

Investigation of an Epidemic



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Epidemic

The unusual occurrence in a community or region of disease, specific health related behaviour (eg. Smoking) or other health related events (eg. Traffic accidents) clearly in excess of “expected occurrence.

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Objectives :

1. To define the magnitude of the epidemic outbreak or involvement in terms of time, place & person.
2. To determine the particular condition and factors responsible for occurrence of the epidemic.
3. To identify the cause, source(s) of infection and mode of transmission.
4. To implement immediate control measure.
5. To make recommendation to prevent recurrence.

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Steps for Epidemic investigation

1. Verification of diagnosis.
2. Confirmation of the existence of an epidemic.
3. Defining the population at risk.
4. Rapid search for all cases and their characteristics.
5. Data analysis.
6. Formulation of hypothesis.
7. Testing of hypothesis.
8. Evaluation of ecological factor.
9. Further investigation of population at risk.
10. Writing a report.

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Verification of diagnosis

- } First step in an epidemic investigation.
- } A clinical exam. of a sample of cases.
- } Lab. Investigations done if necessary.

Confirmation of the existence of an epidemic.

- } Comparing the disease frequencies during the same period of previous years.
- } Some common source epidemics of cholera, food poisoning, hepatitis etc., no comparison is required.

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Defining the population at risk

- } Obtaining a map of the area – Map is prepared, if not available. It should contain information of natural landmarks, roads and location of all dwelling units along each road or in isolated areas.
- } Counting the population – population is counted by house to house visit. The population census may help.

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1. Rapid search for all cases and their characteristics.

- } **Medical survey** – Screening of each member of the population for the presence of disease in question.
- } **Epidemiological case sheet** – should be carefully designed to collect relevant information. This includes name, age, sex, occupation, social class, travel, h/o previous exposure, time of onset of disease, signs and symp.s of illness, personal contacts at home, work, school and other places, exposure to common vehicles such as water, food and milk etc.
- } **Searching for more cases** – The pt. may be asked if he new other cases in the home, family, neighbourhood, school, work place etc. The search is carried out till the area is declared free of epidemic.

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Data analysis

- } Data should be analyzed on ongoing basis, using time, place and person.
- } **Time** – Time and dates of onset and epidemiological curve should be prepared. It may suggest 1. a time relationship with exposure to a suspected source
2. whether it is a common source or propagated epidemic. 3. whether it is a seasonal or cyclic pattern.
- } **Place** – Spot map should be prepared. Clustering of cases may indicate a common source of infection.
- } **Person** – Analyze the data by age, sex, occupation and other possible risk factors. Attack rates/ case fatality rates determined.

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Formulation of hypothesis

} Hypothesis is formulated on the basis of time, place and person or the Agent – Host – Environment.

Testing of hypothesis –

- } All reasonable hypotheses need to be considered and weighed by comparing the attack rates in various groups for those exposed and those not exposed to each suspected factor.
- **Evaluation of ecological factor –**
- } The disease should be related to environmental factors to know the source of infection, reservoirs and modes of transmission.

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Further investigation of population at risk

- } The study population at risk or a sample of it may be needed to obtain additional information.
- } This may involve medical exam., screening tests, exam. of suspected food, faeces or blood sample, biochemical studies, assessment of immunity status etc. The approach may be retrospective or prospective.

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Writing a report

The report should be complete and convincing. Information to be included in the report consists of the following.

- 1. Background information :**
Geographical location Climatic condition Demographic status Socio & economic situation Organisation of health services Surveillance & early warning system Normal disease prevalence
- 2. Historical data :** Previous occurrence of epidemic of same disease locally or elsewhere.

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3. Methodology of investigation

Case definition, Questionnaire used in the epidemiological investigation.

Survey – Household survey, Retrospective survey, & Prospective surveillance.

collection of laboratory specimen, Laboratory techniques.

4. **Analysis of data** : Clinical data i.e. frequency of signs & symptoms.

Course of disease. differential diagnosis. death or sequele

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Epidemiological data : Mode of occurrence in time, place, person.

Modes of transmission : Source of infection, mode of transmission, routes of excretion & portal of entry and factors influencing transmission.

Laboratory data : Isolation, Serological confirmation, significance of results.

Interpretation of data : Comprehensive picture of the outbreak
Hypothesis by statistical analysis.

4. **Control measure** :

Definition of strategies & methodology of implementation.

- constraints
- results

Evaluation – Significance of result, Cost effectiveness Preventive measures

References

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