



## MEASLES AT THE PRESENT STAGE

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### ANNOTATION

Relevance: Measles is an acute viral infection, the most "contagious" among childhood infections. The causative agent of measles is an RNA virus of the genus morbillivirus of the paramyxovirus family, which has a spherical shape and a diameter of 120-230 nm. The measles virus is not stable in the external environment, quickly dies outside the human body, remains active in the air and on surfaces for up to 2 hours, is not resistant to environmental factors, and quickly dies from sunlight and UV rays. Measles is one of the most contagious diseases in the world, with a contagiousness index of over 90%. Perhaps intrauterine infection (transplacental transmission), when a woman falls ill at the end of pregnancy, the child is born with signs of measles. Measles during pregnancy is a high risk factor for preterm birth, spontaneous abortion, and the development of congenital malformations. In the absence of anti-measles antibodies in the mother, the child may become ill in the neonatal period.

**Keywords:** epidemic process, morbillivirus, measles enanthema





## QIZAMIQNING ZAMONAVIY KECHISH XUSUSIYATLARI

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### ANNOTATSIYA

**Dolzarbli:** Qizamiq-o'tkir virusli infektsiya bo'lib, bolalar yuqumli kasalliklari orasida eng "yuqumli" hisoblanadi. Qizamiqning qo'zg'atuvchisi paramiksoviruslar oilasiga mansub morbilliviruslarning RNK saqlovchi virusi bo'lib, sharsimon shaklga ega, diametri 120-230 nm. Qizamiq virusi tashqi muhitga chidamli emas, inson tanasidan tashqarida tezda nobud bo'ladi, havoda va sirtlarda 2 soatgacha faol bo'lib qoladi, atrof-muhit omillariga chidamli emas, quyosh nuri va UB nurlari ta'sirida 'tezda no.bud boudi Qizamiq dunyodagi eng yuqumli kasalliklardan biri bo'lib, yuqumlilik indeksi 90% dan yuqori. Bachadon ichi infektsiyasida (transplental uzatish), homiladorlikning oxirida ayol kasal bo'lib qolganda, bola qizamiq belgilari bilan tug'iladi. Homiladorlik davrida qizamiq erta tug'ilish, spontan abort va tug'ma nuqsonlarning rivojlanishi uchun yuqori xavf omilidir. Agar onada qizamiq antitelolari bo'lmasa, bola neonatal davrda kasal bo'lib qolishi mumkin.

**Kalit so'zlar :** epidemik jarayon, morbillivirus, qizamiq enantema

### Introduction

According to the World Health Organization, the unfavorable situation with measles persists in many countries of the world [1]. Since the beginning of 2019, the number of cases of measles has continued to rise. Preliminary global data show a 300 percent increase in reported cases in the first three months of 2019 compared to the same period in 2018. There are a number of countries currently experiencing measles outbreaks. These countries are the Democratic Republic of the Congo, Ethiopia, Georgia, Kazakhstan, Kyrgyzstan, Madagascar, Myanmar, Philippines, Sudan, Thailand and Ukraine.

Cases are also on the rise in countries where vaccination coverage is generally high, including the United States of America, Israel, Thailand and Tunisia.

The European Region has seen an unprecedented rise in measles cases over the past 10 years. In 2019 alone, in Ukraine, the rate of measles patients was 84.9 per 100,000 population, in Georgia - 39.6, in Montenegro - 32.4, in Greece - 26.1, in Romania - 8.4, in Moldova - 7.7, in France - 4.3, in Italy 4.2 [2].





During 2020, 12 205 cases of measles were reported in 37 countries (71%) of the WHO European Region out of 53 countries reporting measles data. Of the total cases in the Region, 10 717 cases (88%) were reported in 6 countries: Uzbekistan (n=4053; 33%), Kazakhstan (3269; 27%), Russian Federation (1100; 9%), Romania (976 ; 8%), Kyrgyzstan (708; 6%) and Turkey (611; 5%) [24] .

Where measles remains endemic, its epidemic process is characterized by pronounced seasonality: in temperate zones, the most intense transmission of the virus occurs mainly in late winter and spring (most cases of measles are observed in the winter-spring period (December -May) with an increase in the incidence every 2- 4 years).

Before the introduction of vaccination programs, the incidence of measles in children was almost universal. Measles epidemics were cyclical and occurred about once every four years, with alternating rises in incidence and inter -epidemic periods characterized by low incidence. With the introduction of measles vaccination and an increase in vaccination coverage, the incidence of this infection in the years of epidemic upsurges has decreased, and the inter -epidemic periods have become longer. Achieving a very high level of population immunity has led to the elimination of measles in many countries, but if this level is not maintained, then periodic epidemic rises in the incidence of measles will occur again [3].

Measles is an acute viral infection, the most "contagious" among childhood infections. The causative agent of measles is an RNA virus of the genus morbillivirus of the paramyxovirus family , which has a spherical shape and a diameter of 120-230 nm . The measles virus is not stable in the external environment, quickly dies outside the human body, remains active in the air and on surfaces for up to 2 hours, is not resistant to environmental factors, and quickly dies from sunlight and UV rays. At room temperature, it is inactivated after 3-4 hours. Sensitive to the action of detergents and disinfectants [4].

The source of infection is only a sick person, including atypical forms of measles [5,6,7]. The patient is contagious from the last days of the incubation period (day 2), during the entire catarrhal period (day 3–4) and the rash period (day 3–4). From the 5th day of the appearance of a rash, a patient with measles becomes non-contagious. However, in the presence of complications (pneumonia), the period of contagiousness is extended to 10 days from the onset of exanthema [8,5,9].

The transmission mechanism is drip. The disease is transmitted by airborne droplets, less often by contact. The measles virus, when talking, coughing, with droplets of saliva, is spread by air currents not only into the room where the patient is located, but can penetrate into neighboring rooms through corridors and stairwells, through the ventilation system, and even to other floors of a residential building.





A contagiousness index of over 90%. Susceptible to measles are those who have not had measles and have not been vaccinated against it ( remain highly susceptible to measles throughout their lives and can get sick at any age) or are vaccinated once, as well as those with an unknown vaccination history or those who, with a serological the examination did not reveal antibodies to the measles virus in protective titers in RTHA - 1:5, in the passive hemagglutination inhibition reaction (RPHA) - 1:10 and higher.

Intrauterine infection is possible ( transplacental route of transmission); if a woman falls ill at the end of pregnancy, the child is born with signs of measles [8].

Measles during pregnancy is a high risk factor for preterm birth, spontaneous abortion, development of congenital

vices. In the absence of anti-measles antibodies in the mother, the child may become ill in the neonatal period [7].

A WHO standard case definition for measles has been developed - any person with a temperature of 38°C or above, a maculopapular rash and at least one of the following symptoms: cough, runny nose, conjunctivitis (red eyes), or any person suspected of having measles.

Epidemiological classification of measles cases:

- A case of acute illness in which one or more of the typical clinical signs of measles listed above is present should be considered "**suspicious**";
- A case of acute illness in which there are clinical features consistent with the standard definition of a measles case and an epidemiological link to another suspected or confirmed measles case should be considered "**probable**";
- A case of acute illness classified as "suspicious" or "probable" after laboratory confirmation of the diagnosis is considered "**confirmed**".

However, a laboratory-confirmed case of measles does not have to meet the standard clinical case definition (atypical, erased forms).

In the absence of laboratory confirmation of the diagnosis of measles due to the impossibility of conducting studies, a "probable" case is automatically classified as "confirmed".

The final diagnosis of measles is established in the presence of laboratory confirmation of the diagnosis and / or epidemiological connection with other confirmed cases of this disease [10].

The disease includes three stages: latent (incubation) period, catarrhal, rash period and pigmentation period. The incubation period from the moment of infection to the onset of the first symptoms of the disease lasts 8–14 days, less often 21 days, averaging 10–12 days. Lesions usually appear 14 days after infection (range 7-18 days) [11].





The disease is characterized by an acute onset - a rise in temperature to 38-40 ° C, a dry cough, runny nose, photophobia, sneezing, hoarseness, headache, swelling of the eyelids and redness of the conjunctiva, hyperemia of the pharynx and measles enanthema - red spots on the hard and soft palate. On the 2nd day of illness, small whitish spots appear on the buccal mucosa in the area of the molars, surrounded by a narrow red border: these are the so-called Belsky - Filatov - Koplik spots, which are a pathognomonic symptom of measles. A measles rash (exanthema) appears on the 4-5th day of illness and is characterized by a staging of the rash:

- On the 1st day, elements of the rash appear on the face, neck;
- On the 2nd day - on the trunk, arms and thighs;
- On the 3rd day, the rash covers the extensor surfaces of the arms and legs, including the fingers, and on the face the rash begins to turn pale.

The most dense elements of the rash are located on the face, neck and upper body. The rash consists of small papules, surrounded by a spot and prone to merging (this is its characteristic difference from rubella, in which the rash does not merge). The reverse development of the elements of the rash begins on the 4th day of the rash: the temperature returns to normal, the rash darkens, turns brown, pigments, flakes (in the same sequence as the rash), pityriasis peeling is observed (on the face and trunk). Pigmentation lasts from one to 1.5 weeks.

It should be noted that in children, measles is easier, intoxication and fever are less pronounced. Accompanied by puffiness of the face, catarrhal sore throat, rough, barking cough, stentorian breathing. Spots Filatov-Koplik-Belsky disappear in the first two days of the rash [12,13].

In adults, the disease proceeds with high fever and severe intoxication. The catarrhal period can be delayed up to 6-8 days. Filatov-Koplik-Belsky spots persist longer than in children, up to 3-4 days of skin rash. The rash is profuse, large-spotted-papular, often confluent, and may be hemorrhagic in nature.

It is necessary to take into account the peculiarities of the course of the disease at the present stage [22,23,25]. Violation of the stages of rashes, the presence of diarrheal syndrome, nausea, vomiting are common signs of the course of measles today.

Diagnostic errors in the period of rash are more likely to occur with an atypical course of the disease (mitigated measles, measles with a malignant course - hypertoxic, hemorrhagic).

Mitigated measles is observed in individuals who have received normal human immunoglobulin or, in some cases, in those vaccinated, but who have lost immunity. The disease is characterized by mild catarrhal symptoms, Filatov-Koplik-Belsky spots may be absent, the temperature is normal or subfebrile, the rash is not plentiful, dim.



The hemorrhagic form of measles is characterized by severe general intoxication and is accompanied by phenomena of hemorrhagic diathesis: multiple hemorrhages in the skin, mucous membranes, bloody stools, hematuria. With this form, death can quickly occur.

The hypertoxic form of measles is characterized by hyperthermia, toxicosis, acute cardiovascular insufficiency, and meningoencephalitic phenomena [14].

### **Complications**

Measles remains one of the leading causes of death in young children worldwide. Most deaths are due to complications of measles. Most often, complications develop in children under 5 years of age and in adults over 20 years of age. Approximately 30% of registered measles patients develop one or more complications. In developed countries, these are otitis media (in 7-9% of cases), pneumonia (1-6%), diarrhea (6%), loss of vision. A less common but very serious complication of measles is subacute sclerosing panencephalitis (1 case per 100,000 cases) [15,16].

### **Prevention**

Although safe and effective vaccines have been available for over 40 years, measles is still one of the world's leading causes of death among young children.

**The most effective means of protection against measles is vaccination** given to children at the age of 1 year (12 months) and 6-7 years (before entering school). The measles vaccine provides long-term, active post-vaccination ( post- vaccination , artificial) immunity.

If the mother has previously had measles, newborn children have congenital or colostral (colostrum, from lat. colostrum - colostrum ) immunity, that is, acquired passive immunity that develops when antibodies are transferred to a newborn in utero or with colostrum from the mother. This immunity lasts the first 6-9 months of life; passive immunity in children of those mothers who did not have measles, but were vaccinated in childhood, is maintained for a shorter period. There are cases of congenital measles with transplacental infection of the fetus with a virus from a sick mother.

After the disease, stable immunity develops; re-infection with measles in humans without concomitant pathology of the immune system is doubtful, although such cases have been described [3].

The formation of population immunity occurs under the influence of vaccine prophylaxis and the natural epidemic process, the role of the latter has significantly



decreased in recent years against the backdrop of a sporadic incidence rate. It is known that post-infection immunity is more pronounced and persistent than post-vaccination immunity [ 17, 18].

Serological monitoring of the state of herd immunity to preventable infections is carried out among reliably vaccinated individuals in the indicator age groups (3-4 years, 9-10 years, 16-17 years, 25-29 years, 30-35 years, 40 years and older (excluding data on vaccination), since “epidemiological well-being in relation to these infections is determined by the state of post-vaccination immunity [18].” Persons not vaccinated, who received the vaccine once and who had measles earlier are not included in the serological survey.

The criterion for epidemiological well-being for measles is the detection of no more than 7% of seronegative individuals during serological monitoring [18, 19, 20, 21].

Identification of risk groups when conducting a study of the state of population immunity to measles allows you to significantly expand the possibilities of epidemiological diagnostics, develop areas for preventive work, including vaccination of the uncovered population, and also evaluate the effectiveness of vaccination.

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