The Value of Vaccines to Mitigate Antimicrobial Resistance in Viet Nam

Global Antibiotic Resistance Partnership (GARP)-Viet Nam
Policy Brief



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LIST OF ABBREVIATIONS AND ACRONYMS

AMR	antimicrobial resistance
AMU	antimicrobial use
ARIs	acute respiratory infections
AWaRe	Access, Watch, Reserve
COPD	chronic obstructive pulmonary disease
DDD	defined daily dose
EPI	Expanded Programme on Immunization
GARP	Global Antibiotic Resistance Partnership
GDP	gross domestic product
Hib	*Haemophilus influenzae* type b
HPV	human papillomavirus
IPC	Infection prevention and control
IPD	invasive pneumococcal disease
LMICs	low- and middle-income countries
MDR	multidrug resistant
MICS	multiple indicator cluster survey
MoH	Ministry of Health
MRSA	methicillin-resistant *Staphylococcus aureus*
MSA	Medical Services Administration
NCD	non-communicable disease
NITAG	National Immunization Technical Advisory Group
PCVs	pneumococcal conjugate vaccines
RCT	randomized controlled trial
WASH	water, sanitation, and hygiene
WHO	World Health Organization



OVERVIEW

Antimicrobial resistance (AMR) is a growing health threat in Viet Nam, driven by a high burden of infectious disease and extensive antimicrobial use. Vaccination can help address AMR by preventing infections in the first place, reducing antibiotic use and slowing the emergence and transmission of resistance. Viet Nam's Expanded Programme on Immunization provides a strong foundation for this approach, but vaccination is not yet explicitly integrated into the country's national AMR policy. Drawing on a review of scientific literature, relevant policies and regulations, and consultations with the Global Antibiotic Resistance Partnership (GARP)-Viet Nam Technical Working Group, this brief examines the contribution of vaccines to AMR mitigation and recommends closer alignment between immunization and AMR strategies, sustained routine vaccine coverage, timely introduction of priority vaccines, and stronger evidence generation and institutional coordination.

*Photo Credit: Oxford University Clinical Research Unit



EXECUTIVE SUMMARY

AMR poses a critical threat to the health and well-being of populations worldwide. In Viet Nam, an estimated 14,434 deaths were attributable to, and 56,466 deaths were associated with AMR in 2021, out of a total of 703,526 deaths from all causes. Because continuous exposure to antimicrobials creates selection pressure that favours resistant organisms, sustainable solutions need to include both new therapies and novel interventions to reduce the incidence of infectious diseases and the use of antibiotics. Vaccines are critical, yet undervalued tools in addressing the growing public health challenge of AMR. Therefore, strengthening immunization efforts in alignment with AMR strategies could increase the impact of vaccination and strengthen the AMR response, ultimately curbing the spread of resistant infections and reducing reliance on antibiotics.

Vaccines can mitigate AMR by preventing primary and secondary infections, thereby reducing the need for antibiotic use. Additionally, adequate vaccination coverage can promote herd immunity and curb the transmission of drug-resistant pathogens. As a result, vaccines play a crucial role in preserving the efficacy of antibiotics, slowing the spread of AMR, and reducing the burden on health and the economy. In the World Health Organization (WHO) Global Action Plan on AMR published in 2015, vaccines were listed as one of the key tools for mitigating AMR and associated infections. Their role has been further reaffirmed as a strategic priority in the updated WHO Global Action Plan on AMR for 2026–2036.

Vaccines have been identified as one of the three most effective interventions to reduce the burden of bacterial AMR globally, alongside infection prevention and control (IPC) and water, sanitation, and hygiene (WASH) interventions. It is estimated that 4.2 percent of AMR-related deaths in low- and middle-income countries could be prevented by prioritizing paediatric vaccines. Acknowledging the importance of vaccines in AMR mitigation, the 2024 Political Declaration of the High-level Meeting on Antimicrobial Resistance hosted by the United Nations emphasized their role as invaluable prevention tools.

By reducing the burden of infections and antibiotic use, vaccines can also alleviate the economic burden exacerbated by AMR, as demonstrated by evidence from the impacts of the pneumococcal conjugate vaccine and *Haemophilus influenzae* type b vaccine.

This policy brief, informed by literature review and expert consultation on the infectious disease burden in Viet Nam, assesses antibiotic access and consumption in the country, the evidence on the role of vaccines in AMR mitigation, relevant policies and institutions, challenges with policy implementation, and offers policy recommendations to highlight the potential of effective immunization program in controlling AMR.

*Photo credit: Oxford University Clinical Research Unit

Key Recommendations

Key recommendations from the GARP-Viet Nam technical working group:

- Sustain and expand coverage of vaccines in the routine immunization schedule. Ensure continuous updating of comprehensive guidance on catch-up vaccination for all Expanded Programme on Immunization vaccines in Viet Nam.

- Accelerate the introduction of seasonal influenza vaccines into the Expanded Programme on Immunization in Viet Nam. Develop guidelines and ensure timely implementation of the pneumococcal conjugate vaccine (PCV) and rotavirus vaccine in accordance with their respective roadmaps.

- Integrate the role of vaccination in preventing and combating AMR in all activities of the Expanded Programme on Immunization and in the next National strategy on AMR and its operational plans.

- Strengthen collaboration between key stakeholders in generating country-relevant data on the impact of vaccination on AMR that can guide the development and implementation of policies that can address AMR and infectious disease burden.

BACKGROUND

1.1 Country Profile

Viet Nam had an estimated population of 100.35 million (World Health Organization 2025a) in 2023 including approximately 7.2 million children under 5 (UNICEF 2023a). Over the past two decades, life expectancy at birth has increased from 72 years in 2000 to 75 years in 2023 (World Bank 2025a), reflecting improvements in healthcare and living conditions. Meanwhile, under-five mortality has declined significantly, from 30 per 1,000 live births in 2000 to 20 per 1,000 in 2023 (World Bank 2025b).

According to WHO, non-communicable diseases (NCDs) accounted for 78.2 percent of deaths in Viet Nam in 2021 (World Health Organization 2025a). The leading causes of death include stroke, ischemic heart disease, and chronic obstructive pulmonary disease (COPD) (World Health Organization 2025a). Beyond these NCDs, infectious diseases and antimicrobial resistance (AMR) remain major public health challenges in Viet Nam (Our World in Data 2025; Institute of Health Metrics and Evaluation (IHME) 2024, 2023a).

1.2 Infectious disease burden and AMR in Viet Nam

In Viet Nam, infectious diseases resulted in an estimated 57,901 deaths in 2023 (Our World in Data 2025), with respiratory infections and tuberculosis among the six leading causes of death (IHME 2023b). Despite the significant infectious disease burden, the use of antibiotics, alongside improved nutrition, access to clean water and sanitation, and access to vaccines, have more than halved the under-5 mortality from 51.6 deaths per 1,000 live births in 1990 to 20.3 deaths per 1,000 live births in 2022 (UNICEF 2022). These improvements in public health infrastructure and services have extended the average human lifespan by 23 years (Browne et al. 2021). However, the misuse and overuse of antibiotics now threaten to reverse this progress with the rapid emergence and spread of AMR (Hutchings et al. 2019).

AMR occurs when bacteria, viruses, fungi and parasites evolve and no longer respond to antimicrobial agents such as antibiotics, antivirals, antifungals and antiparasitics, making infections harder or impossible to treat and increasing the risk of disease spread, severe illness, disability and death. As a result, growing resistance threatens to reverse decades of progress in human and veterinary medicine, agriculture, food production and environmental sustainability and overall sustainable development (World Health Organization 2026a). In 2021, bacterial AMR was estimated to directly cause 1.14 million deaths globally and to have contributed to 4.71 million deaths (Naghavi et al. 2024). In Viet Nam, AMR was responsible for an estimated 14,434 deaths and was associated with 56,466 deaths in 2021, out of a total of 703,526 deaths from all causes (IHME 2024; World Health Organization 2026b). Across 204 countries, Viet Nam ranks 89th in AMR-associated age-standardized mortality rate (IHME 2023a). This metric represents a weighted average of the mortality rates for specific age groups per 100,000 people, adjusted for age distribution relative to the WHO standard population (World Health Organization 2024a). This ranking emphasizes the urgent need for targeted interventions to curb AMR-related mortality, particularly in vulnerable populations in Viet Nam.

A recent *Lancet* series on AMR (Lancet 2024) highlighted the growing threat AMR poses to global health, as it undermines the effectiveness of antibiotics, often referred to as the backbone of modern medicine. While AMR can affect anyone, the very young, the elderly, and those with severe illnesses bear the greatest burden. Through modelling estimates, the series demonstrates that preventing infections, particularly through improved vaccination, as well as better water and sanitation, can significantly reduce AMR-related deaths in low- and middle-income countries (LMICs) while also lowering antibiotic use to help preserve their effectiveness. In Viet Nam, where AMR is a pressing concern, understanding the primary bacterial pathogens driving resistance is essential for developing effective mitigation strategies.

AMR surveillance data from Vietnamese hospitals show that the five most commonly isolated bacterial species

in 2020 comprised *Escherichia coli*, *Staphylococcus aureus*, *Klebsiella pneumoniae, Acinetobacter baumannii*, and *Pseudomonas aeruginosa* (Ministry of Health 2023a):

- *E. coli:* 70 percent of the isolates were resistant to third-generation cephalosporins (first-line treatment), and 10 percent were resistant to carbapenems (second-line).
- *K. pneumoniae*: 60 percent of the isolates were resistant to third-generation cephalosporins (first-line treatment) and 50 percent resistant to carbapenems (second-line).
- Critical and high-priority pathogens:
    - *S. aureus*: 78 percent of isolates were methicillin-resistant (MRSA).
    - *Acinetobacter*: 87.8 percent of isolates were carbapenem-resistant.
    - *P. aeruginosa*: 40 percent of isolates were ceftazidime-resistant (first-line treatment) or carbapenem-resistant (second-line).

These proportions highlight the urgent need for effective antimicrobial stewardship, infection prevention and control and regulatory enforcement to curb the spread of drug-resistant infections. Addressing resistance in these key pathogens through improved surveillance, infection prevention and control, and vaccine deployment could play a crucial role in reducing AMR-related morbidity and mortality in the country. AMR has also been closely linked to the widespread use, misuse and overuse of antimicrobials across other sectors, including animal husbandry, agriculture, and aquaculture (World Health Organization 2017).

1.3 Antimicrobial use and access in Viet Nam

Increasing use and misuse of antimicrobials in humans, animals, and agriculture drive the emergence and spread of drug-resistant pathogens (World Health Organization 2023). The regulatory framework for human antimicrobials stipulated in the Law on Pharmacy in Viet Nam, requires all antimicrobials to be dispensed with prescription only, yet most drug sellers continue to sell antimicrobials without prescriptions. Roughly 60-90 percent of antibiotics were reported to be dispensed without a prescription in the community (Nga et al. 2014; Do et al. 2021). Viet Nam's estimated antibiotic-consumption rate more than doubled, from 25.6 to 54.0 defined daily doses (DDDs)[1] per 1,000 inhabitants per day between 2016 and 2023 (Klein et al. 2024).

A multicentre point-prevalence study in Viet Nam found that 67.4 percent of hospitalised patients were receiving antibiotic therapy, approximately one-third of whom were prescribed antibiotics inappropriately (Thu et al. 2012). Another cross-sectional study conducted across five hospitals in Viet Nam found the proportion of patients receiving antibiotics was higher among hospitals with larger bed capacities, ranging from 16.4 percent to 49.7 percent (Vu et al. 2024).

The WHO AWaRe (Access, Watch, Reserve) classification of antibiotics provides targets to support the appropriate use of antibiotics, where antibiotics in the Access category have the lowest potential for resistance. These antibiotics comprise the first line of treatment and are recommended to constitute 70 percent or greater of the total amount of antibiotics used (World Health Organization 2025b; 2026c). In Viet Nam, Access antibiotics accounted for only 12 percent to 35 percent of total antibiotic consumption, well below this target, which is a significant concern (Vu et al. 2024).

1.4 Current policies on AMR in Viet Nam

Viet Nam was the first country in the WHO Western Pacific Region to adopt a National Action Plan on AMR in 2013, covering the period of 2013-2020 (Thomas et al. 2024). In September 2023, the Prime Minister approved the National Strategy on Prevention and Control of AMR (2023-2030), with a long-term vision extending to 2045 (Ministry of Health 2023b).

The national strategy comprises four major objectives, eight key tasks, and three essential projects spanning healthcare, veterinary medicine, and environmental sectors. The projects focus on raising community awareness, strengthening the National AMR and antimicrobial use (AMU) surveillance systems, and enhancing AMU management in healthcare, veterinary medicine, and environmental AMR surveillance (Ministry of Health 2023b). While the Ministry of Health (MoH)

[1] A defined daily dose (DDD) is the assumed average maintenance dose per day for a drug used for its main indication in adults (World Health Organization 2026d)

and the Ministry of Agriculture and Environment are responsible for leading these projects in their respective sectors, the MoH plays a central role, presiding over and coordinating with other ministries, ministerial-level agencies, and stakeholders to implement the strategy nationwide. The MoH is also responsible for evaluating the implementation results of the strategy and reporting to the prime minister.

In addition to the national strategy, two additional decisions were issued in late 2023 to support its implementation – establishing the AMR Steering Committee and forming the AMR Working Group (Ministry of Health 2023c, 2023d). The AMR Working Group has been tasked with consulting, supporting ministries, and assisting the AMR Steering Committee in implementing the national AMR strategy, as well as overseeing related projects and programs. The Medical Services Administration (MSA) within the MoH has been designated as the leader of the AMR Working Group. In 2025, the AMR Working Group was updated to include 34 members representing the MoH, the Ministry of Industry and Trade, the Ministry of Agriculture and Environment, UN agencies, and other international organizations in Viet Nam (Ministry of Health 2025a).

In 2025, based on the National Strategy for the Prevention and Control of Antimicrobial Resistance in Viet Nam for 2023–2030, with a vision to 2045, and taking into account the achievements, challenges, and gaps identified during the implementation of the National Action Plan for the Prevention and Control of Antimicrobial Resistance for 2024–2025, the MoH issued the "Action Plan for the Prevention and Control of Antimicrobial Resistance in the Health Sector for 2026–2030" (Ministry of Health 2025b). The Action Plan sets out general and specific objectives, indicators and targets for 2030, a detailed implementation plan, a monitoring and evaluation framework, as well as clear information on funding sources and the allocation of responsibilities.

1.5 The Expanded Programme on Immunization in Viet Nam

Since its establishment in 1981, the Expanded Programme on Immunization (EPI) in Viet Nam has enabled significant strides in protecting the population against vaccine-preventable diseases. The program was initiated by the MoH, with support from the WHO and the United Nations Children's Fund (UNICEF), and since 1995, the EPI has reached all communes nationwide (EPI Viet Nam 2025).

Currently, the EPI in Viet Nam provides immunization against 13 vaccine-preventable diseases: Hepatitis B, tuberculosis, diphtheria, pertussis, tetanus, poliomyelitis, *Haemophilus influenzae* type b infection, measles, Japanese encephalitis, rubella, rotavirus diarrhea, pneumococcal disease, Human Papillomavirus (HPV), and other diseases as recommended by the MoH (Ministry of Health 2026). The rotavirus, pneumococcal, and HPV vaccines are the most recent additions to the program. Deployment of the rotavirus vaccine began in 2024 and has since been expanded nationwide in accordance with the planned roadmap (Ministry of Health 2022, 2026). In contrast, pneumococcal and HPV vaccines are scheduled for introduction from 2025 and 2026 in accordance with the roadmap for expanding the EPI during 2021–2030 (Ministry of Health 2022), with priority given to disadvantaged mountainous areas and areas with ethnic minority populations (Viet Nam Government News 2025a). During 2026–2028, pneumococcal vaccination is expected to be introduced on a small scale initially and progressively expanded to 16 provinces by 2028, while HPV vaccination will be implemented among 11-year-old girls in four provinces, Tuyen Quang, Quang Ngai, Dak Lak, and Vinh Long, representing four regions of Viet Nam (Viet Nam Government News 2025a).

The coverage estimates for childhood immunization in Viet Nam are presented in Table 1.1.

Table 1.1 Official Coverage Estimates for Childhood Immunization in Viet Nam, 2024

Vaccine	Target pathogen	Required dosage	2024 coverage (percent)
BCG	Tuberculosis	1	96
DTP1	Diphtheria, pertussis and tetanus	1	99
DTP3	Diphtheria, pertussis and tetanus	3	97
HepB3	Hepatitis B	3	97
HepBB	Hepatitis B	1	86
Hib3	*Haemophilus influenzae* type b	3	97
IPV1	Poliomyelitis	1	93
IPV2	Poliomyelitis	2	86
MCV1	Measles	1	98
MCV2	Measles	2	95
Pol3	Poliomyelitis	3	73
RCV1	Rubella	1	95

Source: WHO/UNICEF estimates of national immunization coverage (WUENIC) (WHO/UNICEF 2025)



According to the roadmap for expanding the EPI during 2021–2030 (Ministry of Health 2022), Viet Nam aims to achieve 95 percent vaccination coverage among children and introduce four additional vaccines by 2030, including the rotavirus vaccine, pneumococcal vaccines, HPV vaccine, and seasonal influenza vaccine. Of these, the first three vaccines have already been incorporated into the EPI (Ministry of Health 2026). To sustain the achievements of the EPI and continue implementing this roadmap, the Ministry of Health issued the EPI Plan for the 2026–2028 period in August 2025 (Viet Nam Government News 2025a). Under the Plan, the EPI aims to achieve 90 percent coverage for hepatitis B vaccination within 24 hours of birth and full tetanus vaccination among pregnant women, and at least 95% coverage for other EPI vaccines nationwide. For pneumococcal and HPV vaccines, the target coverage of at least 95 percent applies to the areas where these vaccines are being implemented (Ministry of Health 2025c).

The impact of the EPI has been profound. Through the immunization of millions of children, the country's

*Photo Credit: Oxford University Clinical Research Unit

national EPI has contributed to achieving polio-free status, eliminating neonatal tetanus as a public health problem and significantly reducing the incidence of diseases such as measles, diphtheria, pertussis, and Japanese encephalitis (World Health Organization 2024b; UNICEF 2025b). Viet Nam was certified polio-free by WHO in 2000 (Viet Nam Government News 2025b) and achieved maternal and neonatal tetanus elimination in 2005 (World Health Organization 2019). The country has maintained both achievements since then (Viet Nam Government News 2025b; Jones et al. 2024).

Despite these successes, challenges persist, and immunization coverage remains suboptimal in mountainous, remote, and ethnic minority-populated areas. Additionally, vaccine hesitancy, often fuelled by misinformation, threatens the maintenance of high vaccination coverage (UNICEF 2025b). The COVID-19 pandemic, in particular, caused a sharp decline in childhood immunization in Viet Nam. A UNICEF report indicates that nearly 250,000 children in Viet Nam missed one or more vaccinations between 2019 and 2021 due to service disruptions caused by strained health systems, the diversion of already scarce immunization resources, and declining public confidence (UNICEF 2023b). These disruptions also resulted in an estimated 114,000 children under one year of age receiving no doses of the diphtheria, tetanus, and pertussis (DTP) vaccine in 2022, an indicator commonly used globally to monitor immunization coverage (WHO/UNICEF 2023). High numbers of unvaccinated children increase the risk of outbreaks of vaccine-preventable diseases (VPDs) (WHO/UNICEF 2023). Following the decline in vaccination coverage, Viet Nam experienced a resurgence of VPDs (World Health Organization 2026e), with sporadic outbreaks reported in the post-pandemic period (Nguyen-Tien et al. 2026; Ong et al. 2025). Addressing these gaps requires a well-structured immunization system that can ensure vaccine accessibility and coverage across all regions.

1.6 Vaccines and AMR

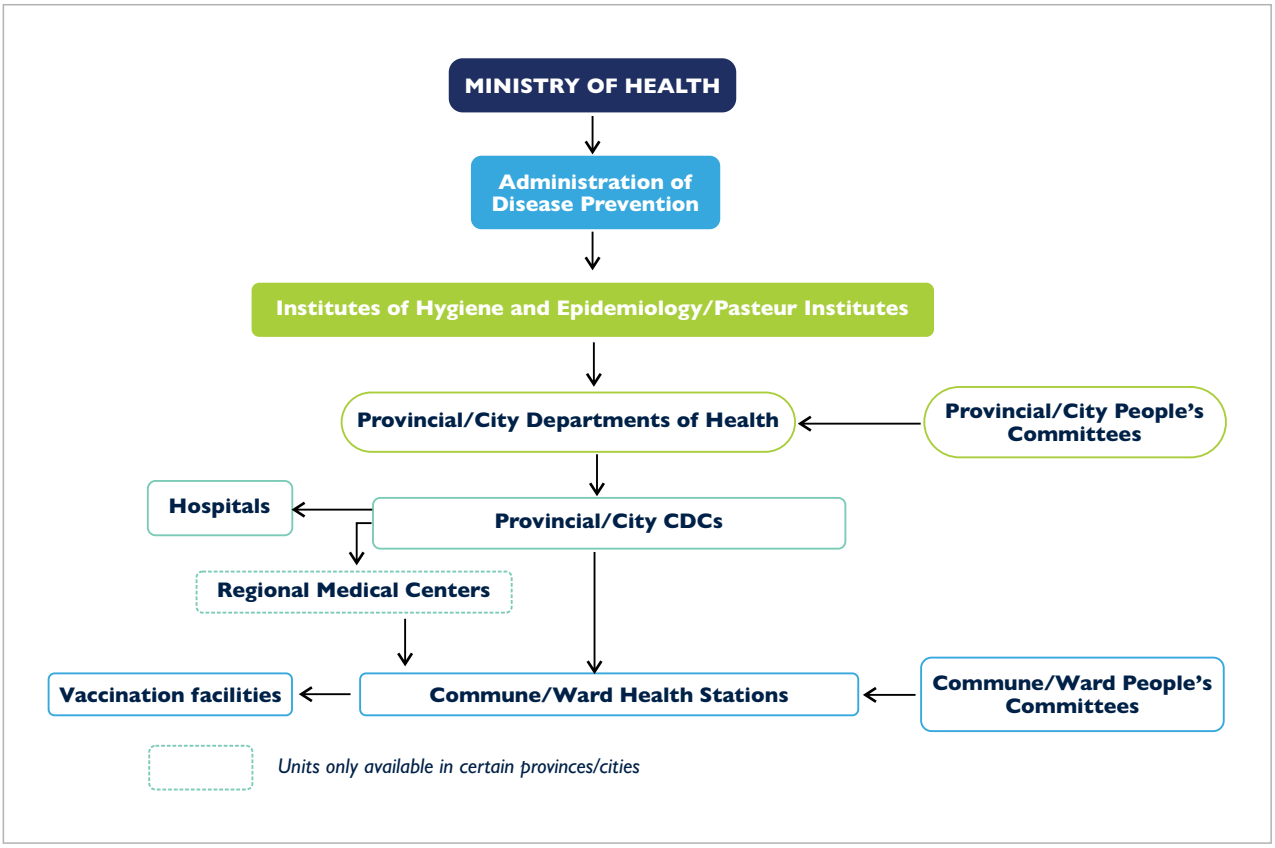
With over 154 million lives saved globally over the past 50 years, vaccines are critical in the fight against infectious diseases (Spooner et al. 2024; World Health Organization 2024c). Notably, COVID-19 vaccines alone have been estimated to have saved nearly 20 million lives during the first year of their rollout (Watson et al. 2022). Today, more than 20 life-threatening diseases can be prevented through immunization alone (World Health Organization 2020) and millions of children have been protected by vaccination for over 40 years in Viet Nam (World Health Organization 2024b).
Beyond their role in preventing infectious diseases, vaccines have been increasingly recognized for their impact on AMR. Vaccines not only prevent infectious diseases but also play a vital role in combatting AMR. They are listed as one of the key tools for mitigating AMR in the WHO Global Action Plan on AMR (2015) (World Health Organization 2015; van Heuvel et al. 2022) and remain a strategic priority in the updated WHO Global Action Plan on AMR for 2026–2036 (World Health Organization 2026a). In Viet Nam, vaccination is currently not integrated as an important intervention for mitigating AMR in either the National Strategy on AMR or the Action Plan for the Prevention and Control of Antimicrobial Resistance in the Health Sector for 2026–2030 (Ministry of Health 2023b, 2025b)

INSTITUTIONAL SETUP OF THE EPI SYSTEM IN VIET NAM

To support nationwide immunization efforts, Viet Nam's EPI operates through a comprehensive network of healthcare facilities (Figure 1.1). The system has recently undergone significant structural changes following the government and provincial administrative reorganizations and mergers implemented in 2025. The current system comprises national-level institutions, including the MoH, the Administration of Disease Prevention (VADP), the Institutes of Hygiene and Epidemiology (National [NIHE] and Tay Nguyen [TIHE]), and the Pasteur Institutes (Ho Chi Minh City and Nha Trang), as well as local-level institutions, including Provincial Departments of Health, People's Committees, Provincial Centers for Disease Control (CDCs), hospitals, Commune People's Committees, commune health stations, and vaccination facilities. This extensive infrastructure plays a crucial role in vaccine distribution, administration, and monitoring, particularly in addressing disparities in immunization coverage.

In the current EPI system, the MoH directs and oversees the operations of the EPI through the Administration of Disease Prevention, which serves as the lead agency, together with other departments, administrations and units under the MoH (Ministry of Health 2026). The Institutes of Hygiene and Epidemiology and Pasteur Institutes provide regional technical leadership for immunization activities by overseeing immunization planning, vaccine distribution and cold chain management, surveillance of immunization safety and adverse events following immunization (AEFI), as well as training, supervision, and monitoring of immunization program. Among these institutes, the National Institute of Hygiene and Epidemiology (NIHE) serves as the lead institute, coordinating with the other institutes and relevant stakeholders to develop national technical guidelines on immunization (Ministry of Health 2026). Provincial health authorities, provincial CDCs, regional medical centers (where applicable), and commune health stations are responsible for coordinating, implementing, supervising, and monitoring immunization activities, including vaccine management, immunization safety, training, and reporting at the local level (Ministry of Health 2026).

In addition to the functional agencies, Viet Nam also has a National Immunization Technical Advisory Group (NITAG). The NITAG is an independent committee that advises the MoH on vaccines and biological products in Viet Nam. The current NITAG is composed of 24 members with multidisciplinary expertise, including clinical medicine, pediatrics, immunology, epidemiology, and vaccinology. Through its guidance, NITAG plays a crucial role in shaping national immunization policies and ensuring vaccine strategies align with public health priorities.



*CDCs: Centers for Disease Control and Prevention

Figure 1.1: Organogram of the Extended Programme for Immunization in Viet Nam

Source: Overview of the Expanded Programme on Immunization in Viet Nam (National Institute of Hygiene and Epidemiology (NIHE) 2026)

KEY FINDINGS FROM REVIEWS AND CONSULTATIONS

2.1 The role of vaccines in mitigating AMR

Vaccines are powerful tools for preventing infections, reducing disease burden and minimizing the need for antibiotic use (World Health Organization 2022). By promoting herd immunity, vaccines also reduce the transmission of drug-resistant pathogens, thereby contributing to the containment of AMR and associated infections (Kalanxhi et al. 2023; Frost et al. 2022) (Figure 2.1)

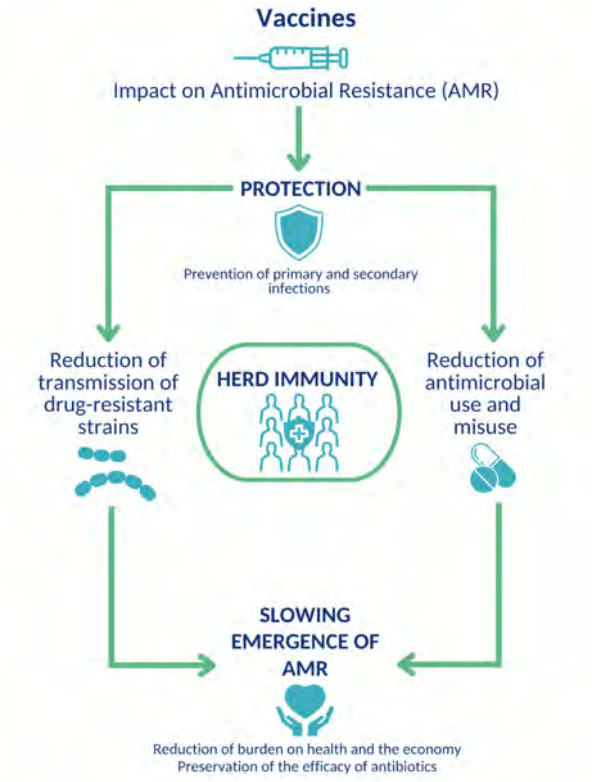


Figure 2.1: The impact of vaccines on antimicrobial resistance

Source: Kalanxhi et al. 2023

Vaccines prevent infections

The first pneumococcal conjugate vaccine (PCV7) was licensed for use in the United States in 2000. Within four years of its licensure, PCV7 contributed to an overall 57 percent reduction in the incidence of penicillin-nonsusceptible invasive pneumococcal disease (IPD). Specifically, the incidence of penicillin-nonsusceptible IPD decreased by 84 percent among children younger than 2 years and by 49 percent among adults aged 65 years or older (Kyaw et al. 2006).

A clinical trial conducted among children aged 6–35 months in 13 geographically diverse countries over five influenza seasons (2011–2014) found that quadrivalent influenza vaccination reduced the incidence of moderate-to-severe laboratory-confirmed influenza by 63 percent and laboratory-confirmed influenza of any severity by 50 percent compared with non influenza control vaccines (Danier et al. 2019).

Vaccines reduce the transmission of drug-resistant strains

A systematic review of 32 studies showed that routine infant immunization with the 13-valent Pneumococcal Conjugate Vaccine (PCV13) led to a decrease in antimicrobial-resistant IPD in children and adults (Htar et al. 2019). Reductions ranged from 23-70 percent for penicillin-resistant IPD, 11-77 percent for cephalosporin-resistant IPD, and up to 50 percent for macrolide-resistant IPD.

Vaccines reduce antimicrobial use

A systematic review examined the impact of influenza and pneumococcal vaccination on antibiotic use across 29 randomized controlled trials (RCTs) and 69 observational studies. The pooled analysis of the RCTs estimated that influenza and pneumococcal vaccination reduced the combined outcome of antimicrobial prescriptions and days of antibiotic use by 29 percent and 8 percent, respectively (van Heuvel et al. 2023).

Among the RCTs, 17 examined influenza vaccination and 13 examined pneumococcal vaccination, including one trial that assessed both vaccines. Most studies were conducted in high-income countries in the WHO European Region and the Region of the Americas. Study populations varied by vaccine and included children, adults, older adults, and patients with COPD. The pneumococcal vaccination studies included PCV7, PCV9, PCV13, PPV23, and PHiD-CV10 (pneumococcal *Haemophilus influenzae* protein D conjugate vaccine) (van Heuvel et al. 2023).



Vaccines slow the emergence of AMR

A large-scale systematic review of 559 studies found significant absolute reductions in the proportions of pneumococci showing non-susceptibility and resistance to various drug classes, including penicillin and third-generation cephalosporins, over the 10 years after the implementation of PCV vaccines (Andrejko et al. 2021).

2.2 Estimating the impact of vaccines on AMR

Vaccines reduce AMR associated health burden

In 2019, vaccines against 16 pathogens were estimated to have the potential to avert about 510,000 deaths associated with AMR globally, which would account for approximately 12 percent of all AMR-associated mortality (Kim et al. 2023; World Health Organization 2024d). When the use of vaccines is expanded to all target populations at risk of infection, an additional 1.2 million deaths associated with AMR could be averted (World Health Organization 2024d). Additionally, vaccines are projected to prevent 150,000 deaths attributable to AMR, amounting to approximately 10 percent of the total AMR-attributable deaths (Kim et al. 2023).

In the WHO Western Pacific region, the burden of bacterial AMR infections that could be averted by vaccines ranked fourth among WHO regions, at around 60,000 deaths and 2 million disability-adjusted life years (DALYs) averted. One DALY represents the loss of the equivalent of one year of full health (World Health Organization 2024e).

Among vaccines, those targeting *Mycobacterium tuberculosis* and *S. pneumoniae* are estimated to have the highest impact on AMR globally. These vaccines were projected to avert approximately 120,000 and 100,000 deaths associated with AMR, respectively in 2019 (Kim et al. 2023). Similarly, vaccination against *H. influenzae* type b at 2019 coverage levels is estimated to have averted 11,000 deaths associated with AMR. If the global coverage of this vaccine reached 90 percent, the number of AMR-associated deaths averted could increase to 13,000 (Kim et al. 2023).

Vaccines reduce the AMR associated economic burden

The economic burden of AMR is significant, and vaccines can help reduce associated healthcare costs.

In China, modelling estimated that increasing PCV coverage could reduce AMR-related costs by $371 million under the scaled scenario and $586 million under the accelerated scenario over five years, between 2021 and 2025. These cost savings included direct and indirect costs incurred by patients and caregivers, as well as productivity losses due to mortality and disability (Lu et al. 2021). These estimated savings equate to approximately 0.003 percent of China's GDP in 2021 (World Bank 2023a), in a country with a population of 1.41 billion people (World Bank 2022a).

*Photo credit: Oxford University Clinical Research Unit

In Ethiopia, PCV vaccination between 2011 and 2017 was estimated to have averted approximately 718,100 cases of antibiotic treatment failure and 9,520 AMR-related deaths, resulting in US$32.7 million in AMR-related cost savings (Ozawa et al. 2021). This estimated cost savings translates to approximately 0.1 percent of Ethiopia's GDP in 2011 (World Bank 2023b), in a country with a population of 92 million people (World Bank 2022b). The annual savings could increase by an additional US$7.67 million and US$11.43 million in the scenarios of maintaining the current PCV immunization coverage and increasing PCV coverage to 85 percent by 2022 respectively (Ozawa et al. 2021).

2.3 Potential impact of vaccines in Viet Nam

Rotavirus vaccines

Rotavirus infections are a significant cause of childhood diarrhea in Viet Nam (UNICEF 2025a), often inappropriately treated with antibiotics (Zawahir et al. 2022). The implementation of rotavirus vaccination has the potential to reduce not only the number of diarrhea cases, but also the amount of inappropriately prescribed antibiotics, thereby reducing the risk of AMR associated with overuse and misuse of antibiotics in young children.

Figure 2.2 represents the potential impact of rotavirus vaccines on AMR in Viet Nam (Lewnard et al. 2020). The estimated effect of vaccines on antibiotic use was derived using data from demographic and health surveys in several LMICs and extrapolated to the other countries within this group. Estimates from Viet Nam were derived using data from the Multiple Indicator Cluster Survey (MICS) conducted by UNICEF in 2013-2014 in Viet Nam, assuming universal immunization coverage. Under this modelling scenario, the direct impact of rotavirus vaccines could prevent 367,452 out of 548,064 (67 percent) antibiotic-treated diarrhea cases attributable to rotavirus each year among children under 2 years old in Viet Nam.

In the current context, rotavirus vaccination was introduced into the EPI in Viet Nam in 2024, reaching 34.4 percent coverage in implemented areas during the first six months of 2025 (Ministry of Health 2025c). It has since been expanded nationwide in accordance with the planned roadmap, with a target coverage of at least 95 percent for the period 2026-2028 (Viet Nam Government News 2025a).

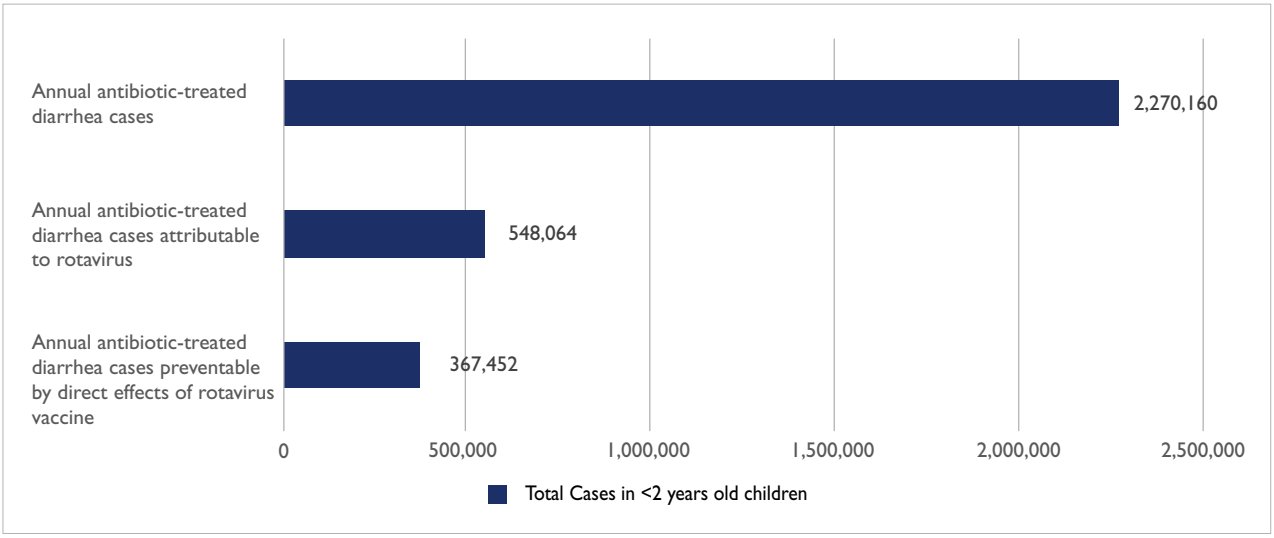


Figure 2.2: Annual antibiotic-treated diarrhea cases preventable by the rotavirus vaccine in Viet Nam

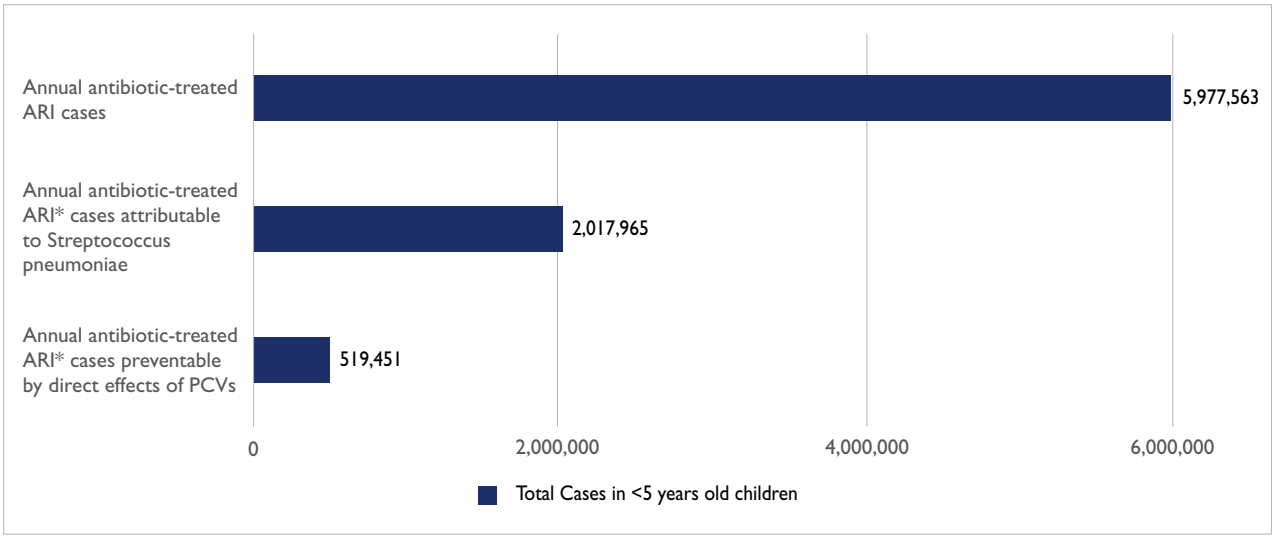
Source: Lewnard et al. 2020

Pneumococcal vaccines

Acute otitis media (AOM) and IPD are acute respiratory infections (ARIs) associated with *Streptococcus pneumoniae* that are often treated with antibiotics (Weiser et al. 2018). Figure 2.3 shows the potential impact of PCVs on AMR in Viet Nam (Lewnard et al. 2020). PCV could directly prevent 519,451 out of 2,017,965 (26 percent) antibiotic-

treated ARI cases attributable to *Streptococcus pneumoniae* each year among children under 5 years old in Viet Nam. These modelling estimates were derived using data from MICS conducted by UNICEF in 2013-2014 in Viet Nam, assuming universal immunization coverage.

In the current context, pneumococcal vaccines are scheduled for introduction from 2026 in accordance with the roadmap for expanding the EPI during 2021–2030 (Ministry of Health 2022). Priority will be given to disadvantaged mountainous areas and areas with ethnic minority populations, with implementation expected to expand to 16 provinces by 2028 and achieve a target coverage of at least 95 percent (Viet Nam Government News 2025a).



**ARI: acute respiratory infection, using estimates for acute otitis media and invasive pneumococcal disease numbers*

Figure 2.3: Annual antibiotic-treated ARI cases preventable by pneumococcal vaccines in Viet Nam

Source: Lewnard et al. 2020

Seasonal influenza vaccines

Influenza and influenza-like illnesses may contribute substantially to antibiotic use in Viet Nam. In 2024, Viet Nam recorded 289,876 seasonal flu cases and eight deaths (Viet Nam News 2025). A national survey of private pharmacies in Viet Nam found that respiratory conditions accounted for 61.4 percent of antibiotic purchases, with flu-like symptoms among the most commonly reported respiratory conditions associated with non-prescription antibiotic purchasing (Nguyen et al. 2022).

Influenza vaccination directly protects against influenza but also indirectly protects against secondary bacterial infections such as invasive pneumococcal disease, to which patients with influenza are more susceptible (Tessmer et al. 2011). By preventing influenza and associated secondary bacterial infections, influenza vaccination can reduce antibiotic use and, consequently, selection pressure for the emergence and transmission of resistance, not only in the target pathogens but also in bystander members of the normal bacterial flora (World Health Organization 2024d).

In the Western Pacific Region, a modelling scenario estimated that seasonal maternal influenza vaccination could avert approximately 670,000 of the 14 million (5 percent) defined daily doses (DDDs) of pathogen-associated antibiotic use in 2019. This estimate assumed 70 percent vaccination coverage among pregnant women to protect neonates and infants, with 70 percent vaccine efficacy over one year (World Health Organization 2024d). More broadly, WHO recommends that countries consider expanding seasonal influenza immunization to high-risk groups, including pregnant women, older adults, children, health workers, and individuals with comorbidities or underlying conditions to reduce the spread and impact of influenza (World Health Organization 2024d).

RECOMMENDATIONS FOR USING IMMUNIZATION TO TACKLE AMR

The potential impact of vaccines in mitigating antimicrobial resistance highlights the need for strategic immunization policies. Strengthening vaccination program can significantly contribute to controlling AMR-related infections, reducing the disease burden, and limiting the spread of resistant pathogens. To ensure the effective implementation of vaccines as an AMR mitigation tool, the following recommendations are proposed:

To the Administration of Disease Prevention:

1. Sustain and expand coverage of vaccines in the routine immunization schedule. Ensure continuous updating of comprehensive guidance on catch-up vaccination for all EPI vaccines in Viet Nam.

2. Accelerate the introduction of seasonal influenza vaccine into the EPI in Viet Nam. Develop guidelines and ensure timely implementation of PCV and rotavirus vaccine in accordance with their respective roadmaps.

3. Integrate the role of vaccination in preventing and combating AMR in all activities of the EPI.

4. Cooperate with the Medical Services Administration and other stakeholders in developing policies addressing AMR and the burden of infectious diseases.

5. Enhance communication and data sharing regarding the role of vaccines in mitigating AMR across the EPI system.

To the Medical Services Administration:

1. Incorporate vaccine-related targets in the next National Strategy on AMR and its operational plans in Viet Nam.

2. Develop communication and awareness-raising projects and encourage institutes to conduct research on the value of vaccines in mitigating AMR in Viet Nam.

3. Cooperate with the Administration of Disease Prevention and other stakeholders in developing policies addressing AMR and the burden of infectious diseases.

CONCLUSION

Vaccines represent a powerful yet underutilized component of the AMR response. As demonstrated by the potential impact of rotavirus vaccines, PCV and seasonal influenza vaccination in Viet Nam, immunization efforts can prevent a substantial number of AMR-related infections and deaths in Viet Nam. Viet Nam can build on the strength of its existing immunization program by sustaining high coverage, ensuring equitable introduction of priority vaccines, and explicitly recognising vaccination as an AMR-mitigation intervention.

Achieving this will require close collaboration between the Administration of Disease Prevention, the Department of Medical Services Administration, and other relevant units within and outside the Ministry of Health. Including vaccination as a key component of AMR control strategies, and including AMR objectives in immunization planning, would support a more sustainable, coherent and effective approach to combating drug-resistant infections in Viet Nam.

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Initiated in 2008, the Global Antibiotic Resistance Partnership (GARP) has played a critical role in advancing country-led national strategies and policies to address antimicrobial resistance (AMR) in several countries in Africa and Asia.

GARP's current focus is generating cross-disciplinary evidence highlighting the impact of vaccines on AMR in country specific contexts.

This policy brief lays out the situation in Viet Nam and recommends policy measures to use vaccines as tools to control AMR in the country.

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