Community 432 Medicine

7 General Principles of Prevention and control of communicable diseases

Objectives

1. Identify measures for prevention and control of communicable diseases
    a. Measures towards reservoir
    b. Measures towards the MOT /environment
    c. Measures to contacts and susceptible host
2. Identify the levels of prevention of diseases.

Done By:
Manar Aleid

Reviewed By:
Rozan Murshid
Latifah Al-Fahad

جامعة الملك سعود
King Saud University

NEW Terminologies:

1-Prevention: =Limitation

Actions aimed at eradicating, eliminating, or minimizing the impact of disease and disability, or if none of these is feasible, retarding the progress of disease and disability.

-The concept of prevention is best defined in the context of levels of prevention; primary, secondary, and tertiary prevention.

2-Control:

Disease incidence is reduced to a minimal level, acceptable at the level of country/region, at which the disease is no longer considered as a public health problem, while infection may still occur.

3-Eliamination:

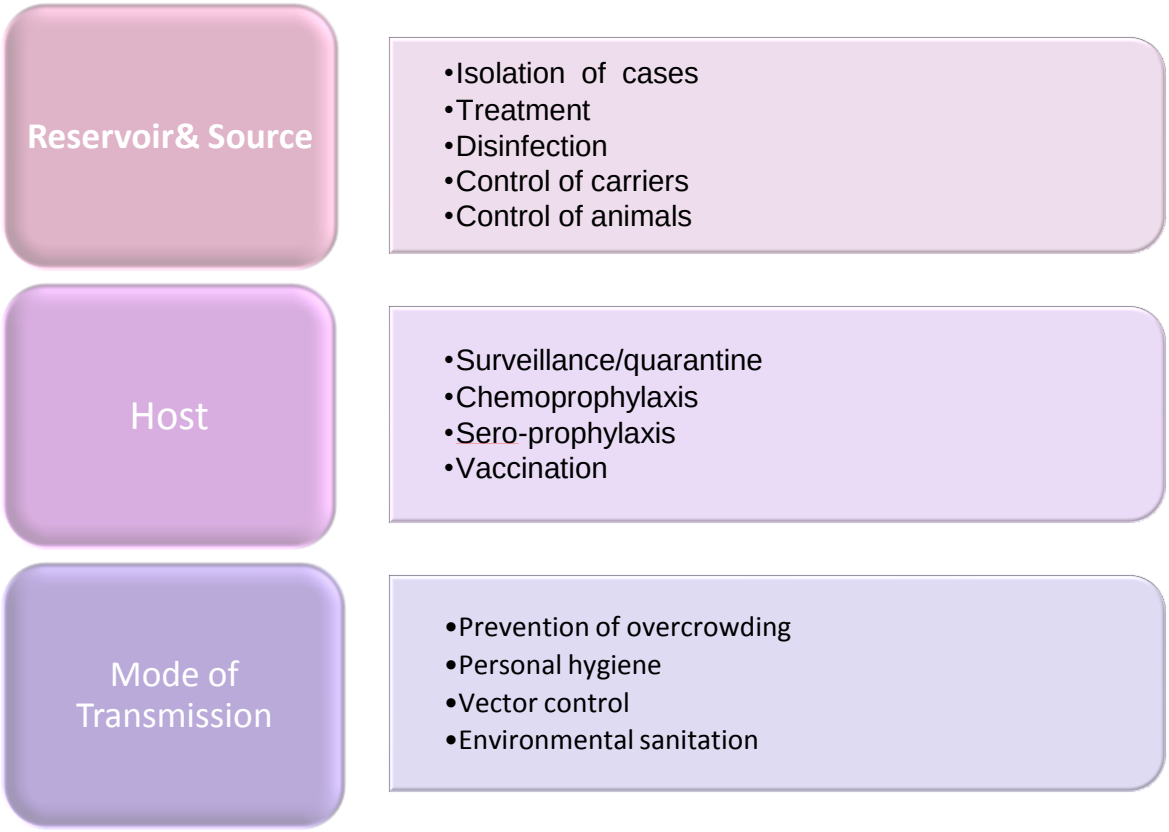
Reduction to zero of the incidence of a specified disease in a defined community or country or region as a result public health actions. Like polio infection.

4-Eradication

It means worldwide disappearance of a disease i.e. (permanent reduction to zero level): The organism may be present only in laboratories, but there is no need for public health actions. e.g. smallpox since 1979.

Cycle of infection

and interventions applied at each link



In general, control measures should be directed towards the link in the infection chain is most susceptible to interference.

Then, Let's talk about each one in details

First: Reservoir and Source

-Measures towards Reservoir:

Objective of control measures towards reservoir

- ✳ Reduce quantity of agent (complete or partial reduction).
- ✳ Reduce communicability.

-Measures towards cases:

1. Case finding (early detection/screening)

2. Reporting "will discuses it later on"

3. Segregation /isolation of cases:

   ✳ This means that the patient is isolated from the community in a fashion that prevents direct or indirect spread of infectious agents.
   ✳ Isolation is usually done for a period, which equals the "period of communicability*" at a hospital (fever hospital) or at home. Ideally repeated negative sample are needed before his release.

period of communicability*: it is variable , depends on the type of infection.

1. Treatment of cases:

Early diagnosis and prompt treatment of infections with appropriate regimens (e.g. antibiotics, antiviral or other chemotherapeutic agents) helps reducing communicability.

2. Disinfection:

-Concurrent

-Terminal

Disinfection of the soiled articles by the patient discharges or excreta concurrently (during his presence as source of infection) and/or terminally (after his discharge from the hospital or death) helps in reduction of communicability.

Disinfection of contaminated objects with appropriate "enteric precautions," "respiratory precautions," "universal precautions*".

universal precautions*: in blood borne diseases like HBV.

-Measures applied to carriers:

1. Detection of carriers:

If they represent important reservoir of infection.

If they were suspected in a closed community, such as boarding schools, army barracks, food handling places,…..

2. Exclusion from work: in certain occupations for example;

-food handler (e.g. Typhoid carrier) or a

-teacher (e.g. Diphtheria carrier).

3. Treatment for the carrier state (when applicable).

-Measures applied to animal reservoir: (zoonotic diseases)

1-Inspection and slaughtering of infected animals (in bovine tuberculosis)

2-Testing and immunization of uninfected sheep, cattle (in brucellosis)

3-Careful husbandry and sterilization of animal products (in anthrax).

4-Extinction/Destruction of animal reservoir has been successful with diseases as rabies and bovine TB in several countries. Such procedure is only possible for domestic animals while it is difficult or almost impossible for wild animals (e.g. in jungle yellow fever,.) yellow fever reservoir is monkey.

Second: Contacts/ susceptible Host

- Surveillance/observation=observation
  - ✳ It means close medical supervision of the contacts, without restricting their movement, for the purpose of early detection of the disease in question.
  - ✳ Surveillance should be done for duration of the longest "incubation period" of the disease counted from date of last exposure.

    Early detection=good management

- Quarantine:
  - ✳ Quarantine means separation (with restriction of the movement) in a specific place (quarantine) of apparently well persons(not diseased) or animals who have been exposed (contact) to a case of infectious disease.(or 4 a person comes from an endemic area)

- ✳ Quarantine is done for the duration of the longest "incubation period" of the disease counted from date of last exposure. It allows early detection of the disease among these individuals.
- ✳ This measure is applied for contacts of pneumonic plague and pneumonic anthrax. "it is not applied for any infection, only for specific cases"

- **Increasing resistance of susceptibles:** by

1-Chemoprophylaxis:

- ✖ The administration of a chemical, including antimicrobials, to prevent the development of an infection (if given before exposure).
- ✖ Or to slow progression of the disease to active clinically manifest disease (if given after exposure).
- ✖ is used for travelers to endemic areas, occupationally exposed persons (e.g. Health Care Workers) and for contacts in closed communities as in camps, schools and institutions.

  Examples:

1-Isoniazid (INH) for contacts of tuberculosis cases.

2-Rifampicin for contacts of meningococcal meningitis.

3-Chloroquine for travelers to malaria areas.

2-Sero-prophylaxis (passive immunization)

- ✖ prophylaxis using ready-made antibodies also known as passive immunization
- ✖ (e.g. measles immunoglobulin and tetanus anti tetanic serum (ATS)
- ✖ In case of measles, if it is given within the first three days of the incubation period, it prevents the attack and gives immunity for 4-5 weeks.
- ✖ If administered from the 4th to the 10th day of IP, the subject gets a modified attack (give a mild form of the disease) and permanent immunity.

3-Immunization (next lecture) (Vaccination=Active immunization)

Protection of susceptible host from communicable diseases by the administration of a modified living infectious agent, killed organism, or inactive agent or part of the agent.

Third: Mode of Transmission

Measures towards the environment

1-Reduction of overcrowding (better housing conditions, proper ventilation).

2-Personal hygiene (cleanliness, hand washing, regular bathing).

3-Environmental sanitation: (e.g. sanitary sewage disposal, sanitary refuse disposal, safe water supply,…)

4-Vector control (insecticides, indoor or aerial spraying, mosquito-nets,…..

5-National and international measures: which include different public health measures undertaken within and between countries in order to protect the individuals and communities from communicable diseases.

Choice of appropriate prevention & control measures?

The choice of the control measure is disease dependent. It depends upon the knowledge of:

*Natural history, causation and dynamics of disease(cycle of infection) transmission.

*identification of risk factors and high-risk groups.

*Availability of tools of intervention (vaccine, chemoprophylaxis or treatment,..)

Levels of Prevention

Primary (event pre)	Secondary (event)	Tertiary (event Post)
Health Promotion	Early detection & care	Rehabilitation
-Actions taken prior to the onset of the disease which aim to remove the possibility that a disease will ever occur" -It limits the incidence of diseases by preventing healthy people from developing disease. -Primary Prevention activities can be directed at individuals or at the environment.	-It is the early detection and prompt treatment of a disease, thus hinder the progress of a disease and prevent complications. i.e. intervention in early pathogenesis phase. Measures of secondary prevention include: 1. Screening programs are used to detect diseases at early preclinical stages, when effective therapy may either cure the disease or limit its progression 2. Primary medical care: through early case finding at PHCC. It is the predominant form of secondary prevention.	-Actions taken when the disease process has advanced beyond its early stages i.e. intervention in late pathogenesis phase. -The aim of tertiary prevention is limitation of disability and rehabilitation from disease. -Tools for tertiary prevention include rehabilitation*

More about: Primary Prevention

Measures to improve the general health of the **individuals:**

1-Health education efforts are directed at encouraging people to develop good health habits (Adequate nutrition, exercise) and to adopt hygienic practices (hand washing,….

So, it decreases the incidence at individual level

2-Specific protective measures such as, chemoprophylaxis, sero-prophylaxis, vaccination.

Environmental sanitation is used to provide an adequate sewage system, safe drinking water, clean air and proper ventilation.

More about: Rehabilitation

It is a measure to train disable individuals to reach the highest level of functional ability by using combined coordinated medical, social, vocational (occupational), psychological and educational measures.

It includes

1-Medical rehabilitation – restoration of function or physical loss.

2-Educational rehabilitation change of educational methods.

3-Vocational (occupational) rehabilitation – restoration of the capacity to earn a livelihood.

4-Social rehabilitation: restoration of family and social relationships.

5-Psychological rehabilitation: restoration of personal confidence

Examples of uses of levels of prevention:-

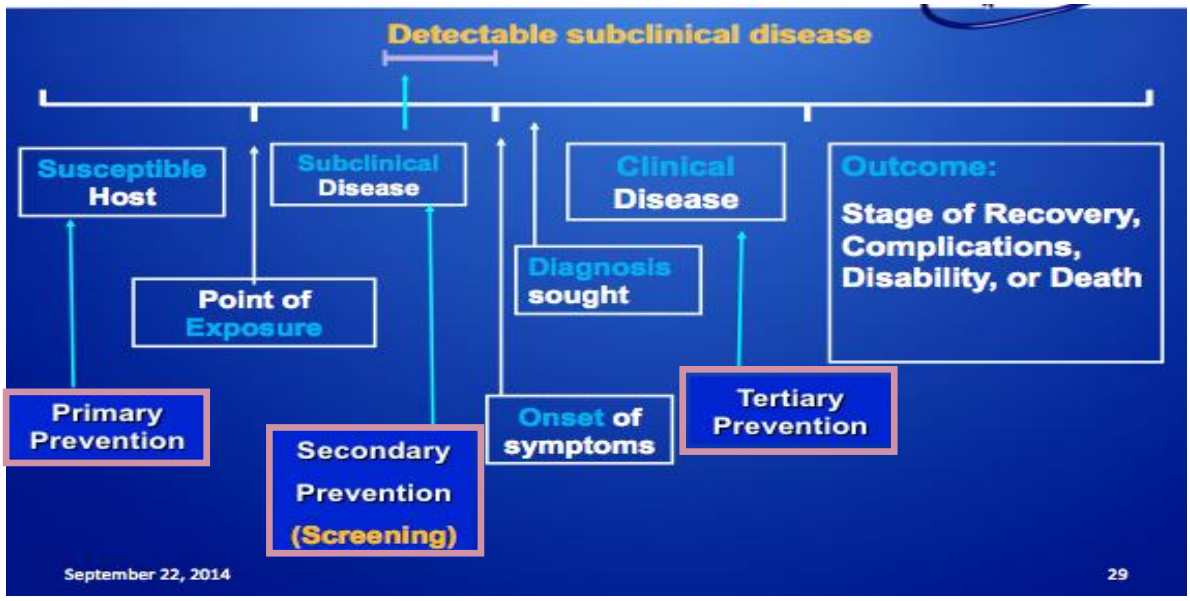
All three levels of prevention can be used to control a single disease process.

1-BCG Vaccination of newborns (primary prevention).

2-Screening and early treating a person with active tuberculosis (secondary prevention) may prevent transmission to another person (primary prevention).(so it will be a 1st prevention for the other person)

3-In advanced cases of tuberculosis, occupational and social rehabilitation (tertiary prevention) by modification of working conditions may help to regain the capacity to earn his livelihood.

Natural History of Disease



MCQs

Q1: What is the appropriate measure towards carriers of communicable disease ?
A. Surveillance
B. Vaccination
C. Exclusion from certain jobs
D. Isolation away from the community

Answer: C

Q2: Which of the following public health actions targets the mode of transmission?
A. Vaccination
B. Vector control
C. Sero-prophylaxis
D. Chemoprophylaxis

Answer: B

Community medicine team leader :

Rozan Murshid

If you find any Mistakes please contact me:

Roza1066@gmail.com