Principles of Communicable Diseases Epidemiology L-4

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Objectives

- Designate the principles of passive immunity
-Recognize the principles of prevention of infectious diseases.
-Describe the key elements for control of infectious diseases(cases, contact, reservoir, and community)

PASSIVE IMMUNIZATION

(SEROPROPHYLAXIS)

Passive immunization needed for rapid, but temporary protection of susceptible, either after exposure to infection or before expected exposure (occasionally).

The duration of immunity induced is short and variable (1-6 weeks).

Passive immunization has a limited value in the mass control of disease, it is recommended for non-immune persons under special circumstances.

Three types of preparations are available for passive immunity

A. normal human immunoglobulin

B. specific [hyper immune] human immunoglobulin

C. antisera or antitoxins

APPLICATION OF IMMUNOGLOBULIN:

1-After exposure ; associated with either

* **Sero prevention ; when given early in incubation period**

* **Sero attenuation ; when given later in incubation period.**

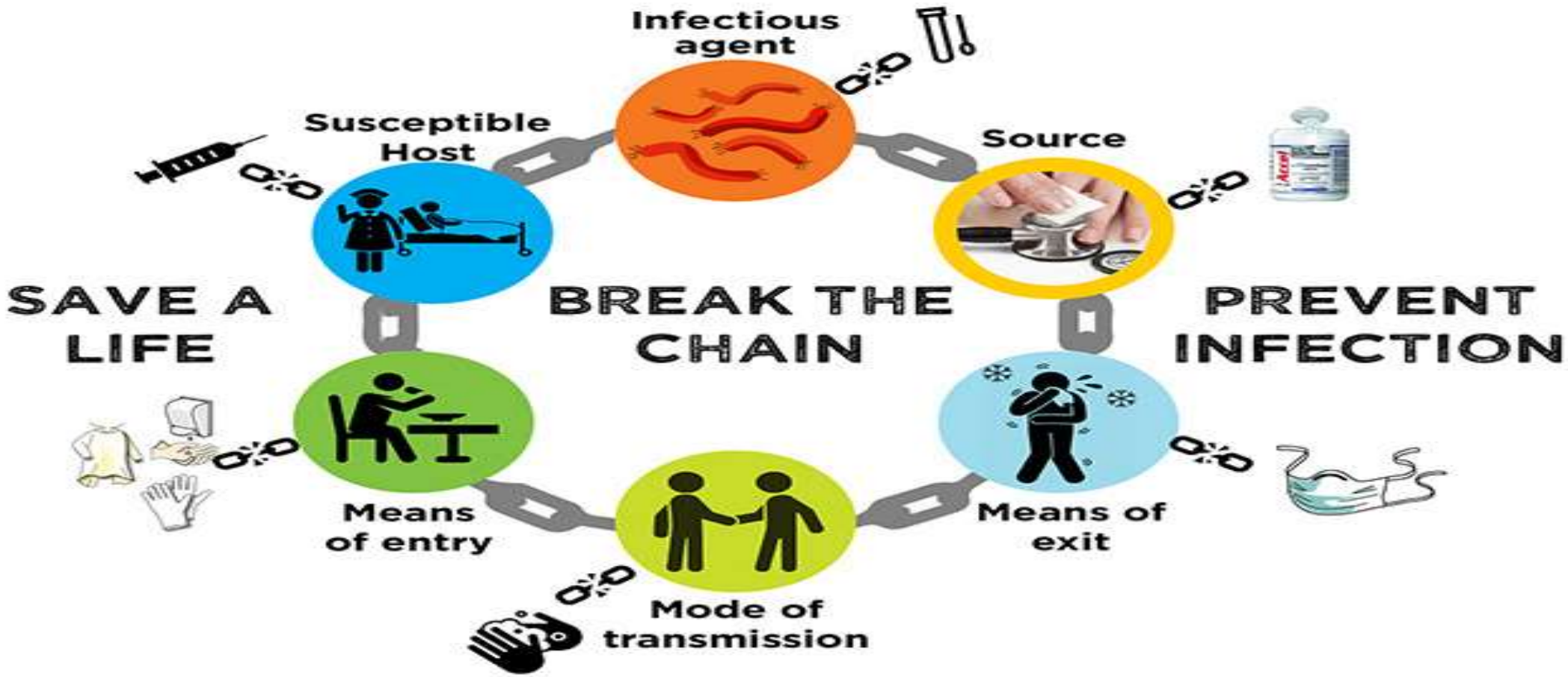
* **Not effective; if given late in incubation.**

2-Before expected exposure; travelers from free to endemic areas can be given seroprophylaxis for expected infection; hepatitis A.

➨ **Specific immunoglobulin's are available for Sero-prophylaxis; antiviral (mumps, hepatitis A,B, measles, rubella, rabies. antitoxic (diphtheria & tetanus), and antipertussis (for exposed susceptible infants).**

- **Serotherapy: tetanus ,diphtheria and rabies have specific antitoxin immunoglobulin that can be used for both prophylaxis & therapy in bigger doses. But there is no antiviral Serotherapy.**

prevention & control of infectious diseases



CONCEPTS OF PREVENTION

The goals of medicine are to promote health, to preserve health, to restore health when it is impaired, and to minimize suffering and distress.

These goals are embodied in the word prevention

PREVENTION of INFECTIOUS DISEASES

Primary prevention means preventing the occurrence of infectious diseases, and so having no cases.

Primary prevention can be achieved by general & specific measures.

1-General preventive measures:

a- Sanitation of the environment: clean, pollution free.
b- Clean, proper behavior and habits of the public through health education.
c- Health promotion of the public, with adequate nutrition, to raise the general body resistance.

2- Specific preventative:

a-Immunization; active & seroprophylaxis

b- Chemoprophylaxis.

Control of Infectious Diseases

The term disease control describes ongoing operations aimed at Reducing:

- **The incidence of disease**
- **The duration of disease and as a result the risk of transmission**
- **The effects of infection, including both the physical and psychosocial complications**
- **The financial burden to the community.**

Control means the measures to be taken for existing infectious diseases, with following objectives:

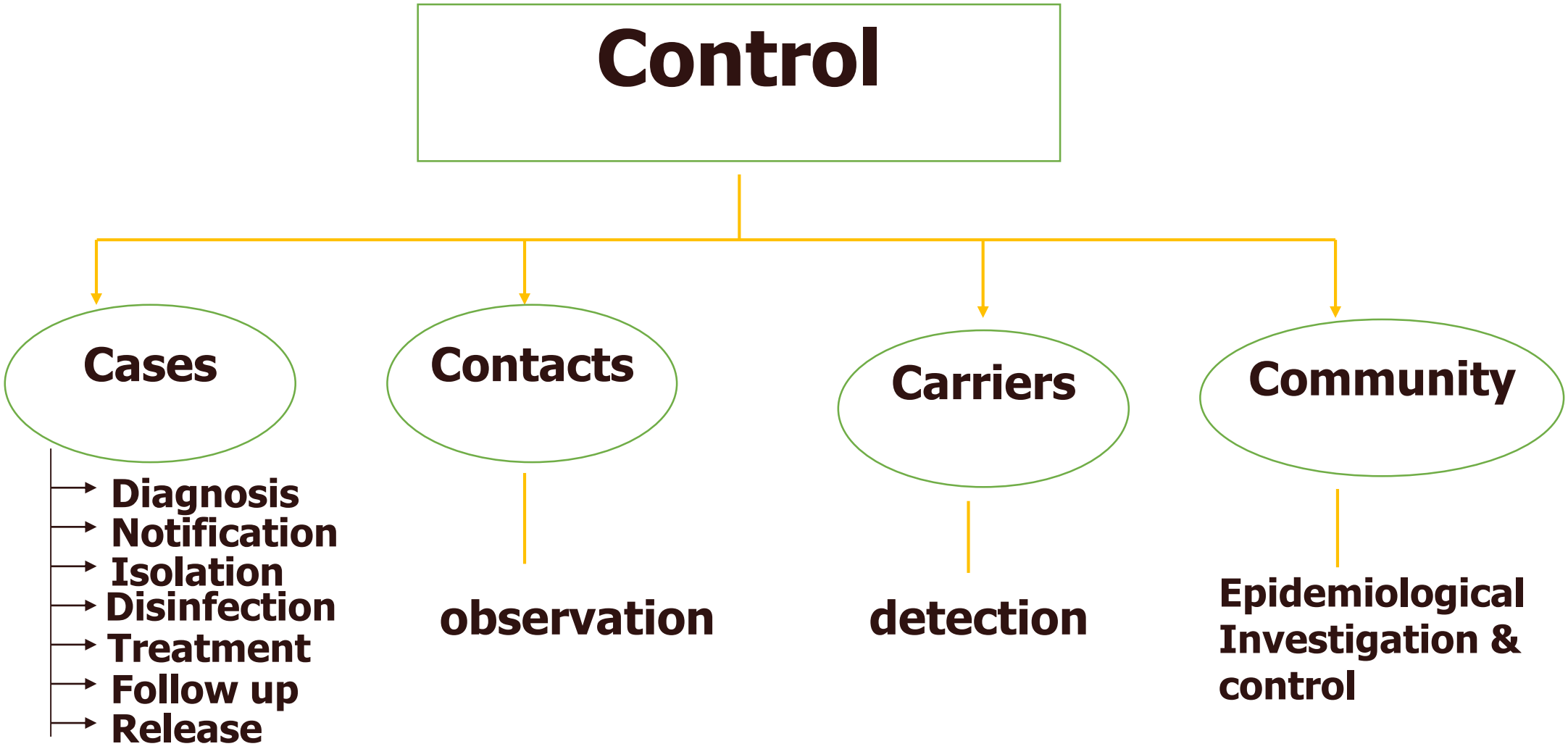
1-Case finding [detect cases]

2-Management of cases, and protecting them against hazards and sequelae of disease.

3-Protecting susceptible contacts and other groups who may be exposed to infection

4-Preventing or minimizing spread of disease in the involved community

Control of infectious diseases (the 4 "C"s)



1- Control of cases

a- Case – finding clinical diagnosis, and laboratory confirmation if necessary.

b- Notification: cases, of definite or suspected diagnosis, must be notified to the local health authority . This will depend on nature of disease.

Value of notification:

- To take prevention & control measures for the cases, and contacts and the community if necessary.
- To help tracing source and channels of infection, in outbreak or epidemic.
- To collect significant statistical data.

C-Isolation

isolation is the act of separating a sick individual with a contagious disease from healthy individuals without that contagious disease in order to protect the general public from exposure of a contagious disease.

Isolation is defined as "separation" , for the period of communicability of infected persons or animals from others in such places under such conditions , as to prevent or limit the direct or indirect transmission of the infectious agent from those infected to those who are susceptible ,or who may spread the agent to others".

Isolation of patients is indicated for infectious disease having the following epidemiological features:

1-High morbidity and mortality
2-High infectivity
3-No significant extra human reservoir
4-Infectious cases easily recognizable
5-Chronic carriers are not a significant part of the reservoir.

The infectious case must be isolated, either at home or hospital or special places, according to the nature of disease& home condition, period of isolation varies according to nature of disease.

It is usually for the period of communicability .

Value of Isolation

- To stop activity and movement of the case in the community, thus prevent spread of infection.

- To protect the case against the risk of secondary infection, when exposed to contacts & visitors.

Categories of isolation:

- There are seven isolation categories (Strict Isolation, Respiratory Isolation, Protective Isolation, Enteric Precautions, Wound and Skin Precautions, Discharge Precautions, and Blood Precautions)

d-Disinfection: is the process of destroying pathogenic organisms outside the body, by direct exposure to chemical or physical agents.

Types of disinfection are :

1- Prophylactic
2-Concurrent
3-Terminal

Prophylactic Disinfection

As preventive measure to prevent the onset of disease such as chlorination of water, scrubbing and washing hands of health care providers, sterilization of instruments before using for surgery.

Concurrent disinfection: is carried out during the course of disease for:

- Excreta and discharge, any object or material used in nursing, soiled articles & fomites.

Terminal disinfection: disinfection for the last time, after transferring the case to hospital, or cure or death.

e-Treatment:

- **Specific therapy for bacterial disease, chemotherapy& antitoxins.**
- **Nursing and proper feeding**
- **Symptomatic treatment**
- **Prevention & control of sequelae and complications [2nd bacterial infection, dehydration…]**

f-Release:

The case can leave isolation, and return to school or work if:

- **Clinical recovery { becoming clinically free}**
- **Satisfactory general condition**
- **Becoming bacteriologically free, in diseases having convalescent carriers**

2-Control of Contacts

A contact is the person who has been in association with the case at any time during the i.p and until discovered and isolated.

❑ **Forms of Contacts: house holds including family contacts; work, school.**

•The local health center is responsible for control of contacts of notified cases.

1-Enlistment: special [contact list] is filled for names& personal data.
2-Examination: for case-finding if any; general condition, body temp, & any manifestations.
3-No exposure to isolated cases.

4-Surveillance, segregation ,quarantine or isolation according to disease:

a-Surveillance

in most infectious diseases, contacts are put under supervision, every day for the incubation period of the disease, for case-finding, mean while, they go to work& school.

Personal **SURVEILLANCE** the practice of close medical or, other supervision of contacts to permit quick recognition of infection or illness but without restricting their movements.

b-Segregation: **Contacts of the following diseases are excluded from school or work (not isolated)**

- **Diseases having contact carriers e.g. Typhoid & diphtheria. Food handlers & school personnel contacts are excluded from work, and bacteriologic ally examined until prove not to be carriers.**

- **Diseases which are highly infectious in the early days, measles, susceptible contacts are excluded from school, and so will not be at school, otherwise spread infection, if get diseased.**

C-quarantine

A quarantine is used to separate and restrict the movement of persons; it is a 'state of obligatory isolation'

This is often used in connection to disease and illness, such as those who may possibly have been exposed to a communicable disease.

- **Covid -19 Contacts provided with education, information, and support to understand their risk, what they should do to separate themselves from others who are not exposed; monitor themselves for illness, and the possibility that they could spread the infection to others even if they themselves do not feel ill.**

- **Contacts are encouraged to stay home and maintain social distance from others (at least 6 feet) until 14 days after their last exposure, in case they also become ill.**
- **They should monitor themselves by checking their temperature twice daily and watching for cough or shortness of breath.**

Quarantined individuals will be sheltered, fed, and cared for at home, in a selected emergency facility, or in a specialized hospital, depending on the disease and the available resources.

They will also be among the first to receive all available medical interventions to prevent and control disease, including:

- **Vaccination.**
- **Antibiotics.**
- **Early and rapid diagnostic testing and symptom monitoring.**
- **Early treatment if symptoms appear.**

c-Isolation

Contacts of cholera [non endemic areas], pneumonic plague& pneumonic anthrax are isolated each for a certain period of time; since these diseases are serious, and so if any of the contacts is diseased, he will be isolation, and not exposed to others to infection.

5- Specific protection: By immunization or chemoprophylaxis, if available.

3-Community Control Measures

Sporadic cases of endemic infectious diseases can be readily controlled by control measures for cases& contacts, but if epidemic or outbreak appears or threatens to occur, prevention & control measures are needed to protect the at risk community.

Community Control Measures Include

a-Case finding and control of cases & contacts.

b-Epidemiologic investigation, to trace source& channels of infection.

c-Extreme control measures, been taken, if necessary e.g. closing schools and public places .

ERADICATION of INFECTIOUS DISEASE

Eradication literally means to "tear out by roots".

Eradication of disease indicates termination of all transmission of infection by extermination of the infectious agent , eradication is an absolute process, and not a relative goal.

Getting rid of the causative organism and consequently disease, in certain area or country or the world; no reported cases, nor reservoirs of infection. It achieved for a limited number of infectious diseases.

Today, smallpox is the only disease that has been eradicated.

The feasibility of eradicating polio appears to be greater than other disease like measles.

ELIMINATION of INFECTIOUS DISEASE

The term elimination is used to describe interruption of transmission of disease, as for example, elimination of measles, polio and diphtheria from large geographic regions in world.

It means that existing endemic disease so controlled to reach the level of ' no reported cases'. This is usually by protection of at risk group or population, while the causative agent not necessarily eliminated.