENEY STREET
GOLDEN SQUARE
PUMP
PUMP C
PUMP
N
W
E
S

Collective epidemiological investigation of the outbreak

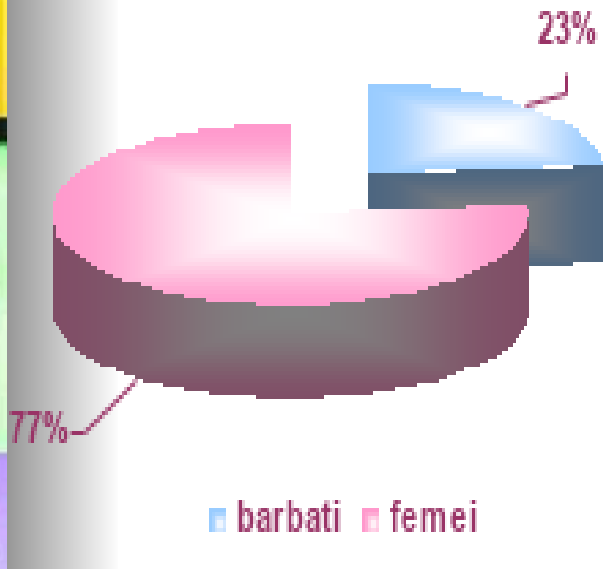
Graphic representation of disease progression :

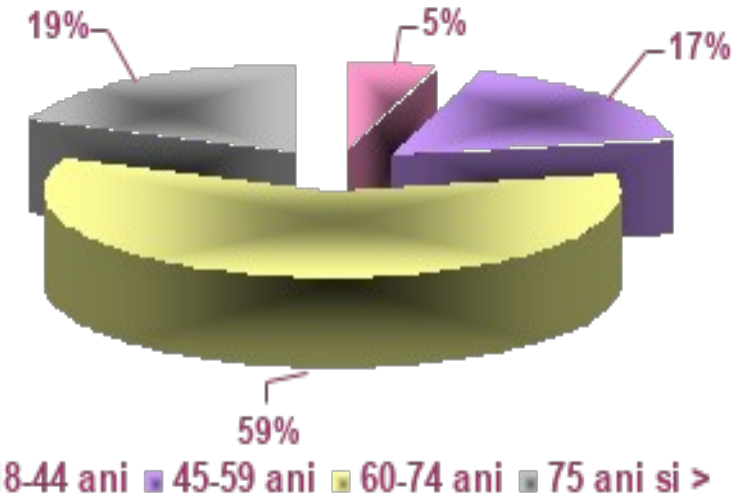
- They can be linear graphs or histograms - x-axis for the time units (days, months, years) and the y-axis for the number of cases



Collective epidemiological investigation of the outbreak

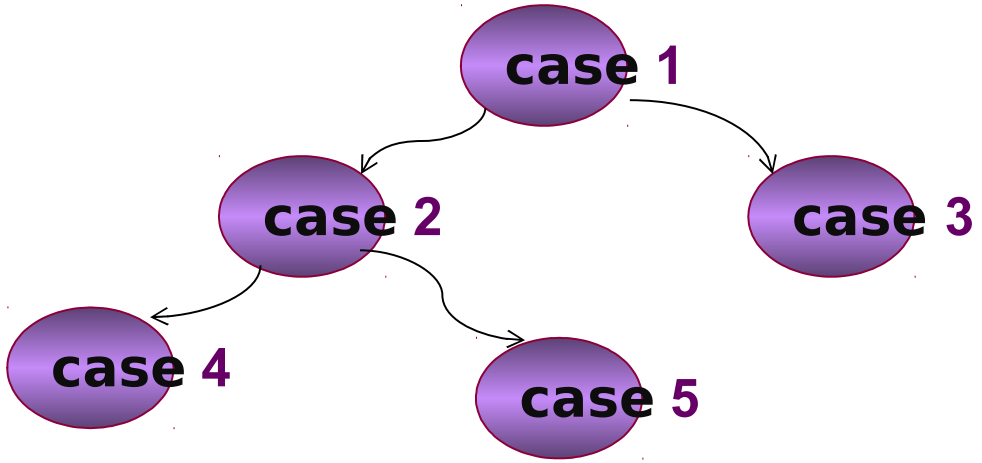
- The graphs help represent the distribution of cases based on different criteria, such as sex, age, occupations, etc.





Collective epidemiological investigation of the outbreak

- **Drawing up the case filiation scheme**– to establish links between diseases within the maximum incubation period of the disease.
- The transmission of the disease from a primary case to two or more secondary cases is observed
- The moment the secondary case infests another, it becomes a primary one for the infected one.



Collective epidemiological investigation of the outbreak

3. applying disease control measures :

- It is based on an epidemiological diagnosis that should include:
  - the pathogen agent
  - infection source, transmission means, clinical state of the population
  - secondary favouring factors
  - Prognosis elements
- The prevention plan includes:
  - Neutralizing the infection sources
  - Limiting the expansion of the outbreak
  - Minimizing the receptivity of the population
  - Eradicating negative influences from the secondary favouring factors

FIŞĂ UNICĂ DE RAPORTARE CAZ DE BOALĂ TRANSMISIBILĂ

Pentru bolile marcate cu (T) se anunţă telefonic imediat

Toate fişele se trimit în termen de 5 zile prin: curier, poştă, fax

Date despre pacient:

Numele şi prenumele: .....

Adresa: .....

.....

(acoperă pentru duplicat I)

Localitate de domiciliu: .....

Localitate/ţară de incubaţie: .....

Data naşterii (sau vârsta dacă nu se cunoaşte D.N.): ...../...../.....

Sex: ..... Ocupaţia: .....

Locul de muncă/Colectivitatea: .....

Date despre boală:

Data debutului bolii: ..../..../......

Data depistării: ..../..../......

Internat: DA ..... NU .....

Deces: DA ..... NU ..... Data decesului: ..../..../.....

Cum a fost depistat: consult clinic ..... contact .....

screening ..... alte .....

Datele privind modalitatea confirmării cazului:

Conform definiţiei clinice de caz: DA ..... NU .....

Conform diagnosticului etiologic: DA ..... NU .....

Data recoltării probei: ..../..../......

Rezultatul diagnosticului etiologic: .....

.....

Metoda de laborator: .....

Bifaţi

[ ] (T) Poliomielită cu virus sălbatic

[ ] Paralizie acută flască (PAF)

[ ] (T) Tetanos

[ ] (T) Tetanos neonatal

[ ] (T) Difterie

[ ] (T) Rujeolă

[ ] Rubeolă

[ ] (T) Infecţie rubeolică congenitală NN

[ ] (T) Gripă umană cauzată de un nou subtip

[ ] Infecţie cu Haemophylus tnft. b.

[ ] Sifilis recent şi congenital

[ ] Infecţii gonococice

[ ] Infecţie HIV

[ ] Infecţie cu Chlamydia spp.

[ ] Infecţie genitală cu Herpes simplex

[ ] Limfogranulomatoza venerianã

[ ] Hepatita virală acută A

[ ] Hepatita virală acută B

[ ] Hepatita virală acută C

[ ] Alte hepatite virale acute

[ ] (T) Infecţie cu E. coli Enterohemoragic (EHEC)

[ ] Campylobacterioze

[ ] Yersinioze

[ ] Cryptosporidiaza

[ ] Salmoneloze

[ ] TIA (alte etiologii)

[ ] (T) Botulism

[ ] Shigeloză (dizenterie bact.)

[ ] Dizenterie amoebiană

Conform criteriilor epidemiologice: DA ..... NU .....

Observaţii privind cazul: (date clinice, paraclinice sau epidemiologice) .....

.....

Date privind sursa de infecţie şi calea de transmitere a infecţiei:

Depistată: [DA _____] [NU _____]

Contact cu caz similar/confirmat: [DA _____] [NU _____]

Transmitere aerogenă [DA _____] [NU _____]

Transmitere prin alimente [DA _____] [NU _____]

Transmitere hidrică [DA _____] [NU _____]

Transmitere prin elemente de mediu [DA _____] [NU _____]

Transmitere parenterală [DA _____] [NU _____]

Transmitere prin vectori [DA _____] [NU _____]

Transmitere iatrogenă [DA _____] [NU _____]

Transmitere sexuală [DA _____] [NU _____]

Datele sunt furnizate şi completate de:

Numele şi prenumele medicului: Semnătura şi parafa:

Locul de muncă al medicului:

Bifaţi în cazul în care mai doriţi fişe: .....

Nr. ASP ...../..... (cod auto + nr. din registru)

Data primirii fişei: ...../...../.....

[ ] (T) Febră tifoidă şi paratifoidă
[ ] (T) Listerioză
[ ] Trichinoză
[ ] (T) Leptospiroză
[ ] Toxoplasmoză
[ ] Varianta transmisibilă CJ
[ ] Citomegalia acută
[ ] Infecţii pneumococice
[ ] (T) Boala meningococică (MCSE)
[ ] Meningite bacteriene
[ ] (T) Meningite virale
[ ] (T) Meningită bacilară TBC
[ ] Tuberculoză
[ ] (T) Legioneloze
[ ] (T) Psitacoză/Ornitoză
[ ] Scarlatină
[ ] Infecţie urliană (parotidită epidemică)
[ ] (T) Antrax
[ ] (T) Bruceloză acută
[ ] Echinococoză
[ ] Ankilostomiază
[ ] (T) Tularemie
[ ] Morvă/Melioidoză
[ ] Leishmanioză
[ ] Filariaze/dracunculoză
[ ] Rabie
[ ] Boala Lyme
[ ] (T) Encefalite inf. primare
[ ] (T) Encefalite trsm. prin vectori/West Nile
[ ] Febra Q/butonoasă/rickettsioze
[ ] (T) Holeră
[ ] (T) Malarie
[ ] (T) Pestă
[ ] (T) Lepră
[ ] (T) Tifos exantematic/Brill
[ ] (T) Febrele virale hemoragice
[ ] (T) Febră galbenă
[ ] (T) Dengă
[ ] (T) Variolă/varioloidul
[ ] (T) etiologie necunoscută
[ ] (T) eveniment neobişnuit/neaşteptat
[ ] (T) Reacţii adverse postvaccinale indezirabile
[ ] Pertussis
[ ] (T) Sindrom acut respirator sever (SARS)

Collective epidemiological investigation of the outbreak

- **Measures regarding the suspects:**
  - Similar to the ill ones, with separate isolation until the confirmation or denial of the case.
- **Measures regarding the contacts:**
  - Home confinement
  - Temporary suspension from the workplace
  - Active medical supervision, lab tests
  - Specific prophylaxis
  - Sanitary-means education
- **Measures regarding the bearers:**
  - Detection, constant medical supervision, lab tests
  - Sterlization, exclusion from potential infectious sites

Collective epidemiological investigation of the outbreak

- **Measures regarding the transmission methods:**
  - Current and final disinfection - eradicating the germs from the ill patient's secretions but also from the environment - water, air, food, objects
  - Current and final extermination - eradicating insect vectors, such as flies, fleas, lice, bugs, etc.
  - Pest control

Collective epidemiological investigation of the outbreak

- Measures regarding the population implied by the outbreak
  - Specific – active and passive immunity prophylaxis
    - chemical prophylaxis
  - Non-specific
    - improvement the general resistance by certain appropiate dieting, rich in nutrients
    - avoiding the infected contacts
    - avoiding physical, mental stress.
    - following a resting and sleeping schedule
    - sanitary and epidemic education

Collective epidemiological investigation of the outbreak

4. **Practicing the final combative methods and observing their evolution:**

   - After determining the plan, the correct application and effectiveness of the measures will be monitored

   - It is established an outbreak surveillance scheme, the date and person declaring the end of the process.

   - **A correct epidemiological investigation leads to eradicating it!**

The art of epidemiological thinking is to have conclusions based on incomplete data!

George W. Comstock