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

**DEPARTMENT OF INFECTIOUS DISEASES**

# EPIDEMIOLOGY AND PREVENTION OF INTESTINAL INFECTIONS.

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

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**1. General characteristics of infections with a fecal-oral transmission mechanism.**

The fecal-oral transmission mechanism is typical for pathogens with intestinal localization. Isolation of the pathogen from the infected organism (stage 1) is associated with the act of defecation. The penetration of the pathogen into the body (stage 3) occurs through the mouth. During the 2nd stage, the pathogen is in the external environment on various factors, the combination of which forms the pathways for the transmission of the pathogen. AboutychThere are three types of transmission routes:

- foodeva,
- water,
- contact-household.

***Food way.***Food contamination with pathogenic and potentially pathogenic pathogens can be:

- *primary*, i.e. lifetime penetration of the pathogen into the organs and tissues of animals (meat, milk, eggs, as well as fish and other hydrobionts. In this case, the primary infection of meat and milk is observed in the case of generalization in animals of salmonellosis, staphylococcosis, escherichiosis, clostridiosis. Primary (transovarial) contamination of chicken and duck eggs observed in salmonellosis;
- *secondary*, i.e. contamination of food products in the process of their receipt, processing, transportation, storage and sale. At the same time, the penetration of pathogens of most AEI into food products is possible with animal secretions, incl. birds and rodents. It is possible that microorganisms get into meat products from the intestines of farm animals in case of violation of the rules for their slaughter and butchering of carcasses. Exogenous infection of eggs can occur due to penetration mAndkroflora(For example, salmonella) hepno Infection of food with AEI pathogens is also possible from people (patients, carriers). Food contamination is not excluded by arthropods (flies, cockroaches).

Pathogens can enter food products through the contaminated hands of the source of infection (contamination of products is possible when using contaminated water to wash dishes in which the products are then placed, or to wash the products themselves). It is dangerous to infect with the hands of the source of infection of the product after heat treatment (dairy, meat, fish products, confectionery, etc.) or a product that is not subjected to heat treatment (vegetables, fruits, etc.).

Local food outbreaks, which are the result of the accumulation of the pathogen in the product just before its consumption, develop, as a rule, acutely: a sharp rise in the incidence, a sharp decline (if the product, after a single consumption, is completely

Andhspent), then for some time a sluggish course of the epidemic process (the so-called contact tail) is possible.

Food outbreaks are monoetiological; all infected individuals produce the same culture of the pathogen. Diseases are most often difficult, because. consumption of the infected Pproduct coPis born ByRayenie bolbshAndX dOh inhbooparent. The incubation period is usually minimal, so the previous episode of infection must be looked for within this incubation.

***Waterway.***INWater is often polluted by faecal matter entering the soil (sewer system). This process of water contamination can be how toRboth temporary and long-term.

Outbreaks of AII caused by the implementation of the water route of transmission of the pathogen are recorded much less frequently than food ones. At the same time, rotaviruses, enteroviruses, Shigella Flexner and cholera vibrios often act as an etiological agent.

MIt is possible to distinguish the following types of water flashes of OKI:

- Pwhen drinking water from a centralized utility and drinking water supply system, as a result of violations of the regimes for its purification and disinfection at treatment facilities, as well as due to the ingress of pathogens into the water after its treatment at head facilities and in the distribution network.
- Pri useresearch institutes without ochAndstitches Bydzborrowed waterm and hohegg and drinking water pipelines;
- Pwhen using toldressing water contaminated Aaccount of penetration into the well of feces from nearby toilets or from Andexternal and flood waters;
- Pwhen using the water of open reservoirs polluted by surface waters or as a result of the discharge of domestic and faecal waters;
- Pwhen using water from small containers (barrels, cisterns, cisterns, etc.);
- Pri the use of water of technical water supply systems.

Water epidemics and outbreaks can be acute or chronic. Acute water epidemics are very indicative in case of a combined accident of centralized water supply and sewerage systems. Large water epidemics (outbreaks), as a rule, are polyetiological, i.e., there is a consistent development of epidemics(outbreaks)of various To Andsh bowel diseases.

Chronic waterborne epidemics are more common than acute ones. They have a wide territorial distribution, many more people get sick due to chronic water epidemics than due to acute ones. Chronic water epidemics, like acute ones, are polyetiological. Rospotrebnadzor data shows that the quality of water in the country still does not meet international standards, which especially affects the incidence of viral hepatitis A and enterovirus infection.

***TOcontact-household transmission path,*** infection due to contaminated household items (toys, dishes, etc.), is realized primarily in children's institutions, in which the necessary sanitary and hygienic regime is not observed.

Under the action of a contact-household transmission, there must be focality (the probability of infection by a contact-household route depends on the closeness of communication), as well as the slow development of the epidemic process. How methe longer the sources of infection are removed from the focus, and the worse the sanitary and hygienic conditions in the team (or sometimes in the family), the more likely the development of the incidence due to the contact-household transmission route. In psychiatric hospitals, contact-household transmission sometimes becomes the leading one, and outbreaks can mimic food ones.

Certain types of pathogens with intestinal localization are characterized by a relatively narrow organotropism. All this determines the originality of the epidemiology of individual nosological forms of infectious diseases with a fecal-oral mechanism of pathogen transmission.

The implementation of the fecal-oral transmission mechanism is influenced by social and natural factors. The common factors are household inconvenience and low sanitary culture of people.

Specific social factors that determine the involvement of certain routes of transmission of pathogens of intestinal infections are the following:

- sewage collection and disposal system (presence or absence of sewerage);
- public amenities, mainly in terms of the availability of breeding grounds for flies and their contact with faeces;
- organization of water supply (presence or absence of water supply, the likelihood of fecal contamination of water sources, the degree of water disinfection, water quality control);
- catering, the likelihood of faecal contamination of fruits (flies) and vegetables (in irrigated fields), the likelihood of access to food products (milk, bread) or utensils of infected people;
- The level of sanitary culture and conditions for observing the rules of personal hygiene.

Of natural factors, the duration of the period with air and soil temperatures above 10°C, favorable for the breeding of flies, is of great importance. Air temperature and humidity also have a certain effect on the activity of winged flies and the frequency of their entry into toilets.

Infections with a fecal-oral transmission mechanism are classified as diseases managed by sanitary and hygienic measures.

## 2. Infections with a fecal-oral transmission mechanism.

***2 . 1 . Shigellosis (dysentery)****— these are anthroponotic intestinal infections caused by bacteria of the genus Shigella, occurring with a predominant lesion of the distal large intestine and symptoms of general intoxication*.

***Etiology and pathogenesis***.Currently, dysenteric microbes are united in the genus Shigella, family Enterobactereacea.

All Shigella microbial cells contain endotoxin. One species, S. dysenteriae 1 (formerly Shigella Grigorieva-Shiga), produces exotoxin, which plays an important role in the development and nature of pathology in humans.

According to the modern classification, the genus Shigella is divided into 4 species (Table 1.). Currently, the leading pathogens of shigellosis in our country are Sonne and Flexner shigella. S. flexneri 2a is considered to be a particularly virulent variety. Sonne's dysentery is often characterized by a very acute onset of the disease in 6-7% of cases.

pathogens Xwell preserved in water, in food products. Existing disinfectants in accepted concentrations have good efficiency. Shigella in the intestinal tract can become infected from the permanent inhabitants of the intestine with extrachromosomal genetic material - plasmids that contribute to the formation of drug resistance (the so-called R-factor). Some plasmids can enhance the virulence of the pathogen. The presence of plasmids is of great importance in epidemiological diagnostics: epidemiological links can be established by the profile and the source of infection can be determined.

***Epidemiology***. *Source of infection*- sick or bacterial carrier. The incubation period for shigellosis is from 1 to 7 days, with the food way of infection - from several hours to 2-1 days. With the appearance of clinical symptoms (diarrhea, etc.), patients become contagious to others. Also, patients represent an epidemic danger in the period of convalescence. Some patients may have Vexcretion inzbuparent posle classinilogical Youhrecovery. Boldysentery (70-80% of cases) emit shigella within a week, in some patients (15-16%) it can continue for another 10 days, and some patients excrete the pathogen for a month or more. In most cases, with Flexner and Sonn shigellosis, infection occurs from patients with manifest forms, and with Sonn, 80% are patients with mild or

an erased form of the disease, which do not seek medical help, but are treated themselves. Bacterial carriers play a lesser role in infection (6-12%). Carriage with Flexner is less common than with Sonn.

*Mechanism transmission* - fecesno-oral. shigellosis couldatT RAspread in the following ways: food, water and contact-household.

In the food route of transmission, milk and dairy products (sour cream, cottage cheese, kefir, cheese, etc.) are the leading factors, especially in Sonne dysentery, in which shigella are not only well protected, but also able to multiply. Also, a factor in the transmission of the pathogen can be pies, vegetables, berries and fruits, salads and vinaigrettes, and other products, the infection of which can occur during their preparation, transportation, storage and sale. Sometimes in the hot season, with abundant breeding of flies, mechanical transmission of the pathogen from fecal matter to food products is possible,

**Waterway**Ptransmission is realized when drinking contaminated water and when bathing, as a result of its ingestion. Water becomes a transmission factor when it is bacterially contaminated in the zones of sanitary protection of drinking water pipelines, violation of the regime of purification and disinfection of water in drinking water pipelines, accidents in public water supply systems and sewer networks with a breakthrough and suction of sewage. In addition, infection is possible with technical defects or unsatisfactory sanitary and technical condition of water columns, wells, the use of water from technical water pipes for drinking and household needs, etc.

Given the small infectious dose, Shigella infection can occur through household contact, mainly among young children and debilitated individuals. Household items (dishes, toys, etc.) can act as transmission factors for the causative agent of dysentery. Particularly noteworthy is the role of hands as a factor in the transmission of the pathogen, primarily those serving children, those involved in cooking, feeding other people (children, patients, family members). This is confirmed by data on outbreaks that took place in hospitals and children's groups.

*Characteristics of the epidemic process.*According to WHO, about 1 million people a year die from shigellosis worldwide. In our country, shigellosis occupies a leading position in the group of intestinal infections. Morbidity rates in the Russian Federation are tens and hundreds (40-150) cases per 100,000 population.

Epithe demic process in shigellosis can occur in the form of sporadic cases (up to 70% -80% of the total incidence) and group diseases (outbreaks, epidemics). Various age groups of the population are affected, but the highest rates are observed in preschool children. Children attending institutions have a greater risk of contracting dysentery than children who are home raised. At present, outbreaks are registered in hospitals, more often in a psychiatric profile, and are mainly of a contact-household nature.

In the long-term dynamics, periodic rises are observed, however, since the end of the 80s. 20th century in the Russian Federation there is a trend towards lowerereducing the incidence of shigellosis. Until the early 1990s. Sonne shigellosis prevailed in many regions of Russia.

DlI shigellosis Sonne is characterized by summer-autumn seasonality.

In subsequent years, the incidence of Flexner's shigellosis significantly increased, which is characterized by a seasonal increase in the incidence in the warm season, but sometimes seasonality may be practically absent.

In the proportion of different age groups in the incidence of dysentery, the adult population dominates: persons 15 years and older make up 50-60%. This means that the adult population, rather than children, most often acts as sources of infection.

*risk factors*hdiseases are:

- childhood,
- Pstay opganiseovannom collection twillow mustachelovia WithKuchennews Andnon-compliance with the rules of personal hygiene,
- neySatisfactory communal improvement of settlements, including water supply.

***Preventive and anti-epidemic measures.****Prevention of shigellosis*includes Pconducting mero Priyatiya By abouteubaking usesupply of good-quality food and water and safe, in an epidemic sense, living conditions of the population.

Necessary:

- compliance with sanitary rules and regulations at facilities for the production, storage, transportation, sale of food products, public catering, water utilities, regardless of ownership and departmental affiliation;
- observance of sanitary rules and norms in families, in organized groups of children and adults, medical institutions, sanatoriums, rest homes, etc.;

Andeducation of the population and especially workers of certain professions directly related to the process of production, preparation, storage, transporting and selling food products, raising children and teenagers;

- Pconducting clinical and laboratory examinations upon admission to work of persons of certain professions;
- identification of patients with shigellosis or suspected of the disease, when patients seek medical help or through active identification among contacts or during preventive examinations.

*When carrying out anti-epidemic measures*the diagnosis is established on the basis of Tolinesical Psigns disease, uhepidemiological anapleza, rehatltats of laboratory examination. In the epidemic focus of shigellosis, focal (current, final) disinfection is carried out. Disinfection is subject to the discharge of the patient, dishes, underwear and bed linen, toys, other objects and surfaces. VPareas with which the patient has been in contact.

In the focus of group morbidity, samples of available food products and dishes (daily sample), water are taken, swabs are taken from inventory, equipment, overalls and from the hands of personnel, etc. The transmission factor (a specific food product or water) is excluded from use until the end of all a complex of anti-epidemic measures in the outbreak.

Among contacts in the focus, active identification of patients (carriers) is carried out on the basis of a survey, clinical and laboratory examination, medical observation is established.

DlRecently, active immunization of the population according to epidemic indications has been proposed for the prevention of dysentery Sonne, which is carried out with the threat of an epidemic or outbreak (natural disasters, etc.). Vaccinations are carried out before the seasonal rise in the incidence. The purpose of immunization is to prevent Sonne dysentery in children from 3 years of age and adults. Primary vaccination is recommended for:

- employees of infectious diseases hospitals and bacteriological laboratories;
- whethercemployed in the field of public catering and communal improvement;
- children attending children's institutions and leaving for health camps;
- whetherctraveling to regions with a high incidence of Sonne dysentery.

The Shigellvak vaccine, Russia, is used - a dysentery vaccine against Shigella Sonne, liquid lipmolisaccharide. The introduction of the vaccine after 2-3 weeks provides immunity to infection for 1 year. The coefficient of effectiveness of the drug -92.4%. The vaccine is administered once, deep subcutaneously or intramuscularly into the outer surface of the upper third of the shoulder. The dose for all ages is 0.5 ml (50 mcg). Revaccination against dysentery is carried out, if necessary, once a year with the same dose. In the event of the emergence of group foci in organized groups of children and adults, as well as We dedinsettlements canet talso spendbexia profandlactic specialist bacteriophage in accordance with the instructions for the use of the drug.

***Epidemiological supervision*** VClYutea heldAnde reTprospective (identification of groups, territories, time of risk and risk factors) and operational epidemiological analysis (according to indications, epidemiological examination of foci). The indications for epidemiological examination of foci are the appearance of multiple foci (2 or more), as well as sporadic morbidity, which Pexceeds the incidence Youshe slOlived ORdinar. Sanitary supervision of epidemiologically significant objects (dairy plant, catering establishments, water supply system, etc.) is of great importance.

**2.2 Typhoid fever and paratyphoid A and B***are caused by three types of Salmonella - Salmonella typhi, S. paratyphi A, S. schotmuelleri (paratyphoid B). Clinically, these diseases practically do not differ, therefore, often (if an accurate etiological diagnosis is not carried out) they are denoted by one concept - typhoid fever.*

***Etiology and pathogenesis.***Mcausative agents differ from each other in a number of biochemical properties, and in antigenic structure - in somatic O-antigens and in flagellar H-antigens. The causative agent of typhoid fever has the Vi antigen, which largely determines the virulence of the culture. InhbooThe host is subdivided into more than 100 stable phage types. Moderately stable in the environment: in soil, water it lasts up to 1-5 months, in feces - up to 25 days, on linen - up to 2 weeks. On food products it lasts up to several weeks and at temperatures above 18□C is able to accumulate. Sensitive to the use of various physical (primarily boiling) and chemical disinfectants.

When pathogens enter the small intestine, they settle in the lymphoid tissue (Peyer's patches and individual solitary follicles), then reach the mesenteric lymph nodes, where, after the next stage of accumulation, they break through this barrier and penetrate into the blood through the lymphatic pathways. At this time, the pathogen is practically not detected in the feces (1 week of illness). Bacteria circulating in the blood are retained by liver cells and excreted through the biliary tract into the intestinal lumen. Once in the intestine, pathogens re-settle in the lymphoid system of the intestinal wall and multiply again in it. This replication leads to ulceration of the intestinal wall, which in some cases can lead to perforation and the development of peritonitis.

***Epidemiology.****source of infection.*The incubation period ranges from 3 to 56 days (average 9-10 days). Start of clinical Pmanifestations coincides with the penetration of the pathogen into the blood, therefore, early diagnosis includes the isolation of blood cultures. The danger of the patient to others is associated with the re-penetration and reproduction of the pathogen in the intestines and biliary tract, which corresponds to approximately the 2nd week - the beginning of the 3rd week of the disease. Then the concentration of the pathogen in the fecal masses gradually decreases, but even in the stage of convalescence it usually remains. Also

the pathogen can be found in the urine. In recent years, milder variants of the disease have become more common. These hard-to-diagnose forms are dangerous because of the preservation of the activity of patients.

Most of those who have been ill are released from the pathogen in the first 1-2 weeks. or the next 2-3 months. convalescence. Approximately 3-5% of those who have been ill remain carriers for a long time, and some for life. The epidemiological danger of a chronic carrier is determined by his profession and depends on his compliance with the rules of personal hygiene.

*Pathogen transmission mechanism*- fecal-oral, it is realized by water, food and domestic routes.

In areas with a high incidence of infection, the infection spreads mainly by water. This occurs when using water from contaminated shallow water bodies and technical water pipes, unsatisfactory sanitary and technical condition of water and sewer facilities.

In the food route of infection, the most dangerous are milk and dairy products, creams, salads and other products, which are a good breeding ground for the pathogen. Occasionally, infection can also occur through vegetables, especially when watering them with sewage or fertilizing with feces.

**Bytnew transmission path**possible with a low sanitary culture of bacteria carriers or patients with an erased form of the disease. In this case, the surrounding objects are infected, and then the food.

*Susceptibility*people is not the same - the infectious dose can have significant differences, namely, by 3-4 orders of magnitude (in a seemingly homogeneous population, some people get sick from a dose of $10^5$, others require a dose of $10^9$ microbial cells). The transferred disease leaves stable lifelong immunity.

*Manifestations of the epidemic process.*Zthe incidence of typhoid fever in the Russian Federation is on average low (0.1-0.3 per 100 thousand population). The regions where the water supply system does not always meet modern requirements remain the most disadvantaged (the use of water from open reservoirs, insufficient water disinfection, etc.). Most often, the incidence during the transmission of the pathogen through water is recorded in the form of scattered sporadic cases. Seasonal incidence of typhoid and paratyphoid fever, if only sporadic cases are taken into account (i.e., excluding episodes of outbreaks, especially Torumonuh, catorye mogu Andhchange having foldedshwowXia hregularity of intra-annual dynamics) is quite typical. The maximum incidence rate occurs in the summer-autumn period.

The age structure is quite characteristic - the highest incidence is observed in the most active groups of the population, i.e. among adult young people. Among the child population, unlike most intestinal infections, typhoid fever often affects unorganized children. "Milk" outbreaks among young children and "bathing" water outbreaks among schoolchildren are described.

MatWomen are affected more often, probably due to the influence of social factors: work in enterprises with technical water supply, professional activities near water bodies, etc.

*Factors risk* I showTXia unkindlyToqualitative water supply, tolerance To preparation of food for carriers of bacteria of the typhoid-paratyphoid group - who have had an acute infection in the past.

***Prevention and control measures.***In the system of preventive measures in the fight against typhoid fever, the leading position is occupied by:

- providing the population with water that meets modern requirements for its quality;
- quality control of dairy products;
- control over compliance with the technological and sanitary-hygienic regime for the preparation of finished products in public catering establishments.

WaThe identification of bacteria carriers, primarily among employees of food enterprises and institutions serving children, accounting of carriers and their hygienic education are of the utmost importance. All food workers entering work and persons equated to them are subject to laboratory examination.

SunPPreventive immunization, which is carried out according to epidemiological indications, is of secondary importance.

Vaccinations are carried out according to epidemiological indications from the age of 3-7 years, depending on the type of vaccines, for the following risk groups:

- whethercam living in areas with a high level of morbidity;
- whethercam living in the territories Rand chronic water epidemics of typhoid fever;
- whethercam, busy obsluliving kanaliza- tion sooruzhenii, equipment, networks;
- traveling to hyperendemic countries and regions;
- contingents in the outbreaks according to

epidemiological indications;

- whethercworking with cultures of pathogens of typhoid fever.

The following typhoid vaccines were registered in Russia in 2005:

**Vaccine typhoid alcohol dry,**RRussia. Intended for use in adults. Vaccination is carried out 2 times: 0.5 ml; after 25-35 days. - 1.0 ml, revaccination after 2 years at a dose of 1.0 ml. Enter subcutaneously into the subscapular region. The vaccine is reactogenic, temperature >38.6°C is allowed, infiltration >50 mm in no more than 7% of those vaccinated. The general reaction appears after 5-6 hours lasting up to 48 hours, local - up to 3-4 days.

**Vaccine typhoid vi-polysaccharide liquid (VIANVAK),**RRussia.. The introduction of the vaccine provides immunity to infection after 1-2 weeks, it lasts for 2 years. It is used from the age of 3 once subcutaneously in

nouter surface of the upper third of the shoulder. A single dose for all ages is 0.5 ml (25 mcg). Revaccination - every 3 years.

**Tifim Vi - polysaccharide Vi-vaccine**firma Sanofi Pasteur, France. Its composition is similar to VIANVAK and contains in the first dose (0.5 ml) 25 μg of the Vi-antigen. It is administered once s / c or / m, immunity develops in 2-3 weeks and persists for at least 3 years. Revaccination - once with the same dose. It is used starting from the age of 5, vaccinations for children 2-5 years old are carried out after consultation with a doctor.

*Anti-epidemic measures.*If a patient is identified or if this disease is suspected, hospitalization is mandatory. When patients are discharged from the hospital, a 3-fold bacteriological examination for the presence of the pathogen is necessary.

Recovered after discharge from the hospital:

- 10 days after discharge, they are examined 5 times for bacteriocarrier (feces and urine) at intervals of 1-2 days. Then monthly once subjected to bacteriological examination of feces and urine for 3 months;
- nand in the 4th month of observation, bile and blood serum are examined bacteriologically. If the results of the studies are negative, the ill person is removed from the dispensary observation.
- Pconduct thermometry: the first 2 months - 1 time per week, in the 3rd month - 1 time in 2 weeks;

workers in the food industry and equivalent to them are not allowed to work for 1 month. after discharge from the hospital. During this time, they are 5 times bacteriologically examined. With negative results of the study, they are allowed to work, but in the next 2 months. the survey is repeated monthly. By the end of the 3rd month, bile and blood serum are examined once. In the next 2 years, they are examined quarterly, then throughout the entire labor activity, feces and urine are examined twice annually. If any examination conducted after 3 months. after recovery, at least once the pathogen is released, then such persons are considered chronic bacterial carriers and are removed from work. They are taught the rules for the preparation of disinfectant solutions, routine disinfection and proper hygienic behavior.

RWork in the epidemic focus of typhoid and paratyphoid infection is aimed at:

- na identification of the source of infection (a patient with a mild form, a convalescent person, a chronic carrier);
- hprotection of persons who have been in contact with the patient;
- nobservation of them during the maximum incubation (21 days) to identify new patients.

From work and visits to preschool institutions are suspended until a single negative result for carriage is received:

- Pchildren of preschool age giving birth in the hearth;
- children attending children's institutions;

- employees of food enterprises and persons equated to them;

Disinfection is carried out in epidemic foci. Current disinfection is carried out by relatives during the entire period of stay of the patient or bacteria carrier at home. It provides for the disinfection of secretions (fecal matter, urine) with the help of strong disinfectants in high concentration (10% bleach, 5% chloramine, etc.). The final disinfection is carried out after the hospitalization of the patient by the workers of the deconstruction service.

***3.4 Epidemiological surveillance***includes:

- Pcontinuous monitoring of the incidence of typhoid fever, taking into account the activity of the action of certain routes of infection transmission;
- determination of phage types of isolated pathogens;
- detection of epidemic outbreaks;
- systematic monitoring of chronic carriers of typhoid fever and their periodic laboratory examinations.

Persons entering work in food facilities and equated to them are subjected to bacteriological examinations.

***3 Cholera****- acute anthroponotic intestinal infection with a fecal-oral transmission mechanism caused by pathogenic V. cholerae; occurs with diarrhea and vomiting, which leads to the development of dehydration and demineralization. In accordance with International health Prules applies To especially dangerous quarantine infections.*

***Etiology and pathogenesis.***The causative agents are pathogenic vibrio cholerae (Vibrio cholerae) of serogroup 01, which have biological variants (biovars) classic and El Tor (they have 3 serovars - Ogawa, Inaba, Gikoshima), also serovar 0139 (Bengal). Vibrio cholerae has a thermostable O-antigen and a thermolabile flagellar H-antigen. Includes a number of toxic substances: thermostable lipoprotein complex co itsthWithyours endotoxin, Termolabile uhxotoxin (uhinterotoxin, cholerogen), which is associated rahtwist major patgenetic mexdehydration and demineralization anisms, a number of enzymes and low molecular weight metabolites.

INAndBrion El Tor is very stable, remains viable in water of open reservoirs for several months, in sewage - up to 30 hours. breeds well in fresh milk and on meat products. The causative agent of cholera quickly dies when disinfected and

boiling, drying and na Solnechnom svete, chupersuasive toen Andbiotics of the tetracycline group and chloramphenicol.

With oral infection, most vibrios die in the acidic environment of the stomach. With a decrease in gastric secretion, functional or associated with various diseases, they overcome the acid barrier of the stomach, settle and are fixed on enterocytes, affecting their enzyme systems. During the reproduction and death of vibrios, a large amount of toxic substances are released without the development of an inflammatory process, which leads to hypersecretion of water and salts by enterocytes into the intestinal lumen. Intensive diarrhea and vomiting provoke the development of dehydration, demineralization, hypovolemia, microcirculation disorders, tissue hypoxia, and metabolic acidosis. The insufficiency of the function of the kidneys and other organs is increasing. Endo- and enterotoxin cause activation, and then inhibition of intestinal motility and the occurrence of vomiting.

***Epidemiology.****Source of infection* -patient and carriers (convalescent, chronic or transient carrier). Vibrio El Tor more often than the classic one causes mild forms of the disease, but the carriage is longer. The patient is contagious throughout the disease - from the moment the first clinical symptoms appear, as well as WithTadia rekonvalescence. Naibolb shatuhpidemiological dangerousTbrepresent patients with a pronounced, typical clinical picture of cholera, excreting up to 10-20 liters of feces per day in the first 4-5 days of the disease. Infectiousness of convalescents, as they recover,gradually falls and by the 3rd week there is a release from the pathogen. Patients with erased forms of cholera excrete a smaller amount of feces and, accordingly, the pathogen. With cholera, asymptomatic forms of infection are also recorded.

Recently, an opinion has been expressed that the water of open reservoirs can act as a reservoir of infection (cholera vibrio can multiply in water under favorable temperature and a number of other conditions). There is also a point of view about the role of various aquatic organisms (fish, shrimps, mussels, etc.) in the circulation of cholera vibrio, since, firstly, the reproduction of vibrio in the body of aquatic organisms is allowed, and secondly, outbreaks were noted as a result of use in food dishes prepared from various aquatic organisms.

*Transfer mechanism*- fecal-oral. The leading route of transmission is water, it is possible to spread cholera by food, some authors do not exclude household transmission. In the occurrence of epidemic outbreaks and the spread of cholera within the outbreak, the leading role belongs to surface water bodies contaminated with untreated sewage. watermAnd. contagioneneithere human aboutrefaudition PRAnd atconsumption water dlI household and drinking needs and the use of reservoirs for swimming.

People with cholera are also associated with the use of seafood (mussels, oysters, shrimp, scallops, lobsters, crabs, fish, etc.), the use of which, raw or undercooked, led, as already mentioned, to infection of people .

*Susceptibility*people to cholera is universal, however, the presence of many mild forms and primary (non-immune) carriage indicates the possibility of reproducing

Tsevere manifest forms of infection only when infected with a sufficiently large dose of the pathogen. The most susceptible to the disease are persons with low acidity of gastric juice, suffering from anacid gastritis, some forms of anemia, helminthic invasias. Perecovered hoLeroy priobretreat enTAndbacterial Andantitoxic immunity. The transferred disease leaves relatively stable species-specific immunity, repeated diseases are rare.

*Manifestations of the epidemic process.*Endemic for cholera is Southeast Asia, primarily countries such as India, Bangladesh, Pakistan. From 1817 to the present, there have been seven cholera pandemics. The seventh pandemic began in 1962 and continues to the present. All previous pandemics were caused by the classic Vibrio cholerae, the seventh - by the El Tor biotype. The population of Russia was included in the epidemic process during each pandemic. From 200 to 500 thousand cases of cholera are registered annually in the world. In the Russian Federation, cholera cases have been reported in the republics of Dagestan, Chechnya, and Tatarstan. Isolated cases, mainly associated with importation, were observed in Western and Eastern Siberia, Primorsky Krai, and the Far East.

In endemic countries, cholera is recorded all year round, with an increased incidence observed in the hottest period of the year. In territories partially or completely free from cholera, diseases occur most often during the summer (summer-autumn) seasonal rise in the incidence of acute intestinal infections.

In traditional foci of cholera, children and the elderly are more likely to get sick. In territories free from cholera, after infection, diseases are observed in the most active part of the population (20-40 years old). Risk groups include people working at sewage treatment plants, living on the coasts of seas and rivers, as well as those engaged in coastal fishing and seafood.

*risk factors*PCholera is living in the territory of endemic foci of cholera, pilgrimage, profession (workers of treatment facilities, bacteriological laboratories).

***Mcontrol and prevention measures***. Prevention of cholera consists of:

In improving the socio-economic and sanitary-hygienic living conditions of the population:

- provision of good quality drinking water;
  waste water disinfection;
- sanitary cleaning of populated areas;
- Pimprovement of the sanitary culture of the population.
- In carrying out measures to prevent the introduction of cholera from abroad:
  sanitary inspection of cargo, luggage;
- survey of passengers;
- fromolation of identified patients, etc.

In carrying out specific prophylaxis of cholera for some contingents: it is of auxiliary importance and is most often not carried out.

*Anti-epidemic measures.*ABOUTcholera fungus is declared upon registration of the first case of cholera disease (vibrio-carrying condition) caused by toxigenic vibrio cholerae 01 and 0139 serogroups. The boundaries of the focus of cholera are established within a certain territory on the basis of data on the territorial distribution of patients, places of detection of cholera vibrios in water bodies, as well as the possible implementation of transmission routes of the pathogen. Localization and elimination of the focus of cholera is carried out according to the operational plan of the sanitary and anti-epidemic commission (SEC), which consists of catORoy entrance and.

Dicinian Cab, providing metodic and professional supervision of all work. Quarantine is introduced in exceptional cases. The boundaries of the territory on which certain restrictive measures (observation, quarantine) are introduced are determined, as already mentioned, based on the specific epidemic situation, possible operating factors for the transmission of the infectious agent, and sanitary and hygienic conditions. The intensity of population migration and transport links with other territories are also taken into account.

***Epidemiological surveillance***ha xoleroy includes a system of measures aimed at the timely detection of imported and local cases of cholera. The circulation of Vibrio cholerae in environmental objects is equally monitored by purposeful study of water in surface water bodies (in the zones of sanitary protection of water intakes, places of mass bathing, below the discharge of sewage, including conditionally clean water from power plants, port waters, etc. ).

Suncultures of vibrio cholerae 01 and 0139 serogroups isolated from people and from environmental objects are subject to identification with the determination of toxigenicity and sensitivity To Antibiotics. IN nastanding vreme etcAndnomenclature TouhpiFor demiological surveillance of cholera, the territory of the Russian Federation is conditionally divided into 3 groups. The following criteria are taken as the basis for differentiation:

- atthe proportion of cases of cholera and vibrio carrying in the subject relative to the total number of cases of cholera registered in Russia;
- maximum incidence rates per 100 thousand population;
- himports of infection with (without) spread(s);
- types (water, food, etc.) of the epidemic process;
- properties of vibrio cholerae 01 and 0139 serogroups isolated from humans on the basis of virulence and toxigenicity;
- the maximum number of years of annual isolation of vibrio cholerae 01 and 0139 serogroups (including virulent, hemolysis-negative, containing the ctx gene and avirulent, Gemollients, Not sodeneighing gene ctx) fromsurface water bodies;
- seasonality of detection of cholera vibrios in water bodies;

The first group includes areas of high risk, namely the republics of Dagestan, Chechnya, Ingushetia, Astrakhan, Rostov, Volgograd regions and the Stavropol Territory.

INo the second group includes territories with a lower risk of disease: the Republic Kalmykia, Seaside And KrasnodarAndth the edges. Sune osTRussian administrative territories belong to the third group.

***4. Food poisoning (PTI)***— *acute infectious diseases caused by opportunistic microorganisms that can accumulate toxins outside the human body (in food products), affect the mucous membranes of the stomach and intestines, disrupt the water and electrolyte balance.*

***Etiology and pathogenesis.***Diseases are caused by a large group of microorganisms, of which Staphylococcus aureus, Proteus vulgaris are the most common. Bacillus cereus, Clostridium perfringens, representatives of the genera Klebsiella, Enterobacter, Citrobacter, Serratia, Enterococcus, etc. Pathogens are widespread in nature, able to multiply on environmental objects. Entero- and cytotoxins of opportunistic microorganisms cause inflammatory changes in the mucous membrane of the stomach and intestines, disrupt the water and electrolyte balance and participate in the development of intoxication (see Salmonellosis).

***Epidemiology.****source of infection*are animals and people. Persons suffering from purulent diseases (panaritiums, tonsillitis, furunculosis, etc.), as well as animals suffering from mastitis, secrete staphylococci, which, when they get into food products during their processing, multiply and accumulate. The reservoir of a number of pathogens can be soil and other external objects | environments contaminated
Andexcrement of animals and man.

*Transmission mechanism and susceptibility.* Mtransmission mechanism - fecal-oral, route

Ptransmission is mainly food. For the occurrence of the disease, a massive dose of the pathogen is required, which is achieved when it enters and multiplies in some food products. Most often, diseases are associated with milk, dairy products, meat, fish, vegetable dishes, as well as products containing cream (cakes, pastries), canned fish in oil. Products containing staphylococcal and other enterotoxins do not differ from benign in appearance, smell and taste.

*Manifestations of the epidemic process.*Diseases are ubiquitous. Diseases are recorded in the form of group outbreaks or sporadic cases. Outbreaks are familial or, in the case of infection in public catering establishments, the diseases are often dispersed throughout the territory of the settlement. The number of cases is determined by the number of people who consumed the contaminated food product and can vary significantly. Group diseases are characteristic among passengers of ships, tourists and members of children's and adult organized groups. Outbreaks are usually explosive. There were no differences in the socio-age and gender composition. Diseases are more often registered in the summer. Depending on the type of food product, children or

adults. The natural susceptibility of people is high, usually people who have consumed a contaminated food product become ill.

***Prevention and control measures.***Prevention of diseases is based on the observance of the sanitary-hygienic and technological regime, norms and rules for the procurement, preparation, storage and sale of food products. It is necessary to ensure veterinary and sanitary control of animals that can contaminate the soil, water and surrounding objects with pathogens. To prevent staphylococcal poisoning, Events, directed on atdecrease noseAndTstaphylococcus infections in workers of food enterprises (sanation of staphylococcus carriers in the nasopharynx and on the skin, treatment of chronic inflammatory diseases of the tonsils and upper dyXatelny ways). Heneed to be removed from work,ndirectly related to the processing of food products and their manufacture, persons with pustular skin diseases, pharyngitis, tonsillitis and other manifestations of staphylococcal infection. It is important to properly store food products, excluding the reproduction of pathogens in them. Heat treatment of food products, boiling of milk and compliance with the deadlines for their implementation are extremely important.

***Epidemiological surveillance***Pis carried out in the same directions as in the OKI.

***5. Botulism****— an acute toxic-infectious disease associated with the consumption of foods containing Clostridium botulinum toxin and the pathogens themselves, characterized by the development of paresis and muscle paralysis caused by blockade of acetylcholine release in nerve synapses by the toxin.*

***Etiology and pathogenesis.***The causative agent of the disease - C /. botulinum is a mobile spore-forming rod. In the preparations, microorganisms are arranged in pairs, which gives them the appearance of "drumsticks". The vegetative form of the pathogen is a strict anaerobe. In nature, it is preserved in the form of spores resistant to external influences. 7 serovars of botulism are known - A, B, C, D, E, F, G. On the territory of the Russian Federation, serovars A, B, E and rarely C are mainly found. Optimal growth of clostridia and toxin formation occur at 35□C. Vegetative forms of the microbe die at a temperature of 80□C for 30 minutes, when boiled - after 5 minutes, spores withstand boiling for more than 30 minutes, they die completely only when autoclaved. The toxin is destroyed by 20-minute boiling, resistant to the action of pepsin and trypsin. Botulinum toxins withstand high concentrations (up to 18%) of table salt and are not destroyed in products with spices. The presence of botulinum toxin in food products does not change their organoleptic properties. It is one of the most powerful biological poisons.

Human infection occurs when the toxin enters the gastrointestinal tract with food. Good absorption of the toxin determines its highest concentration in the blood already on the first day. Botulinum toxin helps stop the release of acetylcholine in nerve synapses, which leads to progressive paresis and paralysis of the muscles.

***Epidemiology.****Reservoirs and sources of infection*are the soil, the organism of wild and synanthropic animals, waterfowl, fish and humans. A sick person does not pose an epidemiological danger. Different types of botulism have clinical and epidemiological features.

Type B botulism is associated with:

- relatively low mortality and foci;
- oudlinear incubation period (more than 2 days),
- hbelated termAndOrotation hA medical help, diagnosis, hospitalization and initiation of treatment;
- clinic of moderate and mild severity, late terms of death of patients (over 5 days). Type E

botulism is characterized by:

- very high mortality (30% and above);
- ukshortened incubation (up to 2 days in 90% of patients);
- Pthe predominance of a severe clinic and deaths (about 60% of patients die in 1-2 days).

*Transfer mechanism*- fecal-oral. The main cause of the disease is the consumption of home canned food contaminated with clostridia and containing their toxin, as well as sausages, ham, smoked and salted fish. A high degree of connection between the typical structure of the pathogen and the nature of the transmission factors is determined. Canned meat products (stew, ham, sausages, etc.) most often cause type B botulism, fish - type E and F botulism, and canned plant products (pickled mushrooms, vegetables, fruits, etc.) - botulism types A and B. Virtually all food contaminated with soil or intestinal contents of animals, birds and fish may contain spores of botulinum pathogens. However, the disease can only occur when using those that have been stored under anaerobic conditions. Much less common is wound botulism and infant botulism, which occurs when clostridium that produces the toxin enters the intestine. With injuries in crushed, necrotic tissues, deprived of oxygen access, conditions close to anaerobic are created, under which vegetative forms germinate from spores and toxin is produced.

*Manifestations of the epidemic process.*Botulism occurs as sporadic and group diseases. Often familial as a result of infection through home-cooked products.

In Russia, diseases associated with the use of home-cooked mushrooms, canned vegetables, smoked or dried fish are more often recorded.

The natural susceptibility to botulism is high.

***Prevention and control measures.****Prevention of botulism*is based on strict observance of sanitary and technological rules of food preservation. Meat and fish can only be preserved fresh. Vegetables and fruits should be thoroughly washed before canning to remove soil particles. Canning of overripe fruits is also not allowed. It is necessary to strictly observe the guarantee sterilization regime. Spoiled (with bombing) and expired canned food should not be allowed into the trading network. An important role is given to explanatory work among the population about the danger of botulism and the rules for preserving food at home.

***Anti-epidemic*** ***Events***Pare being Rospotrebnadzor V Withluchae appearance painns bothatlysm. Headsns htasks Pconducted sanitary and epidemiological survey are:

- identifying and eliminating from the use of those canned foods that caused people to get sick;
- atformation of a circle of consumers of these products.

DlI improve the quality of the survey and its effectiveness are widely used laboratory tests of blood, wash water and feces of patients suspected of using canned food, and in the death of victims - cadaveric material. By setting up a biological sample and a neutralization reaction, the presence and type of toxin and pathogens are determined.

In the event of an outbreak of botulism associated with industrial canning, a batch of contaminated canned food is removed from sale in the distribution network. The population is invited to hand over to the trading network or destroy the specified type of canned food. The reasons that led to the violation of the canned product manufacturing technology are identified in order to eliminate them and prevent their recurrence in the future.

When there are cases of botulism caused by home canning products, the latter are subject to seizure and immediate destruction. All identified consumers of such products are subject to medical supervision for 10-12 days. Recommended
intramuscularly inject anti-botulinum serum containing 2000 IU to toxins A, B and E, and also prescribe enterosorbents. Active immunization is not widely used.

***Epidemiological surveillance***basically similar to that in intestinal infections, includes bacteriological control of food raw materials used in the preparation of meat, fish and vegetable canned food, monitoring compliance with their sterilization regimen. The sale of canned food in the distribution network, their appearance (bombing) and the timing of implementation are subject to systematic control.

## 6. Viral intestinal infections

***Hepatitis A***- *anthroponotic benign acute cyclic enteroviral disease, characterized by the cytopathic effect of the virus on hepatocytes and clinically manifested by intoxication syndrome, hepatosplenomegaly and often jaundice.*

***Etiology and pathogenesis.***The hepatitis A virus in biological characteristics (including epidemiological features) is similar to enteroviruses, therefore, in the early 80s. 20th century The International Committee on Taxonomy proposed to designate it as enterovirus type 72. However, then it was decided to separate it into a separate genus Hepatovirus. Hepatitis A virus is well preserved in the external environment (withstands drying, prolonged exposure to normal temperatures, low pH - below 6), is highly resistant to aroundthstvuyu uhfira, many shcommonly used VP practice of disinfectants, including chlorine-containing and other oxidizing agents (higher concentrations and exposures are required), withstands boiling for up to 1 minute. At a chlorine concentration of 0.5-1 ml/l and pH 7.0, it survives for 30 minutes or more, which determines its ability to persist for a certain time in tap water. These features of the pathogen are of great importance in the epidemiology of HAV.

INAndRUwith enters the intestine, from which it quickly penetrates into the bloodstream, causing viremia. Subsequently, it replicates in hepatocytes, exerting a direct cytopathic effect on them, V rezultate heGO Phappening dehintegration membran hepatocytes Andintracellular organelles. Release of hydrolases from cells leads to the development of cytolysis and necrobiosis of hepatic cells. At the same time, an inflammatory process develops in the connective tissue of the liver and cholestasis.

***Epidemiology.****source of infection*is a person with manifest and inapparent manifestations of the disease. The incubation period can vary from 15 to 50 days (on average 3 to 4 weeks). A sick person is dangerous to others from the 2nd half of the incubation period with a peak during the 1st week of illness. The concentration of the virus in the feces grows very quickly, reaching a maximum in the last days of incubation, this level is maintained for some time in the prodromal period (vague signs of acute respiratory disease, fever, dyspeptic symptoms - nausea, loss of appetite, etc.) and then, with the development of jaundice, the concentration of the pathogen in the fecal masses falls rapidly. Only rare patients pose some danger in the first 2-4 days of the icteric period. Therefore, the patient with icteric form poses the greatest potential threat.

mild forms with vague symptoms. Most of these patients do not seek help. There is a widespread asymptomatic form of the infectious process. Such asymptomatic forms of infection (carriage) can occur even at the first encounter with the pathogen (a small dose of the pathogen, weak immunity). Such an abundance of disguised sources of infection creates the preconditions for a significant spread of diseases.

*Transmission mechanism* -fecal-oral. People become infected by drinking water and food infected with the hepatitis A virus, sometimes through household contact. Through medical instruments, the pathogen is almost not transmitted. The role of each transmission route varies in different settings.

**Water path** Youhayut Voutbreaks hdiseases Wededi persons, using contaminated water.

**food outbreaks**hmore associated with the entry of the virus and its accumulation in products. At food enterprises, the pathogen can get from staff,A n d having a mild form of the disease. It is also possible to infect vegetables and berries when human feces are used for their cultivation as fertilizers (rarely).

**TOcontact-household way**Ptransmission usually occurs V organized preschool children's institutions.

*Susceptibility*people universal. The absence of repeated HAV diseases, as well as the high probability of epidemic in our country (due to repeated encounters with the pathogen), providing defitfrom rahorgy of manifest forms infectiontions, testifies O Pcomplete themmuthread. Themmunity expAfights persistent tense.

*Manifestations of the epidemic process.*Viral hepatitis A is one of the most widespread intestinal infections in the world. Increased morbidity is observed in regions with unsatisfactory sanitary and communal conditions, where epidemic outbreaks have Vone origin. For long-term dynamics, non-periodic (after 4-6 years) rises in incidence are characteristic; according to some authors, the maximum rises in incidence occur on average after 22 years. The intra-annual dynamics has a summer-autumn seasonality. The most susceptible to the hepatitis A virus are children from 2 to 14 years old, but in recent years there has been a high incidence of the population aged 7 to 20 years. In a number of places, children 3-6 years old are most often affected. The role of adults in the spread of the virus is dominant.

Risk factors:

- ngood quality water supply;
- ne compliance with the hygiene requirements of food industry workers and persons equated to them.

***Prevention and control measures.***The main measures to prevent infection are to ensure nsettlements dobrokAhonest water Andcoh Denmark mustacheconditions that guarantee the fulfillment of sanitary rules for the preparation, storage, preparation and sale of food products. Ensuring is of great importance

nproper anti-epidemic regime in organized children's groups. Currently, the hepatitis A vaccine is used as a specific prophylaxis. Vaccination Oallows fast Precut flaresshToat Gepatita A.

According to the Russian national vaccination schedule, according to the epidemiological indications of Russia, a circle of people at an increased risk of contracting hepatitis A is indicated:

- children. living in areas with a high incidence of hepatitis A;
- medical workers, educators and staff of kindergartens;
- workers spheres service, before Vseth hired V organ frompublic catering events;
- workers in the maintenance of sewer facilities, equipment and networks;
- traveling to hyperendemic regions and countries for hepatitis A;
- contact in the outbreaks according to epidemiological indications;
- patients with chronic liver diseases (including carriers of HBsAg and hepatitis C virus);
- military contingents employed in the field. All vaccines

are administered intramuscularly only.

***HEP-A-in-VAK*** VAkcina Protiv hepaTitA A, kulural eyesschennaya ton-tscentered adsorbed inactivated liquid, Russia. It is used in children from 3 years old, adolescents and adults. A single dose for children and adolescents under 17 years old is 0.5 ml, for adults - 1.0 ml. The vaccine is injected into the deltoid muscle. The course consists of two vaccinations according to the scheme 0, 6-12 months.

***Avaxim***firm Sanofi Pasteur, France. It is administered to children from 2 years of age and adults once, revaccination is carried out after 6-18 months. once.

***Wakta*** Merck, Sharp and Dome, USA. It is administered once: for children 2-17 years old, 25 antigenic units. - 0.5 ml, adults 50 antigenic units. - 1.0 ml, revaccination with the same dose after 6-18 months.

***Havrix*** GlaxoSmithKline, England. Produced in ampoules of 0.5 ml - 720 ELISA units. for children 1-18 years old and 1.0 ml - 1440 ELISA units. for adults. Vaccination is carried out twice with an interval of 6-12 months. Patients on hemodialysis, as well as persons with defects in the immune system, additional vaccination is recommended after 1 month. after the first vaccination.

*Anti-epidemic measures*. In the focus of infection, medical observation is established for 35 days for persons who have been in contact with the patient. In preschool groups during this period, the transfer of children and staff to other groups is prohibited, new children are accepted only with the permission of the epidemiologist.

Pvaccination is carried out (see above). You can enter immunoglobulin. For children under the age of 10 who have been in contact with the patient, immunoglobulin is administered at a dose of 1 ml, for persons over 10 years of age - 1.5 ml. In the hearth, current and final disinfection is carried out.

***epidemiological surveillance.***The purpose of epidemiological surveillance of viral hepatitis A is to reduce the incidence of the general population and prevent diseases in certain population groups. The goal is achieved by solving the following tasks:

- atformation of social and age groups of the population with high, medium and low levels of morbidity, taking into account their contribution to the total annual incidence rates;
- identification of specific groups where the formation of an epidemic variant of the pathogen and its intensive distribution are presumably taking place;
- utclearing up Pperiods GOh yeah, When V rahpersonal GRUppah useof the disease, an epidemic variant of the pathogen is presumably formed and when it spreads;
- Psearch for specific and intermediate factors of pathogen transmission;
- evaluation of the effectiveness of the anti-epidemic measures taken;
- substantiation of prospective and current management decisions.

In the course of a retrospective epidemiological analysis, the following are distinguished:

- nthe most important sites where activities should take place;
- nthe most important periods of time when they should be spent there;
- the content of the events themselves is specified.
- Operational epidemiological analysis includes:
- Pmonitoring the implementation of planned activities;
- dynamic assessment of the state of epidemiologically significant objects;
- disease tracking

## Test tasks

1. manifestations of the epidemic process of intestinal infections:
A) uneven distribution of morbidity across the territory;
B) global annual pandemics;
C) summer-autumn seasonality;
D) the predominance of adults among the sick
D) the predominance of children among the sick

2. A waterborne outbreak of intestinal infectious diseases is preceded by:
A) deterioration of indicators of bacteriological control of drinking water;
B) heavy rains
B) stable clear weather
D) failure of the water supply and sewerage network
D) floods

3. Food outbreaks of intestinal infections are characterized by:

A) the presence of seasonality
B) the absence of outbreak precursors
C) the predominance of typical forms of the disease
D) the predominance of the minimum incubation period in patients

4. The epidemic process of shigellosis is characterized by:
A) sporadic incidence
B) outbreak
C) the same incidence in all age groups
D) summer-autumn seasonality

5. The source of the causative agent of salmonellosis can be:
A) farm animals
B) rodents
B) a person
D) birds
D) ticks

6. Ways of transmission of Salmonella6
A) food
B) transovarial
B) water
D) everyday life
D) air-dust
E) airborne

7. Measures to prevent the spread of salmonella among people:
A) vaccination of the population
B) veterinary and sanitary control over compliance with the rules of slaughter
C) labeling and proper storage of inventory in catering units
D) chemoprophylaxis of contacts in the epidemic focus
D) compliance with the rules of storage and terms of sale of meat products

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