

### Vaccination Coverage and Inequalities in India (2011-2024)

**Running Title:** India's Vaccination Coverage and Inequalities

Saritha Ala<sup>1</sup>, Rohit Jangra<sup>2\*</sup>

#### Author Affiliations

<sup>1</sup>School of Public Health, National Institute of Epidemiology, Chennai, India.

<sup>2</sup>Department of Community Medicine and School of Public Health, Postgraduate Institute of Medical Education and Research, Chandigarh, India.

**\*Corresponding Author:** Rohit Jangra, Junior Research Fellow, Department of Community Medicine and School of Public Health, PGIMER, Chandigarh, India

**Email:** rohit2000janrarj@gmail.com

#### Abstract

Vaccination coverage in India has improved over the years, but significant inequalities persist across socioeconomic groups and geographic regions. According to the latest National Family Health Survey (NFHS-5) data from 2019-2021, the full immunization coverage among children aged 12-23 months was 76% at the national level, an increase from 62% in NFHS-4 (2015-16). However, there are stark disparities across states, with some states like Assam (59%) and Uttar Pradesh (63%) lagging far behind others like Andhra Pradesh (90%) and Lakshadweep (97%). Socioeconomic factors such as household wealth, mother's education, and rural/urban residence play a significant role in determining vaccination coverage. Children from the poorest households (65%) and those whose mothers have no schooling (65%) have much lower full immunization rates compared to the richest households (84%) and those with mothers having 12 or more years of schooling (88%). Studies have consistently shown a disproportionate concentration of unvaccinated or partially vaccinated children among lower socioeconomic strata, with factors like poverty, illiteracy, and lack of access to healthcare contributing to these inequalities. Addressing these inequalities requires targeted interventions to improve healthcare access and educational opportunities for disadvantaged populations.

**Keywords:** Socioeconomic Disparities, Vaccine, Vaccination Coverage, Vaccine Inequalities,

#### Introduction

The World Health Organization (WHO) launched the Expanded Program on Immunization in 1974 to ensure the protection of children against vaccine-preventable diseases. India adopted the WHO Expanded Program on Immunization in the year 1978, India's Universal Immunization Program is one of the largest routine childhood immunization programs in the world.

The government of India launched Mission Indradhanush program to improve immunization coverage in December 2014. This mission aims to increase immunization coverage for Indian children from disadvantaged communities. Following this initiative, there has been a significant increase in vaccination coverage in areas targeted by this Mission.

Expanding the coverage through Mission Indradhanush is projected to reduce vaccine-preventable diseases, as well as child mortality and morbidity, by ensuring timely vaccination [1]. Efforts such as the Intensified Mission Indradhanush campaigns have played a crucial role in bridging immunization gaps, particularly targeting children who missed routine vaccinations due to various vaccine related barriers. The Intensified Mission Indradhanush campaigns, conducted in February 2022, aimed to vaccinate the unvaccinated and partially vaccinated children, significantly contributing to improving coverage.

Recent data from the National Family Health Survey (NFHS-5) for 2019-21 indicates significant improvements in vaccination coverage across India. The survey reveals that the full immunization coverage for children aged 12-23 months stands at 76.4%, marking an improvement from 62% in NFHS-4 (2015-16) [2]. According to the Health Management Information System (HMIS) portal, the coverage further improved to 89% for the year 2021-22, demonstrating continuous progress in reaching higher immunization rates.

Despite these efforts, vaccine coverage disparities persist in India, which has yet to achieve universal routine immunization. Difficulties in accessing routine immunization while traveling for work have been identified. Additionally, there are significant knowledge gaps regarding the benefits and risks of vaccination, along with fears stemming from negative media reports and common side effects following vaccination. Studies have

consistently shown a disproportionate concentration of unvaccinated or partially vaccinated children among lower socioeconomic strata, with factors like poverty, illiteracy, and lack of access to healthcare contributing to these inequalities [3].

### Vaccination inequality

The vaccine coverage in India has been improved over the period in India. The overall vaccination coverage is not uniform in India, with some states like Kerala, and Tamil Nadu performing significantly better than states like Uttar Pradesh and Bihar. Some factors contribute to the persistent inequalities in different regions and among various population groups [4].

1. **Socioeconomic disparities:** vaccination inequality is closely related to the population's socio-economic status and urbanization [5]. People from wealthier families are more likely to be fully vaccinated as compared to poorer families. Maternal education is a strong predictor of vaccination coverage. The higher levels of maternal education correlate with higher vaccination rates and also urban residency is strongly associated with vaccination coverage. The disparities in the vaccination coverage between rural and urban areas may be the result of rapid urbanization [6]. Factors contributing to lower rural vaccination coverage include access issues, varying views on COVID-19 severity, higher vaccine hesitancy, and a lack of strong vaccine recommendations

from healthcare providers in rural areas [7]. Disparities exist based on socioeconomic factors like wealth, mother's education, and rural/urban residence. Children from the poorest households (65%) and those whose mothers have no schooling (65%) have lower full immunization coverage compared to the richest households (84%) and those whose mothers have 12 or more years of schooling (88%) [8].

2. **Healthcare infrastructure:** The quality and availability of healthcare infrastructure vary across states, which impacts vaccination coverage. Poor availability and accessibility of healthcare facilities, lack of trained health workers, irregular vaccine supply, and logistical challenges in remote areas contribute significantly to the rural-urban divide in vaccination coverage [9]. Furthermore, the quality of health infrastructure, including cold chain maintenance, storage facilities, and monitoring systems, can affect the desired vaccine potency and effectiveness of immunization programs, further exacerbating inequalities [10].
3. **Policy implementation:** Tackling socioeconomic disparities in vaccine coverage necessitates targeted policy measures aimed at enhancing access, utilization, among the underprivileged populations. Strategies must prioritize poverty reduction initiatives, programs promoting female literacy, and bolstering healthcare facilities and boosting

infrastructure in underperforming states and rural regions. States with robust public health systems should spearhead efforts to address vaccination inequities, while strategies to improve healthcare accessibility across all regions and populations will be instrumental in augmenting vaccination coverage [6].

The Indian Government has implemented several initiatives to increase vaccine coverage in underserved areas such as slums and tribal regions. One major strategy has been to conduct special immunization weeks or campaigns to expand outreach in poorly performing districts. The Vaccines Federal Implementation Plan of year 2021-2025 outlines measures such as engaging trusted community members, developing culturally appropriate messaging, and strengthening data systems to monitor coverage in tribal areas. Local research is encouraged to identify the reasons for vaccine hesitancy and to design targeted interventions. Additionally, focusing on various health system functions such as governance, human resources, and service delivery can increase vaccine coverage and improve overall program performance [11].

## Conclusion

In general, timely vaccination offers crucial individual protection and helps prevent rapid disease outbreaks by providing secondary protection. By ensuring vaccines are administered on schedule, we can safeguard public health and reduce the spread of the infectious diseases. However,

achieving timely vaccination remains challenging in countries like India due to inadequate infrastructure and limited awareness about the importance of vaccination. Many areas face difficulties in accessing vaccines promptly, and there are significant gaps in public knowledge as well as socioeconomic inequalities, regarding the benefits and necessity of vaccination. Therefore, addressing these issues is essential to improve vaccination coverage and enhance overall public health.

#### Declaration of Conflicting Interests:

The Author(s) declare(s) that there is no conflict of interest.

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