American Journal of Medicine and Medical Sciences 2024, 14(11): 2850-2853
DOI: 10.5923/j.ajmms.20241411.38

# Manifestation of the Epidemic Process of Measles in the Territory of the Samarkand Region

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**Abstract** According to the World Health Organization (WHO), 60 million cases of measles are registered annually worldwide. Population, of which 3 million. There are cases of mortality among young children. Currently, the epidemiological situation with measles remains difficult throughout the world and in Europe. Despite the measures taken worldwide, today, as a result of changing socio-economic conditions, as well as violations of the timing and schedules of preventive vaccinations, the possibility of aggravation of the epidemic situation concerning specific preventive infections remains [3,4,5]. In 2010, the World Health Assembly set three main goals for the elimination of measles in 2015: increase the coverage of routine vaccination with the first dose of measles vaccine to 90%; reduce and maintain the annual incidence of measles to 5 cases per million population; reduce measles mortality by >95% compared with 2000 [1]. Measles vaccination efforts have had a major impact on reducing mortality. Between 2000 and 2017, measles vaccination prevented 21.1 million deaths. In 2000, global measles mortality decreased by 80% [2]. Currently, the epidemiological situation with measles is unsatisfactory not only in Uzbekistan but also in many neighboring countries; measles epidemics are registered in Kazakhstan, Tajikistan and Russia. According to the Ministry of Health of the Republic of Uzbekistan, the virus exists in the country but was imported from other countries (Russian Federation, Turkey, Ukraine) [4,6,7]. Measles epidemics are cyclical, occurring every four years, with different incidence rates and interepidemic periods, and this condition is characterized by low incidence. With the introduction of measles vaccination and increased vaccination coverage, the incidence of this infection during epidemic years has decreased, and the interepidemic periods have lasted longer. Achieving very high levels of population immunity has led to the elimination of measles in many countries, but unless this level is maintained, periodic epidemic increases in measles cases will occur again.

**Keywords** Measles, Epidemiology, Prevention, Vaccination coverage, Epidemic situation

## 1. Introduction

According to the World Health Organization (WHO), 60 million cases of measles are registered annually worldwide. population, of which 3 million are deaths among young children. Currently, the epidemiological situation with measles remains difficult throughout the world and in Europe. Despite the measures taken worldwide, today, as a result of changing socio-economic conditions, as well as violations of the timing and schedules of preventive vaccinations, there remains a possibility of aggravation of the epidemic situation with respect to specific preventive infections [3,4,5]. In 2010, the World Health Assembly set three main goals for the elimination of measles in 2015: increase the coverage of routine vaccination with the first dose of measles vaccine to 90%; reduce and maintain the annual incidence of measles to 5 cases per million population; reduce measles mortality by >95% compared with 2000 [1]. Measles vaccination efforts have had a major impact on reducing mortality. Between 2000 and 2017, measles vaccination prevented 21.1 million deaths. In 2000, global measles mortality decreased by 80% [2]. Currently, the epidemiological situation with measles is unsatisfactory not only in Uzbekistan, but also in many neighboring countries; measles epidemics are registered in Kazakhstan, Tajikistan and Russia. According to the Ministry of Health of the Republic of Uzbekistan, the virus exists in the country, but was imported from other countries (Russian Federation, Turkey, Ukraine) [4,6,7]. Measles epidemics are cyclical, occurring every four years, with different incidence rates and interepidemic periods, and this condition is characterized by low incidence. With the introduction of measles vaccination and increased vaccination coverage, the incidence of this infection during the epidemic years decreased, and the interepidemic periods lasted longer. Achieving a very high

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Received: Oct. 21, 2024; Accepted: Nov. 10, 2024; Published: Nov. 14, 2024
Published online at http://journal.sapub.org/ajmms

level of population immunity has led to the elimination of measles in many countries, but if this level is not maintained, periodic epidemic increases in measles cases will again be observed.

## 2. Materials and Methods

According to the World Health Organization (WHO), 60 million cases of measles are reported worldwide. Population, of which 3 mln. Cases of death among children of early age are observed. Currently, the epidemiological situation of measles remains complex throughout the world and in Europe. Despite the measures implemented worldwide, today, as a result of changes in socio-economic conditions, as well as violations of the times and schemes of preventive vaccinations, the possibility of complications of the epidemic situation regarding specific preventively controlled infections remains. [3,4,5]. In 2010, the World Health Assembly set three major targets for measles elimination in 2015: to increase routine coverage with the first dose of measles vaccine to 90%; reduce and maintain annual measles incidence to 5 cases per million population; reduce measles deaths by >95% compared to 2000 [1]. Measles vaccination efforts have had a major impact on reducing mortality. Between 2000 and 2017, measles vaccination prevented 21.1 million deaths. Global measles mortality decreased by 80% in 2000 [2]. Currently, the epidemiological situation of measles is not satisfactory not only in Uzbekistan but also in many neighbouring countries, measles epidemics are recorded in Kazakhstan, Tajikistan and Russia. According to the Ministry of Health of the Republic of Uzbekistan, the virus exists in the country, but it is imported from other countries (Russian Federation, Turkey, Ukraine) [4,6,7]. Measles epidemics are cyclical, occurring every four years, with varying incidence rates and inter-epidemic periods, a state characterized by low incidence. With the introduction of measles vaccination and increased vaccination coverage, the incidence of this infection decreased during epidemic years and the inter-epidemic periods lasted 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, periodic epidemic increases in the incidence of measles are observed again.

## 3. The Purpose of the Study

Assessment of the manifestation of the epidemic process of measles in the territory of Samarkand region.

## 4. Inspection Methods and Materials

$\chi$ 2) and Fisher method) methods were used to solve research tasks and achieve the goal. Official data and reports on the incidence of measles in the Department of the Regional Sanitary-epidemiological Tranquility and Public Health Committee of the Samarkand region, maps of epidemiological investigations conducted in measles outbreaks, and medical histories of patients treated in the regional clinical hospital for infectious diseases were taken as the object of the study.

## 5. The Obtained Results

A retrospective epidemiological analysis of measles was conducted in the territory of the Samarkand region in 2010-2023. The analysis of the epidemic process of measles according to the data of the sanitary-epidemiological peace and public health committee is the main part of epidemiological control over these infections. Allows to determine the objective signs.

**Analysis of long-term dynamics of the disease**. The epidemic process of measles at different stages of vaccination against the background of the increase in coverage of the population with vaccination is described in detail in the scientific literature. In our research, we analyzed the main data on the manifestation of the epidemic process of measles in the Samarkand region from 2010 to 2023. The general monitoring of the incidence of measles is as follows. Showed that when the multi-year dynamics were studied from 2010 to 2023, the incidence of measles increased slightly in 2011 and as a result of preventive and anti-epidemic measures taken, the incidence of measles decreased sharply in all regions of Uzbekistan, including the Samarkand region, from 2012 to 2018. the trend remained ($n<0.01$) and epidemic stability was achieved. In Samarkand region When we analyzed the distribution of measles cases recorded by region during the years 2010-2023, it was found that the incidence was unevenly distributed, the highest rate was observed in Samarkand district, the rate of incidence per 100,000 population (13.6), Taylok district (11.2), Pastdargom district (10.99), Samarkand city (8.05), Sirdarya region (7.09), Urgut district (7.31), Bulungur district (7.11), Payariq district (6.97), Akdarya (6.7) in Jomboy district (5.98), Jizzakh region (6.53), Ishtikhan district (3.63), Nurabad district (3.5), Narpay district (2.5), Pakhtachi district (1.01), It was (0.71) in Kattakurgon district, (0.52) in Kushrabad district, and (0.38) in Kattakurgon city.

Achieving epidemic well-being is the result of high coverage of adults and children with preventive vaccinations against measles and active anti-epidemic work in these centres of infection. Reducing the number of cases in Uzbekistan from 2012 to 2018 is in line with the WHO national plan and strategy to obtain a measles-free zone certificate The level of sporadic incidence (less than one per million population) regulated by the WHO served as the basis for the preparation of documents for certification as an endemic measles-free area. The unprecedented decline in the incidence of measles was convincing proof of the widespread use of vaccines and the high quality of the vaccine. However, despite the active work against the epidemic, unvaccinated contingents remained among persons who refused to be

vaccinated due to unjustified medical restrictions, as well as for other reasons.

However, by 2019, despite the measures taken, a sharp increase in the incidence of measles was recorded in Samarkand region. In 2019-2023, the intensive rate of measles infection was 6.46 per 100,000 population.

During the analyzed period, changes in the incidence of measles were observed in a wider range under the influence of morbidity throughout the year. If the accumulation of susceptible individuals caused a measles epidemic before 2019, the quarantine restrictions introduced in 2020 due to the outbreak of the worldwide COVID-19 pandemic also contributed to the epidemic process of measles. Had an effect. Due to the strict quarantine measures that were put in place, a large part of the population stayed mostly at home and many of our children did not get their vaccinations in time.

**Analysis of the annual dynamics of the disease.** When we conducted an analysis of measles cases in the Samarkand region during 2023, we observed that measles cases have been registered since June. We can see that the incidence started to rise towards the upper point from October and reached the highest point in December.

**Seasonality of measles.** As shown in the review of scientific literature, in the pre-vaccination period, measles was characterized by a winter-spring seasonality. Against the background of the one-time regimen of vaccination against this infection, the effect of seasonality was manifested to a lesser extent, with the two-time vaccination regimen, the disease occurred in all months of the year, and the seasonality of the disease disappeared. The analysis of the annual dynamics of the seasonality of measles in the Samarkand region in the period from 2010 to 2023 showed that In the years when the epidemic process of infection was observed, the measles epidemic process was continuous, and cases were recorded every month, but the period from September to February indicates an outbreak of the disease.

The continuity of the measles epidemic process is a sign of an epidemiological problem and indicates the presence of factors contributing to the spread of infection, the main of which, in our opinion, may be related to the insufficient immunity of the population.

**Manifestation of measles incidence by age groups.** The analysis of measles incidence by age groups in the period from 2010 to 2023 showed that in the analysis of the age structure of people infected with measles from 2010 to 2023, the proportion of children under one year of age (those in the period before vaccination based on the vaccination calendar) and those after one year of age (respectively 57% and 43%). At the same time, during the growth period of the disease, the percentage of children infected with measles increased, and in the years of decline - we can observe an increase in the incidence among adults.

One of the main reasons for the increase in the incidence of measles among the population is due to the increase in the epidemic process of the disease, when the measles vaccination coverage of the population decreased by 95%. In the diagram shown above, we can observe that the rate of measles among unvaccinated people is several times higher than among vaccinated people. Among the non-vaccinated people, it was found that the main reasons for non-vaccination include the lack of vaccination against measles during the epidemic of the coronavirus disease, the presence of medical restrictions, and parents' restrictions on the vaccination of their children.

# 6. Conclusions

1. In the Samarkand region When we analyzed the distribution of measles cases recorded by regions during the years 2010-2023, it was found that the incidence was uneven, the highest rate was observed in the Samarkand district, the incidence rate was 13.6 per 100,000 population.
2. In the period from 2012 to 2018, the incidence decreased sharply, the trend of decreasing incidence was maintained ($n<0.01$) and epidemic stability was achieved.
3. Until 2019, the accumulation of susceptible individuals caused measles epidemics, 2020 was due to the quarantine restrictions imposed due to the outbreak of the worldwide SOVID-19 pandemic, where a large part of the population was mostly at home, and many of our children did not receive vaccinations in time.
4. According to the analysis of the annual dynamics of the disease, the incidence was recorded throughout the year, but it reached a peak in the autumn and winter months.

The analysis of the incidence by age groups showed that the proportion of children under one year of age (those in the period before vaccination based on the vaccination calendar) and children older than one year (57% and 43%, respectively).

**The purpose of the study.** Assessment of the manifestation of the epidemic process of measles in the territory of Samarkand region**.**

**Inspection methods and materials.**

$\chi$ 2) and Fisher method) methods were used to solve research tasks and achieve the goal.

**The obtained results**. A retrospective epidemiological analysis of measles was conducted in the territory of the Samarkand region in 2010-2023. Analyzing the epidemic process of measles according to the data of the sanitary-epidemiological peace and public health committee is the main part of epidemiological control over these infections. Made it possible to determine the objective signs in the Samarkand region When we analyzed the distribution of measles cases recorded by regions during the years 2010-2023, it was found that the incidence was uneven, the highest rate was observed in Samarkand district, the rate of incidence was 13.6 per 100,000 population.

**Conclusions:** In the period from 2012 to 2018, the incidence decreased sharply, the trend of decreasing incidence was maintained ($n<0.01$) and epidemic stability was achieved. Until 2019, the accumulation of susceptible individuals caused the measles epidemic, 2020 was due to the quarantine restrictions imposed due to the outbreak of the worldwide

COVID-19 pandemic, which caused a large part of the population to stay at home, and many of our children did not receive vaccinations in time.

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