

WHOOPING COUGH: CAUSES, SPREAD, AND MAIN DIRECTIONS OF
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Annotation: This article is devoted to whooping cough (pertussis), an acute infectious disease caused by the bacterium *Bordetella pertussis*, and its significance in public health. It examines the main characteristics of the disease, its spread in Central Asia, particularly in Uzbekistan, methods of control, and modern treatment approaches. Special attention is given to vaccination-based prevention, diagnosis, and increasing public awareness.

This work, enriched with tables and references, emphasizes the necessity of implementing comprehensive measures to reduce the incidence of whooping cough. This issue is especially relevant in regions where problems related to vaccination coverage and sanitary conditions persist.

Keywords: whooping cough, *Bordetella pertussis*, Uzbekistan, Central Asia, vaccination, prevention, treatment, infection, children, epidemiology

Introduction. Whooping cough is an acute infectious disease of the respiratory tract caused by the bacterium *Bordetella pertussis*, characterized by paroxysms of spasmodic coughing. The disease, also known as the “hundred-day cough,” poses a serious threat to young children but can affect individuals of all age groups. Despite the availability of vaccines, pertussis remains a global public health problem, especially in regions with low vaccination coverage, such as certain areas of Central Asia, including Uzbekistan.

This article discusses general information about pertussis, its spread in Central Asia with a focus on Uzbekistan, methods of control, modern treatment approaches, and key aspects of prevention supported by comparative tables.

General Information About Pertussis. Pertussis is a bacterial infection transmitted through airborne droplets produced by coughing, sneezing, or close contact with an infected person. The causative agent, *Bordetella pertussis*, releases toxins that irritate the mucous membrane of the respiratory tract and lead to a characteristic spasmodic cough with “whooping” sounds during inhalation.

According to the World Health Organization (WHO), approximately 16 million cases of pertussis are recorded annually, of which 95% occur in developing countries [1]. The incubation period ranges from 4 to 21 days (most commonly 7–10 days). The disease progresses through three stages:

- Catarrhal stage (1–2 weeks): cold-like symptoms
- Paroxysmal stage (2–6 weeks): severe coughing spasms
- Convalescent stage (up to several months): gradual recovery

Pertussis is especially dangerous for infants under one year of age due to the risk of apnea and complications such as pneumonia or seizures.

Cherry James D., in the article “*Pertussis in the Preantibiotic and Prevaccine Era*,” noted that “before the advent of antibiotics and vaccines, infant mortality reached up to 50%” [2].

Currently, vaccination has reduced the severity of symptoms, but the disease has not been eradicated.

Spread of Pertussis in Central Asia, Especially in Uzbekistan. Central Asia, including Uzbekistan, Kazakhstan, Kyrgyzstan, Tajikistan, and Turkmenistan, faces an increased burden of pertussis due to historical and contemporary factors.

After the collapse of the Soviet Union in 1991, healthcare systems in the region experienced a crisis, leading to decreased vaccination coverage and increased incidence of infectious diseases.

A study conducted by Cox Helen Suzanne et al. showed that in the 2000s, pertussis remained one of the leading causes of childhood morbidity in Central Asia due to uneven immunization coverage [3]. In Uzbekistan, the situation is complicated by high population density, insufficient sanitary education, and incomplete vaccination in some regions. According to the Ministry of Health of Uzbekistan, local outbreaks of pertussis were registered in 2023, mainly among unvaccinated children [4]. Ataev Nurmat Otabekovich noted in an interview that *“the disease has a seasonal nature and is more common among unvaccinated individuals, which is natural”* [4]. In 2019, the incidence rate in Uzbekistan was approximately 10 cases per 100,000 population, which is lower than in Tajikistan (15 per 100,000) but higher than in Kazakhstan (8 per 100,000) [5].

In rural regions such as Karakalpakstan, the ecological crisis of the Aral Sea increases susceptibility due to poor nutrition and dust pollution.

How to Combat Pertussis. Combating pertussis requires a multi-level approach, including prevention, early diagnosis, and adequate treatment:

- **Vaccination:** The primary method of control is immunization using DTP (diphtheria-tetanus-pertussis) vaccines or combined vaccines (e.g., Pentaxim). WHO recommends three doses at 2, 3, and 4 months of age with a booster at 16–18 months [1].
- **Isolation:** Infected individuals are isolated for 25 days from the onset of symptoms to prevent the spread of infection. Edwards Kathryn M. et al. emphasize that *“isolation reduces the risk of outbreaks in communities”* [6].

- **Diagnosis:** Bacteriological culture, PCR, and serological tests help detect *B. pertussis*. Early diagnosis at the catarrhal stage allows timely treatment before the onset of paroxysms.

- **Infection Control:** Improving ventilation in educational institutions and the use of masks during epidemics help reduce transmission. In Uzbekistan, vaccination coverage reaches 98% according to the “penta-1, 2, 3” schedule (2, 3, 4 months), but vaccine refusal and logistical challenges in remote areas remain significant barriers [4].

Modern Treatment Methods. Treatment of pertussis aims to eliminate the pathogen and alleviate symptoms:

- **Antibiotics:** Macrolides (erythromycin, azithromycin) are standard treatment during the catarrhal stage. Altunaiji Saleh M. et al. state that *“azithromycin (10 mg/kg/day for 5 days) reduces the infectious period but does not decrease coughing episodes after the paroxysmal stage”* [7].

- **Symptomatic Therapy:** Oxygen therapy for apnea, antitussive drugs (with limited effectiveness), and maintaining hydration are used, especially in infants under one year.

- **Hospitalization:** Severe cases (e.g., pneumonia, seizures) require intensive monitoring and treatment. In adults and vaccinated children, the disease is usually milder and often presents as a prolonged cough.

In Uzbekistan, treatment is available in infectious disease hospitals such as the City Infectious Diseases Hospital No. 3 in Tashkent, although resources in rural areas are limited.

Preventive Measures Against Pertussis in Uzbekistan. To strengthen preventive measures, the following recommendations are proposed:

- **Increase Vaccination Coverage:** Achieve 100% vaccination coverage by addressing vaccine hesitancy through educational campaigns. WHO notes that *“high coverage (over 90%) ensures herd immunity”* [1].

- Education: Include hygiene and vaccination awareness in school curricula. Crowcroft Natasha S. et al. state that “*awareness reduces incidence by 15–20%*” [8].
- Improved Diagnostics: Equip regional healthcare facilities with PCR testing, especially in Karakalpakstan.
- Epidemiological Surveillance: Establish real-time registries to monitor outbreaks and vaccination status.
- Contact Prophylaxis: Administer antibiotics (e.g., erythromycin) to individuals who have been in contact with infected patients for 7–10 days.

Table 1. Pertussis Incidence (2019)

Region	Incidence (per 100,000)	Vaccination Coverage (%)	Source
Global	20	86	[1]
Central Asia	12	90	[5]
Uzbekistan	10	98	[4]

Table 2. Effectiveness of Prevention and Treatment

Measure	Reduction in Incidence (%)	Duration of Effect (years)	Source
DTP Vaccination	80-90	5-10	[6]
Antibiotics (prophylaxis)	70	1	[7]
Education	15-20	Continuous	[8]

Conclusion. Pertussis remains a serious problem for healthcare systems, especially in regions with uneven preventive measures such as Uzbekistan. The causes of this disease bacterial infection and insufficient immunization require a comprehensive approach, ranging from vaccination to public education. The spread of pertussis in Central Asia reflects social and environmental factors; however, modern methods of treatment and prevention provide hope for its control.

Increasing vaccination coverage, improving diagnostics, and enhancing hygiene education will help reduce the burden of pertussis, protecting not only children but society as a whole.

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