

Original Research Article

An overview of the universal immunization programme in India: a multi-level discussion

M. Hasan Askari^{1*}, Krishnendu Gupta²

¹Department of Geography, THLH Mahavidyalay, Birbhum, West Bengal, India

²Department of Geography, Visva Bharati, Birbhum, West Bengal, India

Received: 04 July 2026

Revised: 25 August 2026

Accepted: 26 August 2026

*Correspondence:

Dr. M. Hasan Askari,

E-mail: mdhasanaskari90@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: The World Health Organisation (WHO) first introduced the idea of an immunization programme in 1974 with the inauguration of the “Expanded Programme on Immunization” (EPI). In India, EPI was launched in 1978 and was renamed the universal immunization programme (UIP) in 1985. It is crucial to talk about the situation at the global and local levels to better understand the immunization programme’s implementation status.

Methods: The primary objective of this paper is to illustrate the performance of the immunization programme in India, starting with India and going down to the district level, the study is viewed as a multi-level discussion. The study is based on secondary data gathered from various sources. Several maps and diagrams have been prepared to provide a broad overview of immunization programme’s performance for easier comprehension.

Results: The study revealed regional differences in immunization programme performance across the whole country, including at the state, district and block levels. The discussion highlights that the declining IMR in India and West Bengal which reflects improvement in child healthcare, immunization, nutrition and related health services. India has achieved relatively favourable vaccination coverage compared with several other developing countries. The state of West Bengal has also demonstrated satisfactory immunization coverage over time. However, significant spatial disparities exist within the country, states and different districts.

Conclusions: The study suggests that strengthening the immunisation programme requires a combination of better infrastructure, technology, community engagement and healthcare workforce support.

Keywords: Immunization, India, Health, NFHS, UIP

INTRODUCTION

The WHO first introduced the idea of an immunization programme in 1974 with the inauguration of the Expanded Programme for Immunization (EPI), which aimed to control and eradicate the six most frequent preventable diseases: diphtheria, pertussis (whooping cough), tetanus, polio, tuberculosis and measles. The Alma-Ata Declaration of 1978 included an immunization programme to achieve the goal of “Health for All” by the year 2000.¹ In India, the Expanded Programme for Immunization (EPI) was launched in 1978 and was renamed the Universal Immunization Programme (UIP)

in 1985 (Figure 1), following the addition of the measles vaccine and the discontinuation of the typhoid vaccine, thereby broadening its scope.^{2,3} India and China practiced some form of inoculation before the 16th century, but modern immunization emerged in India in the 19th century.⁴

In April 2011, the Ministry of Health and Family Welfare initiated the National Vaccine Policy, offering guidelines to enhance evidence-based vaccine research, development, production, procurement and quality assessment within the UIP.⁵ A few major objectives of this programme may be stated as follows.¹

To reduce mortality and morbidity due to six vaccine preventable diseases (VPDs). Support for alternate vaccine delivery from PHC to sub-centre. Deploying retired manpower to carry out immunization activities in urban slums and underserved areas, where services are deficient. Mobility support to the district immunization officer as per the state plan for monitoring and supportive supervision. Review meeting at the state level with the districts at a six-month interval. Training of ANM, cold chain handlers, mid-level managers, refrigerator mechanics and others. Support for the mobilisation of children to immunization session sites by ASHA, women self-help groups and others.

It is crucial to talk about the situation at the global to local levels to better understand the immunization programme's implementation status. In this paper, an effort has been undertaken to comprehend the effectiveness of the immunization programme in India.

Objective

The primary objective of this paper is to illustrate the performance of the immunization programme in India, considering a multi-level discussion starting from the national to the district level.

METHODS

The study is based on secondary data gathered from various sources. The National Health Mission, the National Family Health Survey (NFHS), the Ministry of Health and Family Welfare, the Chief Medical Officer of Health (CMOH) and the Deputy II office are only a few of the sources of secondary data used in the study. Several maps and diagrams have been prepared to provide a broad overview of immunization programme's performance for easier comprehension. The maps and diagrams were created using QGIS and MS Excel. A thorough assessment of the literature was conducted to develop a conceptual framework and support the overall discussion.

Since the study focuses on a multi-stage analysis across different geographical scales, it relies on secondary data obtained from multiple sources collected at different time periods. The timing of data collection varies from the national level to the state, district and CD-block levels, as these datasets were not generated simultaneously. The timing of secondary data in this study spans from 2011 to 2024, as mentioned in the respective figures.

The study encompasses a range of relevant variables, such as infant mortality rate (IMR), DPT 1, DPT 3, BCG, Polio 3, TTPW, OPV, measles and percentage full immunization coverage across several stages of analysis. Starting with India and going down to the district level, the study is viewed as a multi-level discussion. First, India's performance was discussed; next, the state-wise performance of the immunisation programme was

highlighted; next, the district-wise performance of the immunisation programme was discussed; and finally, a block-by-block discussion was presented for Malda district, one of the underperforming districts of West Bengal (Figure 2).

RESULTS

Immunization is one of the most effective public health interventions for reducing child mortality and preventing vaccine-preventable diseases. India has made substantial progress in expanding immunization coverage through successive national immunization programmes and improvements in healthcare delivery systems. The results of the study provide an overview of the immunization coverage in India through a multi-level analysis. The study examines the status of immunization from the national level to the state and districts levels, with practical emphasis on West Bengal and Malda district.

Figure 3 illustrates the changing trend in the IMR in India and the state of West Bengal over the observed period (2011 to 2017). The figure provides a comparative picture of the decline in IMR, although the rate and pace of decline vary across the two. This result provides evidence of the gradual improvement in infant health outcomes in India and West Bengal.

Figure 4 illustrates the immunization system in India and highlights the important functions performed by various health professionals in ensuring effective vaccination coverage. The figure depicts the systematic process of immunization, including vaccine delivery, administration, monitoring and follow-up, while emphasizing the roles of healthcare workers at different levels of the health system.

It also demonstrates the coordinated efforts of health professionals and the healthcare system in improving immunization coverage, strengthening child and community health in India. Figure 5 presents the comparative assessment of India in relation to eight other developing or less developed countries based on the selected indicators. The comparison clearly demonstrates that India occupies a considerably better position than the countries included in the analysis. The result provides evidence of its better performance compared with the selected international counterparts.

Figure 6 illustrates the state-wise distribution of Full Immunization coverage across India and provides a comparative overview of the performance of different. The figure indicates considerable variation in immunization coverage among the states, with several states demonstrating a high level of performance. Among these high-performing states, West Bengal shows a satisfactory level of Full Immunization Coverage, reflecting the effectiveness of its immunization services and the relatively successful implementation of vaccination programmes.

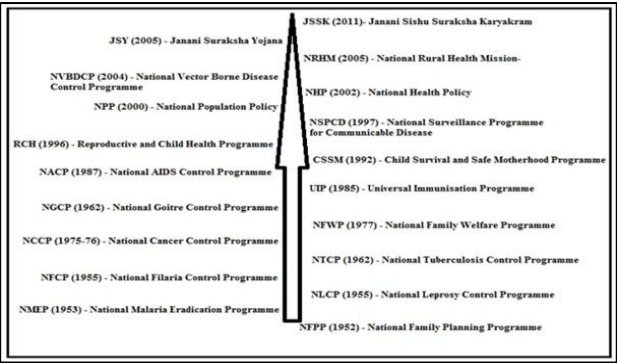


Figure 1: Major health programmes in India.

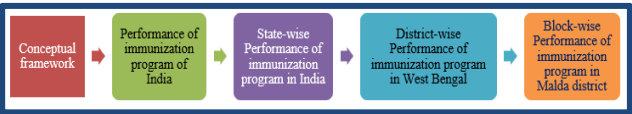


Figure 2: Methodological framework.

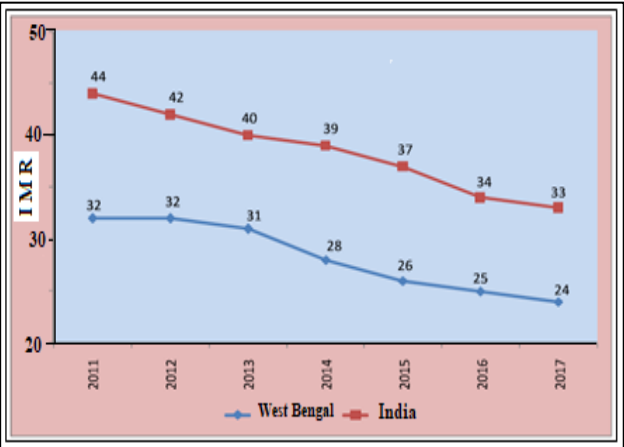


Figure 3: Trends of infant mortality rate in India and West Bengal.

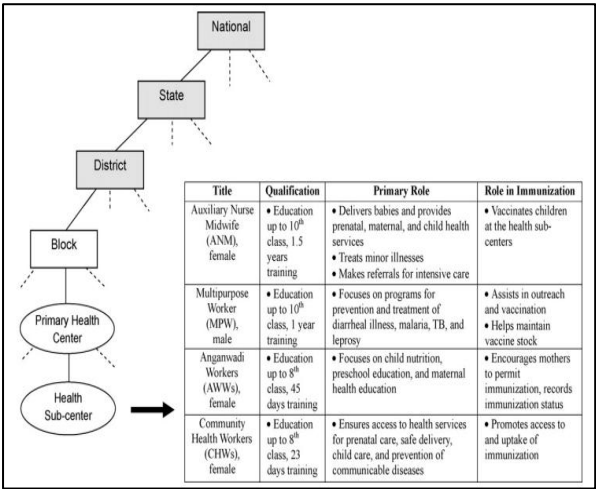


Figure 4: Indian immunization system.¹⁴

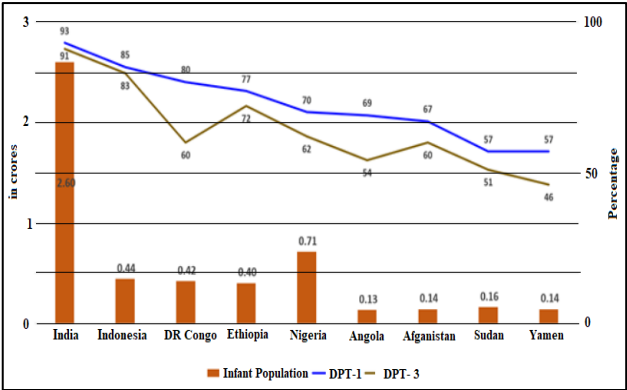


Figure 5: Comparison between India and other Countries with a high number of zero-dose children for DTP-containing vaccine.¹⁵

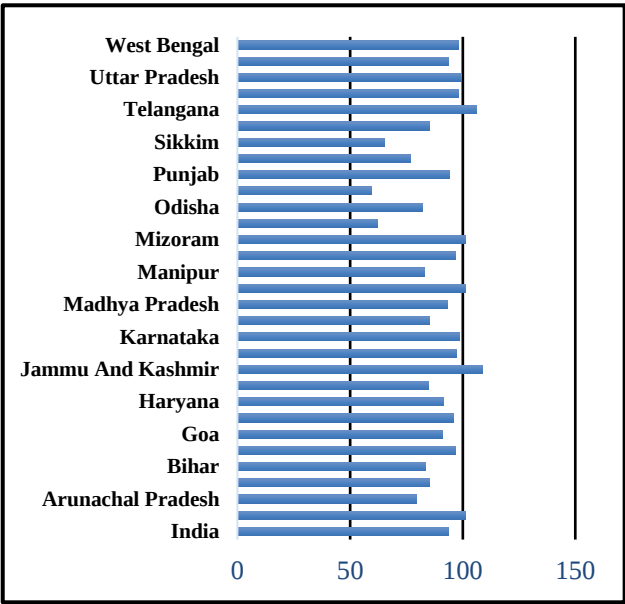


Figure 6: Percentage full immunization coverage (FIC) for FY 2023-24.¹⁷

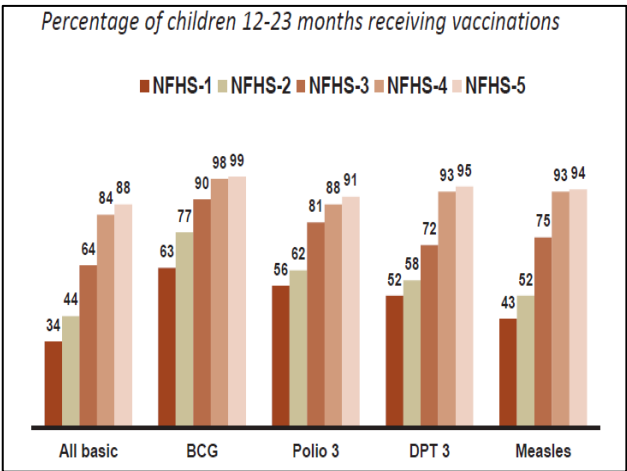


Figure 7: Trends in vaccination coverage in West Bengal.¹⁸

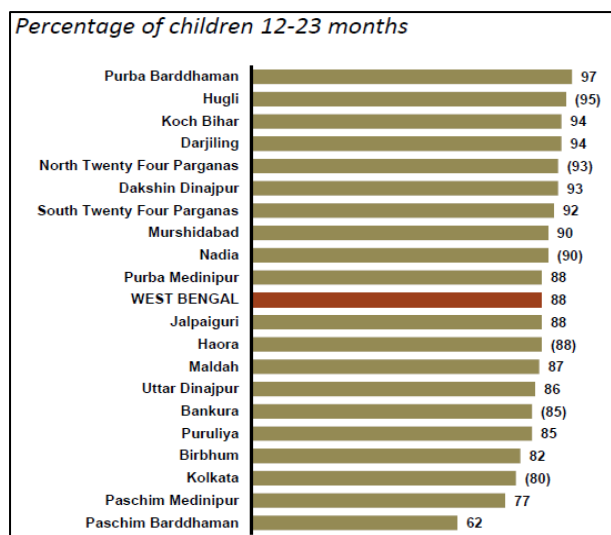


Figure 8: Coverage of all basic vaccinations by districts in West Bengal.¹⁸

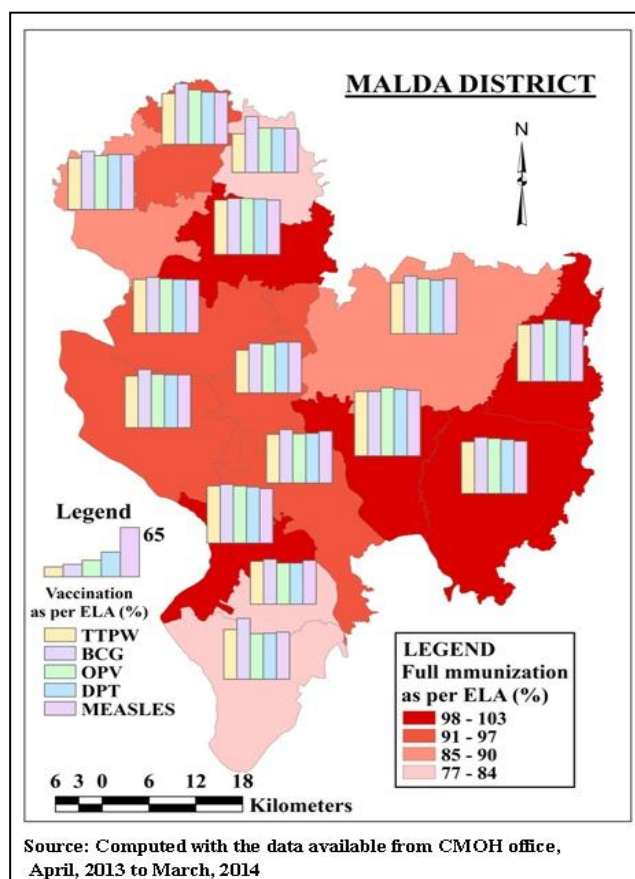


Figure 9: Performance of immunization programme in Malda district.

Figure 7 illustrates the changing trends in vaccination coverage among children aged 12 to 23 months in West Bengal, based on data from the National Family Health Surveys (NFHS-1 to NFHS- 5). The figure presents the percentage of children receiving key childhood vaccinations, including BCG, Polio 3, DPT 3 and

Measles, across the successive NFHS rounds. A clear and consistent improvement in vaccination coverage is observed in the diagram.

Figure 8 presents a comparative assessment of vaccination coverage across the districts of West Bengal. The figure highlights considerable inter-district variation in the level of immunization coverage, indicating that the performance of the vaccination programmes is not uniform throughout the state. While several districts demonstrate relatively higher and satisfactory levels of vaccination coverage, Malda emerges as one of the comparatively underperforming districts. Using data obtained from the office of the Chief Medical Officer of Health (CMOH), a spatial map has been prepared to present the current status of immunization across the blocks of Malda district. In accordance with the expected level of achievement (ELA), immunization rates and the supply rates of different vaccines have been calculated to assess the performance of the immunization programme at the block level. The resulting figure highlights considerable spatial variation in immunization coverage and vaccine supply. The spatial variation indicates that the availability and delivery of vaccines, as well as the level of immunization achievement, are not uniform across the district.

DISCUSSION

Immunization programmes are a major public health advancement, significantly increasing life expectancy and reducing infant mortality rates. They have been complemented by improved access to healthcare and clean water. Vaccines have been a part of human history for more than two centuries and are regarded as one of the best ways for the body to fight off illness.⁶ Millions of lives are saved annually by vaccination, making it a global health success. In Southeast Asia, vaccine-preventable illnesses account for about 20% of all fatalities in children under five.³ Regular childhood immunizations can promote lifelong health and improve outcomes by decreasing stunting.⁷⁻⁹ At a UN meeting in 2019, 193 nations, including India, unanimously pledged to provide universal health coverage (UHC), with a focus on ensuring that everyone has access to high-quality health care without facing financial hardship.¹⁰⁻¹²

Immunization programmes are essential for reducing the IMR, alongside other health care strategies. A diagram (Figure 3) showing the changes in IMR in India and the Indian state of West Bengal has been provided as evidence. The IMR from 2011 to 2017 is shown in the figure. The trend lines for the Indian state of West Bengal and the country as a whole indicate a downward trend, reflecting the improvements in maternal and child healthcare, medical facilities, immunization coverage, nutrition and overall socioeconomic conditions. One of the biggest public health initiatives, the UIP targets around 2.67 crore newborns and 2.9 crore pregnant women per year. It is one of the most cost-effective

public health initiatives, largely responsible for the decline in the vaccine-preventable under-5 mortality rate.¹³

Under UIP, immunization is provided free of cost against 12 vaccine-preventable diseases: Nationally against 9 diseases-diphtheria, pertussis, tetanus, polio, measles, rubella, severe form of childhood tuberculosis, Hepatitis B and meningitis and pneumonia caused by hemophilus influenza type B and Sub-nationally against 3 diseases-rotavirus diarrhoea, pneumococcal pneumonia and Japanese encephalitis; of which rotavirus vaccine and pneumococcal conjugate vaccine are in process of expansion while JE vaccine is provided only in endemic districts.¹³ Micro plans are developed at the district level to guarantee that every child has access to vaccinations. At the block level, primary health centres (PHCs) supervise community health workers (CHWs) and manage the cold chain for vaccine storage. Sub-centres (SCs) are essential to vaccine distribution within the system. The immunization system in India and the functions of health professionals are depicted in an accompanying (Figure 4).

With a target cohort more than three times greater than that of the other nine countries examined, India has the greatest number of children who have received vaccinations. Among them, it is the only nation with DTP (Penta- 1) coverage higher than 90 per cent (Figure 5). Launched in December 2014, Mission Indradhanush (MI) seeks to increase children's full immunization coverage to 90 per cent, especially in low- coverage areas and among hard-to-reach groups where children are unvaccinated or only partially vaccinated.¹⁶ The national full immunization coverage for the financial year 2023 to 2024 is 93.5 percent.

The state-wise Full Immunization Coverage is shown in the figure (Figure 6). Among many high-performing states, the state of West Bengal shows satisfactory performance in terms of the immunization programme. The provided figure (Figure 7) illustrates West Bengal's vaccination coverage trends, taking into account the percentage of children aged 12 to 23 months who have received immunizations. In the case of all basic vaccinations, BCG, Polio 3, DPT 3 and Measles vaccines, the trend emphasises the progressive nature of immunization. The trend has been demonstrated by several NFHS (National Family Health Survey) surveys conducted between 1992-1993 and 2019-2021, indicating substantial progress in the immunization programme over time. The overall upward trend demonstrates West Bengal's progress in expanding childhood immunization and strengthening preventive healthcare.

Purba Bardhaman has the highest district-wise coverage of all basic vaccines (97 percent), whereas Paschim Bardhaman has the lowest (62 percent). For West Bengal as a whole, the coverage is 88 percent. Eleven districts covered fewer than 90 percent of children, while

nine districts performing well, covering 90 percent and above of children aged 12 to 23 months. Malda is one of the underperforming districts of West Bengal (Figure 8). The relatively lower coverage in Malda suggests the need for greater attention towards improving the reach and effectiveness of immunization services, particularly among vulnerable and underserved populations. Strengthening healthcare infrastructure, enhancing community-level awareness, ensuring regular outreach and follow-up services could help address the existing gaps. Investigation at the grassroots level is crucial for understanding the progress of the immunization programme. A map (Figure 9) of the Malda district includes a few of important vaccines such as TTPW, BCG (Bacillus Calmette-Guérin, which is given to infants and children to prevent tuberculosis), OPV (Oral Polio Vaccine), DPT (D: Diphtheria- a severe respiratory illness; T: Tetanus- also known as lockjaw, affecting the nervous system; P: Pertussis- commonly known as whooping cough) and Measles (designed to provide immunity against the highly contagious measles virus). In the Malda district, the performance of the Universal Immunisation Programmes in various CD blocks is quite good. Using data from the CMOH office, a map has been created to depict the current situation. In accordance with the ELA, the immunization rates and different vaccine supply rates have been computed.

Seven blocks- Kaliachak- II, Old Malda, Habibpur, Bamongola, Manikchak, Ratua- II and Chanchal- II are depicted on the above map as having more than or very nearly 100 percent population coverage under the immunization programme. However, three other blocks, namely Kaliachak-I & II, Chanchal- I show comparatively poor conditions with population coverage from 77 to 86 percent. The map also shows the spatial distribution of the vaccination supplies throughout the various Malda district blocks. Nearly every block performs better in meeting the ELA's population coverage target. BCG has the highest population coverage of any vaccination when compared to other vaccines, even though the supply of other vaccines also performs better.

Challenges in programme implementation

In 2011, India's immunization rate reached 61 %.¹⁹ However, one of the obstacles to vaccination coverage is the dropout rate.^{20,21} Studies also show that India's Routine Immunization (RI) faces challenges, with DTP3 coverage at only 61 % in 2010 compared to 77 % in South-East Asia (SEA) and Africa. To address this, the SEA Regional Director declared 2012 as the year of Intensifying RI, an initiative backed by the Government of India.²² Infants from lower caste and less educated families face higher mortality rates compared to those from higher caste families and disparities in child health by socio-economic position have been extensively documented globally.²³⁻²⁵ The acceptance of immunization vaccines is hampered by several variables,

including general reluctance, fear of negative side effects, misinformation about vaccines and others.²⁶⁻²⁸

In certain places, parents have seen healthcare personnel's behaviour and counselling as a barrier to vaccinating their children.^{28,29} Compared to conventional EPI vaccinations, rising per-dose costs for contemporary additions put a strain on public healthcare expenditures.³⁰⁻³³ Vaccines should normally be kept in the "cold chain", which is between +2 and +8° C, to maintain their effectiveness. Nonetheless, there are acknowledged difficulties in following the vaccination cold chain protocols.^{31,34} Reliance on paper records and a lack of real-time tracking led to high vaccine wastage and missed immunizations.³⁵ Poor Road infrastructure frequently makes it difficult for residents to reach clinics or for mobile immunization teams to reach rural or isolated areas.^{36,37}

Limitations

One of the major limitations of the study is that it adopts a hierarchical analytical approach, covering different geographical scales from the national level to the CD block level, rather than relying on a primary sample survey. Consequently, the study does not directly capture the actual difficulties, perceptions, experiences or barriers faced by individuals and households in accessing immunization facilities. Factors such as socioeconomic conditions, geographical accessibility, awareness, healthcare-seeking behaviour and service-related constraints could therefore not be examined comprehensively from the beneficiaries' perspective. The findings are primarily based on available secondary data and spatial comparisons, which may limit the ability to explain the underlying causes of variations in immunization coverage.

Since the study focuses on a multi-stage analysis across different geographical scales, it relies on secondary data obtained from multiple sources collected at different time periods. The timing of data collection varies from the national level to the state, district and CD – block levels, as these datasets were not generated simultaneously. Despite these limitations, the multi-level approach provides a useful overview of immunization coverage and spatial disparities and also offers a valuable basis for understanding the overall immunization situation in India, particularly in West Bengal and Malda district. The study recommends a more detailed discussion of the immunization programmes at different geographical and administrative scales to identify variations, challenges and gaps in immunization coverage.

CONCLUSION

The foregoing discussion highlights that the declining IMR in India and West Bengal which reflects improvement in child healthcare, immunization, nutrition and related health services. India has achieved relatively

favourable vaccination coverage compared with several other developing countries. The state of West Bengal has also demonstrated satisfactory immunization coverage over time. However, significant spatial disparities exist within the country, states and different districts. The hierarchical approach helps reveal disparities at different geographical scales and provides a comprehensive understanding of the overall immunization situation.

Neonatal mortality accounts for over half of under-five deaths in India and more than 40 percent of under-five deaths worldwide. Routine childhood vaccinations significantly enhance child survival rates, preventing approximately 2-3 million deaths annually worldwide. Achieving the Sustainable Development Goals by 2030 requires addressing socio-economic disparities in child health and the effectiveness of immunization programmes. India has significantly reduced newborn and young child mortality, with the infant mortality rate dropping from 47 to 33 per thousand live births (over 28 percent decrease) between 2010 and 2017. Similarly, the under-five mortality rate decreased by 29 percent, from 55 in 2011 to 39 per thousand in 2016.

Strengthening the immunisation programme requires a combination of better infrastructure, technology, community engagement and healthcare workforce support. The government can improve vaccine coverage by expanding cold-chain facilities in remote and rural areas, ensuring an uninterrupted vaccine supply and using digital tracking systems to monitor beneficiaries and reduce missed vaccinations. An inventive technical solution designed to improve vaccination supply chain systems nationwide is the Electronic Vaccine Intelligence Network (eVIN) in India. Evidence suggests that NGOs (Non-Governmental Organisations) facilitating government programmes can improve health care delivery performance effectively. Moreover, greater awareness campaigns through schools, local leaders and social media can help counter misinformation and increase public trust in vaccines.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Park K. Park's textbook on preventive and social medicine. Jabalpur, MP, India. 2013.
2. Gurnani V, Dhalaria P, Haldar P, Aggarwal MK, Singh P, Agarwal A, et al. Comprehensive review of the Universal Immunization Programme (UIP) – Identifying gaps and assist in formulating improvement plan for routine immunization in few states of India. *Clin Epidemiol Glob Health*. 2021;12:100834.
3. Megiddo I, Colson AR, Nandi A, Chatterjee S, Prinja S, Khera A, et al. Analysis of the Universal

- Immunization Programme and introduction of a rotavirus vaccine in India with IndiaSim. *Vaccine*. 2014;32:151–61.
4. Lombard M, Pastoret PP, Moulin AM. A brief history of vaccines and vaccination: -EN- A brief history of vaccines and vaccination -FR- Une brève histoire des vaccins et de la vaccination -ES- Una breve historia de las vacunas y la vacunación. *Rev Sci Tech OIE*. 2007;1;26(1):29–48.
5. Ministry of Health & Family Welfare. National Vaccine Policy. Government of India. Available at: https://nhm.gov.in/images/pdf/programmes/immunization/Guidelines/National_Vaccine_Policy.pdf. Accessed in 21 March 2026.
6. Sáfadi MAP. The importance of immunization as a public health instrument. *J Pediatr (Rio J)*. 2023;99:1–3.
7. Anekwe TD, Newell ML, Tanser F, Pillay D, Bärnighausen T. The causal effect of childhood measles vaccination on educational attainment: A mother fixed-effects study in rural South Africa. *Vaccine*. 2015;33(38):5020–6.
8. Nandi A, Kumar S, Shet A, Bloom DE, Laxminarayan R. Childhood vaccinations and adult schooling attainment: Long-term evidence from India's Universal Immunization Programme. *Soc Sci Med*. 2020;250:112885.
9. Nandi A, Shet A. Why vaccines matter: understanding the broader health, economic and child development benefits of routine vaccination. *Hum Vaccines Immunother*. 2020;2;16(8):1900–4.
10. Dubey S, Deshpande S, Krishna L, Zadey S. Evolution of Government-funded health insurance for universal health coverage in India. *Lancet Reg Health - Southeast Asia*. 2023;13:100180.
11. United Nations. Political declaration of the high-level meeting on universal health coverage: “universal health coverage: moving together to build a healthier world”. 2019. Available at: <https://www.un.org/pga/73/wp-content/uploads/sites/53/2019/07/FINAL-draft-UHC-Political-Declaration.pdf>. Accessed on 21 August 2025.
12. Alnajjar HA, Abou Hashish EA. Exploring the effectiveness of the Career Guidance and Counseling Program on the perceived readiness for the job market: a lived experience among nursing students. *Front Publ Health*. 2024;12:1403730.
13. National Health Mission. Background note on Immunization. 2025. Available at: <https://nhm.gov.in/index1.php>. Accessed on 2 January 2026.
14. Patel AR, Nowalk MP. Expanding immunization coverage in rural India: A review of evidence for the role of community health workers. *Vaccine*. 2010;28(3):604–13.
15. Ministry of Health and Family Welfare. Myth vs. Facts. 2024. Available at: <https://www.pib.gov.in/PressReleasePage.aspx?PRID=2034080®=3&lang>. Accessed on 21 March 2026.
16. Varghese T, Ramesh RM, Dhinagar MJ, Gnanaselvam NA, Kompithra RZ, Varughese DT, Kang G. Universal immunization programme in India: A review of childhood vaccine updates over the last decade (2014-2024). *IJID Regions*. 2026;6:100957.
17. Ding M. Participation pathways in global vaccine partnerships and their implications for immunization systems: a comparative analysis of China and India in Gavi. *Front Publ Heal*. 2026;14:1826364.
18. NFHS 5. National family health survey. 2024. Available at: <https://ruralindiaonline.org/or/library/resource/national-family-health-survey-nfhs-5-2019-21-west-bengal>. Accessed on 21 March 2026.
19. Nath, Kaur P, Tripathi S. Evaluation of the universal immunization program and challenges in coverage of migrant children in Haridwar, Uttarakhand, India. *Indian J Community Med*. 2015;40(4):239.
20. Kusuma YS, Kumari R, Pandav CS, Gupta SK. Migration and immunization: determinants of childhood immunization uptake among socioeconomically disadvantaged migrants in Delhi, India: Migration and immunization. *Trop Med Int Health*. 2010;15(11):1326–32.
21. Nath B, Singh JV, Awasthi S, Bhushan V, Kumar V, Singh SK. A study on determinants of immunization coverage among 12-23 months old children in urban slums of Lucknow district, India. *Indian J Med Sci*. 2007;61(11):598–606.
22. Vashishtha VM, Kumar P. 50 years of immunization in India: Progress and future. *Indian Pediatr*. 2013;50(1):111–8.
23. Baqui AH, Rosecrans AM, Williams EK, Agrawal PK, Ahmed S, Darmstadt GL, et al. NGO facilitation of a government community-based maternal and neonatal health programme in rural India: improvements in equity. *Health Policy Plan*. 2008;19;23(4):234–43.
24. Bhargava A, Chowdhury S, Singh KK. Healthcare infrastructure, contraceptive use and infant mortality in Uttar Pradesh, India. *Econ Hum Biol*. 2005;3(3):388–404.
25. Hosseinpoor AR, Mohammad K, Majdzadeh R, Naghavi M, Abolhassani F, Sousa A, et al. Socioeconomic inequality in infant mortality in Iran and across its provinces. *Bull World Health Organ*. 2005;83(11):837–44.
26. Anderson EL. Recommended solutions to the barriers to immunization in children and adults. *Mo Med*. 2014;111(4):344–8.
27. Maharana S, Dutta S, Kumari A, Mishra A. Coverage of Measles-Rubella Vaccination Campaign: A Cross-Sectional Study in an Urban Slum of Durgapur, West Bengal, India. *Cureus*. 2025;5:76..
28. Ray SK, Dasgupta S, Dobe M, Biswas R, Mehta P, Baishya AC, et al. An evaluation of routine

- immunization coverage in some districts of West Bengal and Assam. *Indian J Public Health*. 2004;48(2):82–7.
29. Singh S, Sahu D, Agrawal A, Vashi MD. Barriers and opportunities for improving childhood immunization coverage in slums: A qualitative study. *Prev Med Rep*. 2019;14:100858.
30. Dasgupta S. Routine immunization: Opportunities, challenges. *Indian J Public Health*. 2010;54(1):3.
31. Dasgupta S. Introduction of newer vaccines in Immunization Programme of India: Challenges to be addressed. *J Compr Health*. 2020;26;5(1):5–11.
32. Sikder R, Mukherjee D, Pattanayak U, Majumdar KK, Kundu SS, Dey R, et al. Prevalence of vaccine hesitancy and its associated factors in an urban area of West Bengal, India. *Int J Community Med Public Health*. 2020;7(9):3443.
33. Solomon R. Involvement of Civil Society in India's Polio Eradication Program: Lessons Learned. *Am J Trop Med Hyg*. 2019;101(4):15–20.
34. Weir E. Preventing cold chain failure: vaccine storage and handling. *Can Med Assoc J*. 2004;171(9):1050–5.
35. Rahmadhan MAWP, Handayani PW. Challenges of vaccination information system implementation: A systematic literature review. *Hum Vaccines Immunother*. 2023;19(2):2257054.
36. Mishra K, Mohapatra I, Sarathi Mohapatra P, Madhusikta S, Parimita P. Challenges and barriers to immunization during COVID-19: An experience of parents/caregivers from a well-baby clinic of a tertiary care hospital of Eastern India. *Clin Epidemiol Glob Health*. 2023;19:101200.
37. Ogunniyi TJ. Revealing the challenges and efforts of routine immunization coverage in Nigeria. *Health Sci Rep*. 2024;7(8):70000.

Cite this article as: Askari MH, Gupta K. An overview of the universal immunization programme in India: a multi-level discussion. *Int J Community Med Public Health* 2026;13:5244-51.