

Health Interventions Impact Assessment

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- To assess the impact of one or more health interventions we need to measure:
- Incidence of a disease or/and
- Prevalence of a disease and/or
- Severity of the cases

- We can also measure intermediate variables (those that are not the endpoints in the causal pathway but are considered closely related with the disease)
- The measures chosen to assess the impact of the intervention are called outcome measures or endpoints

Characteristics of the outcome measures

The outcome measures need to be:

- Clearly defined
- Replicable

How to choose the outcome measures

- Which is of most interest
- Study size and duration
- If our aim is to prevent disease, the outcome measure should be incidence

Factors influencing the choice of outcome measures

- Economic
- Logistic
- Ethical

E.g.:

- vector control --→ climate change
- HIV education--→ behavioral changes

Intermediate outcome measures

Because of time and resource restrictions, some studies requires the short-term or intermediate measures e.g.:

- Access to water and sanitation
- Vector biting density
- Infectivity of vectors
- Knowledge, attitudes and practices
- Economic productivity
- Diet

Selection of outcome measures

- Intermediate outcome measures should be correlated with disease outcome
- In behavioral changes subjects may not be responding truthfully
- A behavioral change may not have any impact on the transmission of the disease
- Final outcome measures may require an increase in the size of the study

Diseases diagnosis in field assessments

- Clinical criteria is the basis to define disease in many intervention trials

A clinical diagnosis is usually based on:

- Medical history
- Physical examination
- Laboratory results
- X-ray or similar images

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- In clinical and field trials, specific questions concerning previous illness, present symptoms, specific kinds of physical examination
- Any physical examination will depend on the disease in question and the objectives of the assessment

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- Physical examinations are virtually always highly personal and requires privacy and respect for individual dignity
- When privacy is required, a third person in the examination room is often important. In case of children mother or legal guardian should be present
- Women prefer to be examined by another woman

Examples of physical signs that can be taken in the field by paramedical staff

- Dermatological lesions
- Body temperature
- Height
- Weight
- Blood pressure
- Pictures are helpful in dermatological lesions
- A second clinical criteria may be required

Standardization of outcome measures

- Definition of a case
- E.g. AIDS, Acute Respiratory Infection, Diarrheal Disease
- A laboratory result may define a case
- Usually it is required to combine the clinical history with laboratory tests
- E.g. malaria clinical and laboratory diagnosis

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- It may also require to define severity of the disease, e.g. dengue
- In some cases algorithms are required to define a case, e.g. leprosy

Mortality Reports

- Sometimes, cases need to be defined after death
- In developing countries, the reliability of the cause of death is doubtful if it occurred out of the hospital
- In these cases a “verbal post-mortem” interview will be required
 - Questions related with signs, symptoms and circumstances are registered based on the information provided by relatives.

Death and verbal post-mortems

- Information is based on the understanding of the reporter and so not always specific or accurate
 - E.g., in rural areas cause of death is not always determined by a physician or health professional
- Death measurement may require a continuous survey instead of a passive vital statistics register
 - *Passive surveillance* relies on reports from the health care system
 - *Active surveillance* relies on field research studies

Behavioral change assessment

- Interview methods can be used but observational studies may be required to determine behavioral changes
- For example in sanitation programs, it is usually required observational studies and measurement of the impacts on gastrointestinal diseases

Assessment of transmission reduction

In a vector control intervention:

- Intermediate outcome measure:
 - impact on vector population
 - Change in the intensity of the infective agent in the vector
- Ultimate outcome measure:
 - Change in the incidence
 - Change in the disease severity
 - Change in the prevalence

Assessment of adverse impacts in human health

- The assessment of adverse effects can be active or passive
- It is important to compare rates of adverse effects among populations with or without an intervention.
- We can also compare the rates of adverse effects between populations exposed and unexposed to an environmental phenomenon, e.g. climate change, natural disasters, water contamination, etc.

Key factors in the assessment of a health intervention program

- Feasibility
- Acceptability
- Reproducibility
- Sensitivity and specificity
- Bias
- Quality control

Comparing health assessment information

- Social: Higher incidence of under-nutrition in low socio-economic strata vs. high socio-economic strata
- Environmental: Higher incidence of Acute Respiratory Infections (ARI) in polluted cities vs. rural areas
- Provision of health services: Better provision and access to health services in areas vs. underserved areas

Case example of comparison with the same population

Background

- In 1991 four coastal towns of Peru reported the presence of cases of severe diarrhea with some fatal cases and with overcrowding of the clinics and hospitals
- Objectives of the health assessment
 - Describe the changes in the incidence of diarrheal diseases
 - Identify risk factors associated with the cases
 - Identify the age group with the highest attack rate
 - Identify access to health services.

Methods

- Epidemiological data to describe changes in the incidence of diarrheal diseases and mortality from diarrheal diseases.
- Interview with health professionals, patients and relatives of fatal cases.
- Review of incidence of diarrheal diseases in neighbor countries .

Results-human health

- Substantial increase in the incidence of diarrheal diseases among adult male population in the last seven days.
- Overcrowding of hospitals and clinics with patients with severe diarrhea and dehydration.
- Poor knowledge about the management of dehydration.
- Deaths could have been prevented with adequate rehydration.
- Association of disease cases with the consumption of “ceviche” (marinated uncooked seafood)

Results-Environmental impact

- Population of pathogenic *Vibrio cholera* increases with algae blooms

Outcomes

- Strengthening of the surveillance system by establishing surveillance sentinel centers in emergency rooms
- Train health professionals and health promoters in the management of severe diarrheal cases and administration of rehydration.

- Establishment of Community Oral Rehydration Units
- National distribution of Oral Rehydration Salts

Community Appraisals

- Can provide accurate and timely information about public health programs
- Practical tool that requires few resources
- Can provide information on health status, knowledge, attitudes and behaviors
- Can give opportunity to participate in health planning and monitoring
- Can give an opportunity for team building

- Give foundations for qualitative assessments like surveys

Steps in Community appraisal

- Define aims
- Identify community for assessment
- Identify team and train in quantitative techniques
- Examine available information
- Design a survey form

Steps in community assessment

- Pilot questionnaires and interviews
- Identify key informants
- Choose methods
- Analyze information
- Write a report and develop an action plan

- In primary prevention our goal is to avoid disease
- In secondary prevention our goal is to make an early diagnosis and treatment in order to reduce severity and prevalence
- In tertiary prevention our goal is to reduce disability and death
- Therefore, most outcome measures need to be based on clinical criteria