Federal State Budgetary Educational Institution of Higher Education "North Ossetian State Medical Academy" of the Ministry of Health Russian Federation

DEPARTMENT OF INFECTIOUS DISEASES

EPIDEMIC PROCESS

EPIDEMIC FOCUS

Toolkit
for students of the 5th year of medical, pediatric faculties and 4 courses of the Faculty of Dentistry.

VLADIKAVKAZ

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One of the central issues of infectious epidemiology is the doctrine of the epidemic process as a continuous process of the emergence and spread of infectious diseases. Generalization of the accumulated factual material and theoretical developments made it possible to formulate a number of concepts and theories about the essence of the epidemic process:

- the doctrine of the epidemic process and the determining role of the pathogen transmission mechanism, developed by the outstanding Soviet epidemiologist L.V. Gromashevsky;
- the doctrine of the natural foci of infectious diseases, created by E.N. Pavlovsky and his school;
- the concept of the mechanism of self-regulation of parasitic systems, expressed by V.D. Belyakov and successfully developed by his school;
- socio-ecological concept of the epidemic process, formulated by B.L. Cherkassky.

The modern approach to the study of the epidemic process is distinguished by the integrity of its perception as a system that accumulates a biological and social essence in itself and, therefore, is capable of preserving, restoring the original state or independently choosing a new state in relation to its biological part, like any living system.

Let us examine the significance of each of the three factors, or links, of the epidemic process.

1) source of pathogens of an infectious disease;
2) the mechanism of transmission of pathogens;
3) the susceptibility of the population.

When at least one of these links is turned off, the epidemic process stops. The epidemic process proceeds continuously in time and space. At the same time, biological factors (the interaction of geno- and phenotypically heterogeneous parasite and host populations) form the causes of the development of the epidemic process, while social and natural factors regulate the conditions for the development

of the epidemic process. The epidemic process is determined by the continuity of the interaction of its three components. Epidemic process - continuous interaction at the species and population levels of heterogeneous in terms of evolutionary conjugated traits, relations to each other of the pathogen-parasite and the human body in necessary and sufficient social and natural conditions, manifested by manifest and asymptomatic forms of infection, distributed among the population by territory, time and risk groups of infection and (or) disease. However, we consider it necessary to note that the epidemic process cannot be the subject of study only of the epidemiology of infectious diseases.

The epidemic process is an extremely complex process in which the population, pathogens of infectious diseases and the environment are involved. Disclosure of the causes and mechanism of development of the epidemic process is impossible without such sciences as infectious diseases, microbiology, hygiene, biology, but the subject of study of each of them will be separate components of the epidemic process. The infectious process develops in the human body and is based on biological phenomena. In the 70s. 20th century VD Belyakov with his co-workers, based on his own research and generalization of world science data, formulated the theory (concept) of the internal self-regulation of the epidemic process, which determines its self-development. The main thing in this theory, which is undoubtedly fundamental and universal, is an indication that the epidemic process, i.e. e. the interpopulation relationship between the parasite and the host is a system subject to internal self-regulatory processes. The development of the epidemic process is also largely determined by biological phenomena: the duration of the release of the pathogen from the body of the source, the survival of the microbe in the external environment, and others. Nevertheless, the epidemic process that is taking place in a collective of people cannot be interpreted as only a biological phenomenon, because it arises and develops under the pronounced influence of social conditions that have developed in the process of the development of society. An epidemic process differs sharply from an epizootic process in an animal population. These

differences are associated with the impact on the epidemic process of production, social, i.e. conscious human activity.

Social transformations in society can slow down the development of the epidemic process (for example, raising the level of sanitary culture, immunization of the population), but they can contribute to its emergence and facilitate its development. Thus, the creation of a water supply system provides a person with a sufficient amount of good-quality water, but a malfunction of the water supply system leads to widespread epidemics. The organization of public catering, the creation of conditions for group education of children, etc. have similar two sides. Terms reflecting the manifestations of the epidemic process (traditional epidemiological concepts) are sporadic incidence, epidemic, pandemic.

Sporadic incidence refers to the level of the epidemic process at which a single (usual) number of cases is noted in a given area and with a given infection. Sporadic incidence precedes a sharp slowdown and elimination of the epidemic process.

An epidemic incidence is an incidence that exceeds the sporadic level or occurs where it did not exist before. With this approach, exotic morbidity is always epidemic. Epidemic morbidity according to its manifestations is differentiated into an epidemic outbreak, an epidemic, a pandemic.

An epidemic outbreak is a short-term rise in the incidence of an infectious or parasitic nature in a limited group of the population (collective, settlement), which are interconnected by a common source of the pathogen or common factors of its transmission.

An epidemic is a mass spread among people of infectious diseases of the same name, covering a country (city) and originating from a common source of infection or common ways of spread, as well as interconnected by a chain of infections.

A pandemic is an epidemic that covers the entire globe or several continents.

Endemic morbidity (endemia) is a morbidity that is constantly recorded in a certain area, characteristic of the population of a given area due to the presence of a pathogen reservoir. If animals are the reservoir, then the incidence among them is defined as enzootic, with which endemic incidence can also be associated.

Exotic morbidity is a morbidity that is unusual for the population of a given area. It occurs as a result of the introduction of the pathogen from the outside with the host organism or on environmental objects.

Periodicity and seasonality of infectious diseases.

At present, the so-called periodic and seasonal fluctuations in the intensity of the epidemic process are of the greatest practical and theoretical interest. We can talk about two types of periodicity of epidemics: a) seasonal cyclicity of their course (throughout the year) and b) a regular change in the rises and falls in the incidence, systematically repeating within more or less identical periods of time exceeding a year.

The first type of periodicity or seasonality of epidemics does not raise any doubts for a number of infections.

The second type of periodicity, covering a cycle of several years, within which a sharp epidemic rise occurs, followed by a low level of morbidity, is still often the subject of fierce debate. However, it seems to us that this question is quite clear both from the point of view of an assessment of the factual material, and from the point of view of an exhaustive explanation of the observed patterns, and, finally, from the point of view of explaining the motives of the dispute. In many cases, periodic fluctuations in the course of the epidemic process are an absolutely indisputable phenomenon. In all cases, it concerns respiratory tract infections (pox, measles, whooping cough, scarlet fever); a similar picture is given by periodic changes in the increase and decrease in the incidence of diphtheria, influenza, cerebrospinal meningitis, etc.

Cyclic fluctuations of the epidemic process are most studied in relation to airborne infectious diseases, which are characterized by the greatest ease of transmission of the pathogen. Epidemics of these diseases arise due to the gradual accumulation of non-immune individuals in the team. The birth of a new generation of people and the extinction of immunity in people who previously had it lead to a drop in herd immunity and an increase in morbidity. Data on the state of the population's immunity to the most common diseases are obtained by taking into account those who have recovered from diseases that leave long-term immunity, vaccinated during the previous year; through a broad serological survey of population groups most susceptible to certain diseases; taking into account all those born in the given area in the past year and those who arrived from other areas. These data are important material for judging the immune stratum of the population in relation to a particular infectious disease. It is known that the greatest susceptibility to pathogens of certain infectious diseases is manifested in different age groups of the population. In this regard, the process of accumulation of a collective sensitive to a particular infection takes an unequal number of years. This explains the various time intervals between periods of epidemic rises of individual diseases. So, for measles, 2-3-year morbidity intervals are characteristic, for scarlet fever - 5-9-year intervals, cyclic rises in the incidence of whooping cough are observed every 3-4 years. Periodic rises in incidence are also characteristic of other infectious diseases. So,

As mentioned above, the seasonality of infectious diseases is the period of the highest incidence of the population during the year, coinciding with the time of easier implementation of the infection transmission mechanism, more frequent exacerbations of chronically occurring infectious diseases, seasonal changes in sanitary conditions of life and nutrition of the population, seasonal increase in contact of the population with polluted water bodies, mass reproduction of flies, seasonal changes in the physiological reactivity of the human body and fluctuations in the level of its nonspecific resistance. Taking into account the peculiarities of seasonal rises in diseases in previous years and the listed causes of their occurrence can provide certain materials for forecasting.

An analysis of various manifestations of seasonality in the course of the epidemic process and its causes leads us to the general conclusion that the dominant (if not the only) reason for seasonal increases is the activation in certain seasons of the year of certain factors that transmit the infectious principle.

For many infectious diseases, seasonality is one of the most characteristic epidemiological features. Long-term observations have shown that airborne infections are characterized by autumn-winter and winter-spring seasonality, which is mainly due to overcrowding. Intestinal infections can be attributed to real seasonal diseases, the peak of which occurs in the summer. An important feature of blood infections associated with the characteristics of the biology of carriers should be considered their inherent seasonality. Fresh infections and an increase in the incidence, with a few exceptions (typhus and relapsing fever - in the cold season), are observed in the warm season and coincide with the maximum activity of arthropods. Traditionally, seasonality is usually described using the so-called typical seasonal curve (Fig. 8).

Natural focality of infectious diseases

Natural foci of infectious diseases - a feature of a number of infectious diseases that can affect people and domestic animals, consisting in the fact that the causative agents of these diseases exist in nature within the so-called natural foci, out of touch with people or domestic animals, parasitizing in the body of wild animal hosts . Such diseases are usually called natural focal, and the territories where their pathogens are found in nature are called natural foci. The concept of "natural foci" in 1938. was proposed by Academician E.N. Pavlovsky. The existence of pathogens of natural focal diseases is due to their continuous circulation among animals - more often rodents and birds; the transmission of pathogens from animal to animal and from animal to person occurs mainly through insects and ticks, but other ways of transmission are possible: through water, food. Natural foci usually exist indefinitely for a long time. People or pets can become infected with natural focal diseases when they enter the territory of a natural focus. Natural focal human diseases include

plague, tularemia, tick-borne and mosquito-borne encephalitis, rabies, leptospirosis, hemorrhagic fevers, cutaneous leishmaniasis, tick-borne typhus, etc. Natural focal diseases can manifest themselves in a number of domestic animals (rabies, foot and mouth disease, leptospirosis, trichinosis , echinococcosis, etc.).

The centers of vector-borne diseases are associated with certain geographical landscapes and occupy certain territories. The landscape confinement of historically formed biocenoses of natural foci allows (based on the developed principles of typification of natural foci of human diseases) to make predictions about the possible presence of a particular infection in a certain area. All this makes it possible to recommend the most rational preventive and health-improving measures. The most effective measures to prevent natural focal diseases in humans and domestic animals are active immunization, for example, against plague, tularemia, encephalitis, anthrax, etc., as well as the use of vector repellents (repellents), the use of protective nets and protective clothing,

endemicity of infectious diseases

The term "endemic" ("en" - "inside", "demos" - "people") denotes the usual presence of an infectious disease in the population of a given territory. The endemicity of infectious diseases in certain areas is supported by the peculiarities of natural and climatic, socio-economic, cultural and living conditions. Natural conditions are of particular importance in maintaining endemicity. Thus, an endemic focus is an area where certain diseases of people are constantly recorded for a long time, which is associated with the natural factors inherent in this territory. What is an endemic focus can be illustrated by the example of an area endemic for malaria. A territory can be considered a malaria endemic focus if in a given place: 1. there are optimal natural and climatic conditions for the development and life of populations of mosquitoes of the Anopheles species; 2. the presence of patients with malaria.

The Ararat valley of Armenia is considered endemic for malaria, India for cholera, the countries of the African continent for yellow fever, etc.

Distinguish between true and so-called statistical endemicity of the area. They speak of true endemicity in those cases when the incidence is fixed in a certain territory by its biological connections - the area of \u200b\u200bdistribution of the source or carrier of infection or the optimal conditions for the development of the pathogen outside the warm-blooded organism. For example, an area where there are favorable natural conditions for the existence of the Anopheles mosquito and for the development of the malaria parasite in the body of the mosquito, in the presence of people with malaria, can be considered as truly endemic for malaria.

In the malaria example above, endemicity is true, due to natural factors and biological relationships.

In contrast, statistical endemicity is due to social, public health factors, and the level of medical care. Therefore, statistical endemicity can be reduced to zero by a system of certain health measures.

In some localities, some non-infectious endemic diseases are constantly recorded - goiter, fluorosis, uro disease. These diseases are associated with certain natural features of the area: iodine deficiency in soil, water, plants (with endemic goiter); excess fluorine compounds in soil, water, food (with fluorosis); lack of microelements in water, soil, plants, etc. (with uro disease).

Driving forces of the epidemic process

As already noted, the epidemic process arises and is maintained by the continuity of the interaction of its three main driving forces (factors, links): the source of infection (invasion), the mechanism of transmission, and the susceptibility of the population to this infection (invasion).

The source of infection is an object in which, under natural conditions, pathogens of infectious diseases multiply, accumulate and are released into the external environment (Fig. 9). The most important is the habitat, without which the pathogen cannot exist as a biological species. It is called a specific, or main, habitat.

For many diseases, such an object is the human or animal body. According to the nature of the sources of infection, anthroponoses and zoonoses are distinguished. In recent years, a group of sapronoses (Greek “sapros” - rotten + nosos - disease) has been identified - diseases, the causative agents of which are microorganisms that live freely in the environment. A typical representative of sapronoses is legionellosis. The natural conditions for the existence of these microorganisms were warm reservoirs inhabiting them, protozoa, algae, water reservoirs, moisture in air conditioners, and soil.

A person is a source of infection during illness and in a state of carriage. The contagiousness of patients is associated with the dynamics of the infectious process. So, in the incubation period, the pathogen, as a rule, lives in the depths of the tissues and is not excreted from the body. In this regard, a sick person (with rare exceptions) is practically not dangerous to others. In some cases, patients become a dangerous source of infection already in the incubation period. For example, with measles, rubella, etc., the patient is dangerous in the last days of incubation and in the prodromal period. In most cases, the contagiousness of the patient usually increases as the disease progresses and reaches a maximum at the height of the disease. It is during this period that clinical manifestations are pronounced, contributing to the dispersion of the pathogen in the external environment.

A correct assessment of the role of the patient in the spread of infection is unthinkable without taking into account the severity of the clinical course of the disease. From an epidemiological point of view, persons with mild, atypical, inapparat forms of the disease are very dangerous, since they often remain in a team for a long time and continue to visit public places. The danger of the patient to others is also largely due to socio-economic and domestic factors. For a number of infectious diseases, the persistence of the pathogen in the body of people who have been ill and after the period of convalescence is characteristic. For example, 3-5% of survivors of typhoid fever remain carriers of typhoid bacillus for a long time. According to the duration of the release of the pathogen carriers can be divided into

acute convalescent (up to 3 months) and chronic convalescent (over 3 months). There are also "healthy" or "transient" carriers. It is possible in the immune organism and lasts for a short time. At the same time, the causative agent, as it were, passes through the body in transit, leaving no consequences.

In some diseases, there is a long persistence of the pathogen in the body, periods of latency under the action of provoking factors are replaced by periods of manifestation and clinical manifestations of the infection (herpetic and cytomegalovirus infections, etc.), the most dangerous for others. In infectious diseases common to humans and animals (zoonoses), the main sources of infection are animals. Infection from humans is rare.

The paradoxical non-infectiousness of a sick person is explained (with rare exceptions, for example, with plague) by the absence of transmission mechanisms in humans that have evolved in animals, as well as by the species-limited susceptibility of people to many diseases of this group. However, when the mechanism of transmission changes (for example, with the development of secondary pneumonic plague, the airborne mechanism is activated), transmission of the infection from person to person is possible. The spread of diseases among animals is an epizootic process, while a person, as a rule, is a biological dead end.

Animals pose an epidemiological danger to humans: wild animals - with rabies (wolves, foxes, arctic foxes, etc.), tularemia (hares, muskrats and water rats); agricultural - for brucellosis (cows, sheep, etc.), ornithosis (birds), toxoplasmosis (cats), etc. In some cases, animals are the only reservoir of infection (for example, with tularemia and brucellosis), in other diseases, an infected person himself becomes a source (salmonellosis, etc.).

The mechanism of infection transmission is the second necessary link for the emergence and maintenance of the continuity of the epidemic process. The mechanism of transmission provides the pathogen with a change in biological host and is a way of its transition from an infected organism to an uninfected one. The doctrine of the transmission mechanism was developed by L.V. Gromashevsky.

According to the basic law formulated by him, parasitism is the result of the evolutionary process of adaptation of a species of microorganisms both to the conditions of existence in certain types of biological hosts and to distribution in populations of these hosts. The mechanism of transmission is a necessary condition for the existence of a parasite as a species in nature. The historically developed type of mechanism corresponds to the localization of the pathogen in the human body,

The mechanism of transmission of infectious agents is complex and consists of three successive phases: isolation of the pathogen from the body, its stay in the external environment and introduction into a new organism. The mechanism of transmission corresponds to the main localization of the pathogen in the host organism. Thus, the localization of the pathogen in the gastrointestinal tract corresponds to the fecal-oral distribution mechanism, localization in the upper respiratory tract - airborne, in the blood - transmission mechanism, i.e. the path of transmission of the pathogen through blood-sucking insects; localization on the outer integument of the body and mucous membranes corresponds to the contact mechanism of transmission. Thus, L.V. Gromashevsky formulated four main mechanisms for the transmission of pathogens of infectious diseases between individuals of the same generations - horizontal transmission. In recent years, the attention of researchers has been attracted by the "vertical" transmission mechanism, which ensures the intrauterine transition of the pathogen from mother to fetus (transplacental transmission), i.e. directly from one generation to the next. Hemotransplacental transmission of pathogens is typical for rubella, toxoplasmosis, herpes viruses, human immunodeficiency (HIV), hepatitis B and C, etc. In addition, when passing through the birth canal, newborns can become infected with pathogens of gonorrhea, syphilis, herpes, hepatitis B and C. The listed mechanisms transmission of infectious diseases are characteristic of the spread of pathogens in natural conditions and are determined by the location of pathogens in the human body (natural mechanisms of transmission of infections). In real life, artificial (artificial) mechanisms for the transmission of pathogens are also possible. Parenterally, you can become infected with infectious diseases in case of violation of the sanitary-hygienic and anti-

epidemic regime in medical institutions through medical instruments and devices, blood transfusion, injections and other manipulations, accompanied by a violation of the integrity of the skin and mucous membranes. This mode of transmission is active among certain population groups, especially among drug addicts. The mechanism of transmission is expressed through factors and pathways of transmission. The transmission path is a certain set and sequence of transmission factors with the help of which the transmission mechanism is implemented. Elements of the environment that ensure the transmission of the pathogen from the source to the susceptible organism are called transmission factors of the infectious principle. Distinguish between non-living and living factors. Non-living transmission factors include: air, water, food, soil, household items, and arthropods and insects are living factors in the transmission of infections. A transmission factor is an element of the environment that plays a role in the transmission of pathogens of certain or several similar infectious diseases. The transmission mechanism determines the start and end point of pathogen transfer. For example, when we talk about the fecal-oral mechanism, we understand that the pathogen must be transferred from the feces to the mouth. However, in order for this transfer to take place, transmission factors are necessary - elements of the external environment that actually transfer pathogens from feces to the mouth or to other objects (water, food, hands, flies, etc.). Thus, the mechanism of transmission is said to be carried out by means of transmission factors. and arthropods and insects are living transmission factors. A transmission factor is an element of the environment that plays a role in the transmission of pathogens of certain or several similar infectious diseases. The transmission mechanism determines the start and end point of pathogen transfer. For example, when we talk about the fecal-oral mechanism, we understand that the pathogen must be transferred from the feces to the mouth. However, in order for this transfer to take place, transmission factors are necessary - elements of the external environment that actually transfer pathogens from feces to the mouth or to other objects (water, food, hands, flies, etc.). Thus, the mechanism of transmission is said to be carried out by means of transmission factors. and arthropods and insects are

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Different transmission factors are needed to implement different transmission mechanisms. For example, with the fecal-oral transmission mechanism (cholera, salmonellosis, dysentery), the pathogen can be carried by food, water, soil, household items (dishes, linen), and flies. The airborne transmission mechanism (measles, rubella, scarlet fever, mumps) can be carried out through air or sometimes household items (children's toys, clothes, dishes, furniture). The transmission mechanism (malaria, borreliosis, yellow fever, trypanosomiasis) is realized through blood-sucking arthropods (mosquitoes, ticks, lice). Often, despite the fact that the same mechanism of transmission can be carried out by several factors, in a number of diseases, predominant transmission factors are distinguished. These are the factors which play the greatest role in the transmission of a particular infectious pathology. For example, in typhoid fever, cholera, hepatitis A, the water factor is predominant, and in Sonne's dysentery, the food factor. So, a factor is an essential circumstance in some process, phenomenon. In the considered process of moving a microorganism from the organism of one host to the organism of another, a huge number of factors operate along the above routes. For example, the temperature of the environment, insolation, air movement, antagonistic or symbiotic relationships between microorganisms, and much more. Factors that promote the movement of the pathogen or maintain its viability, thereby increase the intensity of the transmission mechanism and accelerate the epidemic process as a whole. Such factors are called positive (in relation to the microorganism).

A susceptible organism is the third link in the epidemic process. Susceptibility - the ability of the host to suffer from diseases caused by pathogens, which is manifested

by pathological and response protective specific (immunity) and nonspecific (resistance) reactions.

Immunity is a specific reaction of the body to the introduction of a foreign biological agent.

Resistance is a complex of nonspecific protective reactions of the body.

An epidemic focus is the location of the source of infection (a sick person, a bacteriocarrier, an animal carrier) with the territory surrounding it to the extent that it is capable of transmitting the infectious principle to others in a given specific situation with a given infection. There are two concepts that characterize the epidemic focus. These are the boundaries of the focus and the duration of its existence. The boundaries of the focus are determined by the characteristics of the mechanism of transmission of a particular infectious disease and the specific features of the environment in which the source of infection resides. The duration of the existence of an epidemic focus is determined by the residence time of the source and the maximum incubation period of a particular infection. After the departure of the patient or his recovery, the focus retains its value during the maximum incubation period, as new patients may appear. The spatial extent of the focus, its boundaries are determined by the nature of the infectious disease, the conditions of the social situation, for many infections - natural conditions, etc. So, for typhus, the epidemic focus will be the place where the patient is located - the only source of infection. The boundaries of the hearth may be limited to one apartment, barracks, hostel, or may go beyond the boundaries of the settlement, cover the district, region. The concept of an epidemic focus may include a territory in which there is only one patient, for example: an apartment, a kindergarten, a school. The focus can be very extended, with many patients and bacteria carriers (with spreading cholera, etc.). its boundaries are determined by the nature of the infectious disease, the conditions of the social situation, for many infections - natural conditions, etc. So, for typhus, the epidemic focus will be the place where the patient is located - the only source of infection. The boundaries of the hearth may be limited to one apartment, barracks,

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An epidemic focus is dangerous for as long as viable pathogens that can infect healthy people remain in it. These pathogens are either contained in the body of sources of infection (patients, carriers), or are located on environmental objects. Therefore, from the moment the source of infection is removed from the focus, almost from the moment the patient is hospitalized and disinfected, the possibility of new infections is excluded.

An epidemic focus is considered eliminated when:

- the source of infection is neutralized;
- others are tested for carriers and are free from it;
- in the outbreak, measures were taken to destroy the causative agent of the disease or carriers of the infection (disinfection, disinsection);
- the maximum incubation period for this disease expires and contacts for this disease (persons who have been in contact with patients) do not get sick. Measures in the epidemic focus Measures in the epidemic focus are carried out on the basis of the results of the epidemiological examination of the focus no later than 24 hours after receiving an emergency notification (form N 58). Anti-epidemic measures in the focus are carried out in three directions: 1) in relation to the patient; 2) environmental objects (transmission factors); 3) healthy people who are in the focus (contact).

Measures in relation to the patient with an infectious disease identified in the focus are reduced to isolating him from healthy people. Isolation of infectious patients is an anti-epidemic measure aimed at separating patients with infectious diseases from other people, as well as those who had contact with patients, to prevent further spread of the infection. The following forms of separation are used: hospitalization, isolation at home, placement in isolation. Timely hospitalization contributes to early diagnosis, successful treatment of the patient, and it also ensures the cessation of the spread of the infectious agent among those communicating with the patient and in the environment. For persons who have been in contact with the source of the infectious agent or who are at risk of infection through certain factors of transmission of the infectious agent in the outbreak, established medical supervision. Medical observation is carried out during the entire incubation period of the disease and is extended for an appropriate period after the appearance of each new case of the disease in this focus. In addition, bacteriological and immunological studies are carried out, environmental objects are studied. In some infectious diseases (plague, cholera), contact chemoprophylaxis is carried out in order to prevent the disease and

carry the infection. For a number of infections, artificial active and passive immunization preparations are used (anti-rabies vaccination in rabies foci, measles vaccination in measles foci, etc.). Medical observation is carried out during the entire incubation period of the disease and is extended for an appropriate period after the appearance of each new case of the disease in this focus. In addition, bacteriological and immunological studies are carried out, environmental objects are studied. In some infectious diseases (plague, cholera), contact chemoprophylaxis is carried out in order to prevent the disease and carry the infection. For a number of infections, artificial active and passive immunization preparations are used (anti-rabies vaccination in rabies foci, measles vaccination in measles foci, etc.). Medical observation is carried out during the entire incubation period of the disease and is extended for an appropriate period after the appearance of each new case of the disease in this focus. In addition, bacteriological and immunological studies are carried out, environmental objects are studied. In some infectious diseases (plague, cholera), contact chemoprophylaxis is carried out in order to prevent the disease and carry the infection. For a number of infections, artificial active and passive immunization preparations are used (anti-rabies vaccination in rabies foci, measles vaccination in measles foci, etc.). cholera) carry out chemoprophylaxis of contacts in order to prevent the disease and the carriage of the infection. For a number of infections, artificial active and passive immunization preparations are used (anti-rabies vaccination in rabies foci, measles vaccination in measles foci, etc.). cholera) carry out chemoprophylaxis of contacts in order to prevent the disease and the carriage of the infection. For a number of infections, artificial active and passive immunization preparations are used (anti-rabies vaccination in rabies foci, measles vaccination in measles foci, etc.).

Measures that provide for the neutralization of environmental objects in the focus from pathogens that have entered them from the patient's body, as you know, are combined under one concept - focal disinfection. However, depending on the object of influence (microorganisms, arthropods, rodents), focal disinfection is divided into disinfection, disinfestation and deratization. When prescribing focal disinfection,

one should proceed from the mechanism of transmission of the pathogen with the corresponding infection and have a good idea of which environmental objects (transmission factors) there is a real threat of contamination. Anti-epidemic measures in the focus Anti-epidemic measures are a set of sanitary-hygienic, treatment-and-prophylactic and administrative measures carried out in an epidemic focus with the aim of its localization and elimination. The task of anti-epidemic measures is to effectively influence the factors (elements, links) of the epidemic process in order to stop the circulation of the infectious agent in the outbreak. Therefore, anti-epidemic measures are aimed at neutralizing the source of infection, breaking the mechanism of its transmission and increasing immunity to the causative agent of this infection of persons at risk of infection in the outbreak. However, for various infectious diseases, the significance of individual measures is not the same. So, in intestinal infections, general sanitary measures are effective to prevent the transmission of the infectious agent and neutralize its sources, while in the elimination of the focus of many respiratory tract infections (for example, diphtheria, measles), immunization of all children in the focus is dominant. links) of the epidemic process in order to stop the circulation of the infectious agent in the outbreak. Therefore, anti-epidemic measures are aimed at neutralizing the source of infection, breaking the mechanism of its transmission and increasing immunity to the causative agent of this infection of persons at risk of infection in the outbreak. However, for various infectious diseases, the significance of individual measures is not the same. So, in intestinal infections, general sanitary measures are effective to prevent the transmission of the infectious agent and neutralize its sources, while in the elimination of the focus of many respiratory tract infections (for example, diphtheria, measles), immunization of all children in the focus is dominant. links) of the epidemic process in order to stop the circulation of the infectious agent in the outbreak. Therefore, anti-epidemic measures are aimed at neutralizing the source of infection, breaking the mechanism of its transmission and increasing immunity to the causative agent of this infection of persons at risk of infection in the outbreak. However, for various infectious diseases, the significance of individual measures is

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Measures in relation to the source of infection are a group of measures aimed at solving two problems - identifying and neutralizing the source of the infectious agent. In relation to the source of infection in anthroponoses, diagnostic, isolation, therapeutic and regime-restrictive measures are distinguished, and in zoonoses, sanitary-veterinary and deratization measures.

Early and complete detection of infectious patients is a prerequisite for timely treatment, isolation and anti-epidemic measures in the outbreak. The effectiveness of anti-epidemic measures in relation to sources of infection is largely determined by diagnostics, the requirements for which, from an epidemiological standpoint, are mainly due to the choice of reliable and, above all, early methods.

Measures regarding the source of infection include the following:

•early isolation of the source of infection is the main condition for anti-epidemic control. For its implementation, early correct diagnosis of infectious diseases is necessary. Not only infectious patients with an established diagnosis of an infectious disease, but also patients with suspicion of it, are subject to immediate isolation. However, even before hospitalization, temporary isolation should be provided immediately;

•isolation at home is used not only as a temporary measure until the patient is hospitalized, but also as the only way to isolate patients with those infections in which hospitalization is not necessary (flu, whooping cough, chicken pox, mumps, measles, rubella). In some cases, isolation at home is also taken with mandatory hospitalization during the entire period of infection (with diphtheria, typhoid fever), if for some reason hospitalization is not possible. This must be authorized by an epidemiologist;

•the duration of isolation of infectious patients in hospitals and at home is determined by the period of contagiousness of a particular infection;

•healthy carriers are not subject to hospitalization, with the exception of carriers of pathogens of especially dangerous infections (for example, cholera);

•separation of children who were in contact with infectious patients;

•sick animals serving as a source of infection are exterminated. Children who came into contact with the sick at home are quarantined at the place of residence, and those who had contact in a children's institution are separated. Measures regarding the source of infection in the epidemic focus should be considered effective in cases where, in accordance with the pathogenesis of the disease, the patient is isolated before the onset of the infectious period and for its entire duration (typhoid and typhus). These measures are assessed as ineffective if the patient is isolated at the beginning, at the height or even at the end of the contagious period (viral hepatitis, measles, chicken pox, etc.). In chronic infectious diseases (brucellosis, tuberculosis, leishmaniasis), isolation is used only when a person is able to actively infect others.

For example, with open forms of tuberculosis, patients are isolated, and when the remission of the disease is achieved, they are discharged from hospitals. Among the measures in relation to the source of infection, great importance is attached to the chemoprophylaxis of the population and the sanitation of carriers. Sanitation is the release of an infected human or animal body from pathogenic microorganisms. For this, various medications are used - antibiotics, sulfonamides, nitrofurans, etc. For sanitation, immune preparations are also used - these are therapeutic sera and immunoglobulins. In zoonoses, measures to neutralize the animal - the source of the infectious agent are mainly reduced to its destruction (although sometimes such animals are isolated and treated). So, the corpses of animals that died from anthrax are burned or disposed of. When rodents are the source of infection, deratization is carried out. In some cases, when it comes to high-value breeds of animals, they resort to treatment or the creation of special farms for the maintenance and sanitation of affected livestock. Along with the above, measures are being taken to destroy ectoparasites - carriers of pathogens. In case of zoonoses, such measures are carried out by the veterinary service, which provides relevant information to the sanitary and epidemiological service. In the system of measures regarding the source of infection, the discharge of infectious patients from the hospital is important. The terms of discharge from the hospital, in addition to clinical indications, are determined by the duration of the infectious period for a given infectious disease or are established on the basis of bacteriological studies of feces, urine, bile, throat swabs, sputum, etc. A patient who was treated in an infectious diseases hospital, can be discharged subject to complete clinical recovery, and also if the results of repeated (and in certain cases, three times) laboratory tests do not reveal pathogens. After discharge, patients are placed under dispensary observation, during which medical and bacteriological observation continues. Measures regarding the mechanism of transmission of the pathogen In the prevention of infectious diseases, the impact on the mechanism of transmission of the pathogen is an important measure. The transmission of an infectious principle from a sick person to a healthy person occurs through the external environment with the help of various factors (water, food, air,

dust, soil, household items), which determines the variety of preventive measures. Actions regarding transmission mechanisms are aimed primarily at to neutralize or eliminate transmission factors. In this case, the goal is to break the transmission mechanism itself. Currently, all preventive measures aimed at the second link of the epidemic process are divided into three main groups - sanitary and hygienic, disinfection and pest control.

In intestinal infections with a fecal-oral mechanism of infection (typhoid fever, dysentery, cholera), the main factors of pathogen transmission 103 are food and water, less often flies, dirty hands, and household items. In the prevention of these infections, general sanitary and hygienic measures and various methods of disinfection are of the greatest importance. Communal and sanitary measures, food, school, industrial sanitary supervision, raising the level of general and sanitary and hygienic culture of the population are general sanitary. Among the preventive measures aimed at the transmission of an infectious principle is also disinfection, which is carried out in the foci of infectious diseases, as well as in public places (stations, transport, hostels, public toilets), regardless of the presence of an outbreak or epidemic of an infectious disease.

With respiratory tract infections (measles, rubella, diphtheria, scarlet fever, meningococcal infection, influenza, etc.), compared with intestinal infections, it is very difficult to take measures to prevent the transmission of the pathogen. The transmission of these infections through the air is facilitated by microbial aerosols (droplet and nuclear phases) and infected dust, therefore, sanitation of the indoor air environment and the use of respirators are preventive measures. As for disinfection, it is almost never used for those infections of the respiratory tract, the pathogens of which are unstable in the external environment (measles, chickenpox, rubella, mumps). Disinfection is carried out with diphtheria. Of great importance for the prevention of vector-borne infections are the means of disinsection, aimed at the destruction of carriers of pathogens - blood-sucking mites, insects. Collective and individual protection measures against attacks and vector bites are also applied.

Measures for a susceptible organism Measures for the third link of the epidemic chain (macroorganism) include: the formation of specific immunity (immunity) and the increase of nonspecific resistance in children. Specific prevention of a number of infections is achieved through active immunization. Measures to protect the host population are mainly represented by vaccination of the population, the purpose of which is to create specific immunity (immunity) to individual infectious diseases. Important factors in increasing nonspecific resistance are age-appropriate nutrition, fortification of food, hardening (use of air and water procedures, physical exercises). A separate group is represented by laboratory research and health education work, which cannot be attributed to any direction, but are carried out in the interests of each of them.

Test tasks

1. Sporadic incidence is:

a) group diseases

b) single diseases

c) mild forms of the disease

d) typical forms of the disease

e) carriage of the pathogen

2. Epidemic morbidity is regarded as an "outbreak", "epidemic", "pandemic", taking into account:

a) the rate at which the infection spreads

b) The mechanism of transmission of the pathogen

c) the severity of the course of the disease

d) the number of detected carriers

e) the number of registered cases of diseases

3. The danger of the source of infection depends on the following factors:

a) on the course of the disease

b) the duration of the release of the pathogen

c) sanitary conditions

d) activity of the source of infection

e) age

f) professions

g) sanitary culture

h) massive exhalation of the pathogen

i) sex

4. The pathogen transmission mechanism determines:

a) the clinical form of the disease at the source of infection

b) activity of the source of infection

c) the immune status of the source of infection

d) species affiliation of the pathogen

e) localization of the pathogen in the body of the source of infection

f) the stability of the pathogen in the external environment

g) pathogenicity and virulence of the pathogen

5. The vertical mechanism of exciter transmission is possible:

a) with toxoplasmosis

b) whooping cough

c) rubella

d) shigellosis

e) HIV infection

e) viral hepatitis A

g) viral hepatitis B

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