

## VACCINE PREVENTION OF TUBERCULOSIS

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**Abstract:** This article discusses the importance of vaccination in preventing tuberculosis (TB), the characteristics of the BCG vaccine, and its role in reducing morbidity and mortality rates.

**Keywords:** Tuberculosis, BCG vaccine, prevention, tuberculosis bacteria

**Introduction:** Tuberculosis (TB) is an infectious disease caused by bacteria and spread through airborne droplets when an infected person coughs. It most commonly affects the lungs, although it can also damage other parts of the body. In most cases, the disease develops gradually.

TB is one of the most widespread chronic infectious diseases worldwide and is considered a polytropic infection. According to the World Health Organization (WHO), approximately 2 billion people worldwide are infected with TB. Each year, 10–12 million people contract the disease, and 4–5 million people die from it. Tuberculosis ranks seventh among the leading causes of death. Vaccination against tuberculosis is a preventive measure that protects individuals from the disease through immunization.

**Main Part:** The BCG vaccine is used worldwide and consists of a weakened strain of *Mycobacterium tuberculosis*. The vaccine was developed by Albert Calmette and Camille Guérin in 1906 through repeated cultivation of tuberculosis bacteria over 13 years on a medium prepared from bovine bile. Between 1919 and 1924, it began to be used for preventive vaccination.

After thorough study of the strain, live BCG vaccine was administered orally to newborns. Beginning in 1942 in urban maternity hospitals and in 1943 in rural maternity hospitals, all newborns were routinely given a 10 mg dose on the 3rd–5th–7th day or 4th–6th–8th day of life. Revaccination of uninfected infants, preschool children, and individuals up to 30 years of age was introduced in 1948.

In 1962, the intradermal administration of a special glutamate BCG vaccine became widely adopted. According to the National Immunization Schedule of the Republic of Uzbekistan, the BCG vaccine is administered intradermally into the left shoulder of

newborns at 2–5 days of age in a dose of 0.05 mg (0.1 ml). Revaccination is then carried out at 7–15 years of age.

Premature infants receive a less reactogenic BCG vaccine containing half the number of microbial cells. In a very small proportion of vaccinated or revaccinated individuals, suppuration at the injection site may occur as a complication.

The bacteria contained in the BCG vaccine do not cause disease; instead, they teach the body to recognize tuberculosis bacteria and develop long-term protection. As a result, the immune system is activated and can effectively fight TB bacteria when they enter the body. Immune cells become active, antibodies are produced, and protective mechanisms are formed.

The BCG vaccine protects children against severe forms of tuberculosis, such as tuberculous meningitis and disseminated TB. These forms are particularly dangerous for newborns and young children. The effectiveness of the BCG vaccine is estimated to be around 60–80%. It is especially effective in protecting children from severe forms of TB. However, its effectiveness against pulmonary tuberculosis in adults may be lower. Therefore, other preventive measures also remain important in controlling tuberculosis.

The use of the BCG vaccine has reduced the incidence of tuberculosis and its severe forms several times over. In some cases, vaccination may be temporarily postponed or not administered at all, such as in individuals with severe immunodeficiency, serious congenital diseases, extremely low birth weight in newborns, or when a physician identifies a contraindication.

**Conclusion:** The development and use of the tuberculosis vaccine is one of humanity's most important medical achievements. The BCG vaccine helps prevent tuberculosis in children and reduces the spread of the disease within communities. For this reason, vaccinating newborns remains one of the key preventive measures in public health systems.