World Health Organization

Regional Office for South-East Asia

SOUTH-EAST ASIA

REGIONAL VACCINE ACTION PLAN 2016-2020

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foreword

A good plan is vital to success. As the following pages demonstrate, the WHO South-East Asia Region is well-poised to build on its significant achievements in controlling and eliminating vaccine-preventable diseases and to attain the Global Decade of Vaccines' vision – extending the benefits of vaccination to all people everywhere.

Progress to date has been strong, in line with the Region's Flagship Priority Areas. In March 2014 the Region was certified polio-free. It has since stayed that way, saving millions of children the risk of contracting the debilitating and life-threatening disease. In 2016 the Region was validated to have eliminated maternal and neonatal tetanus. Mothers and their new-borns have never been safer from the 'silent killer'. Region-wide progress towards measles elimination and rubella and congenital rubella syndrome control has meanwhile been solid, with Bhutan and Maldives already free of indigenous measles. Notably, increased coverage of the diphtheria-pertussis-tetanus vaccine from 82% in 2000 to 88% in 2016 has resulted in a substantial drop in associated disease burdens.

The South-East Asia Regional Vaccine Action Plan (SEARVAP), which was developed in line with World Health Assembly-approved Global Vaccine Action Plan, will amplify our gains and enhance the opportunity for all Member States and immunization partners to harness the power of vaccine technology and enhance service delivery. How so? First, the SEARVAP defines a clear vision and purpose that is backed by a set of six guiding principles – ownership, responsibility and partnership, equity, integration, sustainability and innovation. Second, the SEARVAP sets clear goals that are supported by strategic objectives and priority areas of work: It is, above all, a document of initiative and action, with concrete targets and milestones to monitor impact. And third, the SEARVAP identifies challenges and opportunities and how together we can overcome or marshal them to our advantage.

Perhaps most importantly, the SEARVAP considers how governments, health professionals, communities and civil societies among other stakeholders, can come together to reach the unreached and underserved, and strengthen society-wide buy-in for immunization. As the re-emergence of vaccine-preventable diseases in high-income countries demonstrates, constant vigilance and action is needed to sustain progress and ensure vaccine-preventable diseases no longer threaten the health and wellbeing of any community.

To that end I am confident the SEARVAP will fortify Region-wide focus on closing immunization gaps and reinforce immunization's critical role in achieving universal health coverage, and with it the Sustainable Development Goals. The consultative, Member State-driven process by which the SEARVAP was developed will help ensure broad-based ownership and encourage its full implementation, and I look very much forward to witnessing its impact – both in hard epidemiological data, and in the confidence and optimism of healthy, happy and empowered communities across the South-East Asia Region.

Dr Poonam Khetrapal Singh
Regional Director

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introduction

The 11 countries of the World Health Organization's (WHO's) South-East Asia (SEA) Region are home to more than 1.9 billion people, with a combined annual birth cohort of more than 36 million. Immunization is widely recognized as one of the most cost-effective public health interventions, and all countries in the Region give high importance to their national immunization programmes (NIPs).

Over the past few decades, immunizations have prevented millions of deaths and disabilities, achieved dramatic declines in once highly-endemic diseases, stopped the transmission of wild poliovirus across the Region, eliminated maternal and neonatal tetanus (MNT) and dramatically reduced the transmission of measles, Japanese encephalitis (JE) and hepatitis B viruses.

High-quality regional surveillance and accredited laboratory networks have been established to measure disease burden, detect outbreaks and evaluate vaccination impact for many vaccine-preventable diseases. The Region was declared 'polio-free' in March 2014 and achieved MNT elimination in May 2016. Most recently, the Sixty-sixth SEA Regional Committee declared 2020 as the target for the elimination of measles and control of rubella/congenital rubella syndrome (CRS) in the SEA Region.

All countries in the Region have added new antigens to their existing routine immunization programmes, thereby expanding the lifesaving benefits of new and underutilized vaccines. More importantly, this Region is a key vaccine manufacturing hub that exports high-quality vaccines worldwide.

The Regional third dose of diphtheria–tetanus–pertussis containing vaccines (DTP3) coverage was 88% in 2016. National routine immunization coverage data show that six countries (Bangladesh, Bhutan, Democratic People's Republic of Korea, Maldives, Sri Lanka, Thailand) have achieved and sustained ≥90% DTP3 coverage since 2012.

As immunization programmes mature, countries in the Region are turning their attention to issues of vaccine safety and regulation, routine vaccine delivery strategies and a life-course approach to immunization. Many countries in the Region have developed innovative strategies to reach high-risk and underserved populations.

Despite these achievements, there are also challenges. Although many countries in the Region report relatively high national vaccination coverage, in 2016 an estimated 4.2 million infants in the SEA Region do not receive routine vaccines from their national immunization programmes. (1). In several countries, significant coverage gaps exist between the highest and lowest socioeconomic quintiles, and coverage varies considerably across and within districts with many of these lower administrative units yet to reach 80% coverage. The low reliability of reported administrative vaccination coverage data in many countries has not been resolved and deprives programmes of an essential monitoring tool.

Gavi, the Vaccine Alliance (Gavi), has been offering financial support for new vaccines for pneumococcal, rotavirus and human papillomavirus infections for Gavi-eligible countries.(2). Yet, for various reasons, most Gavi-eligible countries in the Region are unable to take full advantage of this offer and, thus, miss out on the opportunity to protect children with more vaccines.

Countries that are not Gavi-eligible are cautious about introducing more vaccines, as financial sustainability is a major concern. Many countries are challenged by limited human resources, infrastructure and physical capacity to meet the requirements of today's immunization programmes, and at least seven countries are still dependent to a varying degree on donor support for their NIPs.

In 2014, the Immunization and Vaccine Development (IVD) Unit of the Department of Family Health, Gender and Life Course (FGL) in the WHO Regional Office for South-East Asia developed a Regional Immunization Policy for South-East Asia Region that led to the development of an IVD Strategic Plan 2014–2017. The SEA Regional Vaccine Action Plan (SEARVAP) 2016-2020 replaces the IVD Strategic Plan, and aligns the immunization priorities of the Region more closely with the vision and goals of the Global Vaccine Action Plan 2011-2020 (GVAP).(3).

Photo by: WHO/India/R Kumar

purpose, vision and guiding principles

Purpose

The current SEARVAP describes a set of regional goals and objectives for immunization and control of vaccine-preventable diseases for 2016 – 2020 and highlights priority actions, targets and indicators that address the specific needs and challenges of countries in the Region.

The SEARVAP reflects the views of many stakeholders and takes into account the most recent global strategic documents, including the GVAP 2011–2020, WHO's Twelfth General Programme of Work, 2014 – 2019, and the United Nations (UN) Sustainable Development Goals. (3) (4) (5).

The SEARVAP does not intend to cover all aspects of immunization programmes nor does it provide detailed guidelines on any specific vaccines, as such details are included in other global and regional documents. Its primary purpose is to provide a framework for decision-making on wide-ranging issues related to access to vaccine and immunizations, including disease surveillance, vaccine research, production, availability, and equitable distribution, and the sustainability of NIPs in the Region.

Vision

The vision of the Decade of Vaccines (2011–2020) (3) is a world in which all individuals and communities enjoy lives free from vaccine-preventable diseases. The SEARVAP vision similarly reflects a joint commitment by countries to a common purpose:

"A South-East Asia Region free of vaccine-preventable diseases, where all countries provide equitable access to high-quality, safe, efficacious, affordable vaccines and immunization services throughout the life course."

Guiding Principles

Six principles guide the GVAP towards achieving the vision of the Decade of Vaccines: (1) country ownership; (2) shared responsibility and partnership; (3) equity; (4) integration; (5) sustainability; and (6) innovation.

The SEARVAP has interpreted these guiding principles as follows:

1. Country ownership: Government ownership and funding is essential to ensure the availability of sufficient quantities of vaccines of assured quality and to oversee effective and efficient NIPs. The decision to introduce an underused or new vaccine or technology in the NIP must be a country's prerogative and the decision must be evidence-based, taking into consideration local epidemiology and disease burden, programmatic capacity and financial sustainability.
2. Shared responsibility and partnership: Immunization is a shared responsibility of communities, health providers, technical experts, government agencies, manufacturers and the development community. Working in partnership, stakeholders can contribute more effectively to the successful control and prevention of vaccine-preventable diseases.

3. Equity: Immunization is a public good; it produces group benefits far greater than the sum of individual benefits obtained by those immunized. Immunization is also a cost-effective health intervention that every person in the target age group should be able to access.

4. Integration: Immunization services are an integral component of a holistic approach to health promotion and disease prevention. Therefore, immunization services must be integrated into primary healthcare packages appropriate to each national setting, thus complementing other approaches towards integrated healthcare services within the overall health system of the country.

5. Sustainability: Sustainable vaccine self-sufficiency for all countries is critical to the continued success of an immunization programme, where self-sufficiency is broadly defined as "Access to all nationally adopted vaccines either through procurement from the global market or through domestic production overseen by a competent national regulatory authority. Mechanisms to finance vaccines should be developed in close collaboration between governments, donor agencies, and vaccine manufacturers to ensure sustainability."

6. Innovation: Innovation is what drives a more effective, equitable and sustainable health system. Innovation in immunization can make programmes safer, less costly, more environmentally friendly and more effective, particularly when innovation is focused on the unique needs and contexts of developing countries in the Region.

Based on the primary principles of equity, sustainability and regional solidarity, the SEARVAP serves as a framework for the development of a national immunization policy in each country where good practices and desirable standards are balanced with country needs and realities.

The SEARVAP has been shared and discussed with countries and guided by input from technical experts and other stakeholders. The activities recommended in the SEARVAP are based on the best available evidence and knowledge but their implementation needs to take country specific situations into consideration. Because planning is a dynamic process influenced by issues both directly and indirectly related to immunization services, the SEARVAP should be periodically reviewed and updated as needed and should be considered a dynamic document.

SEARVAP goals

In May 2012, the GVAP 2011–2020 was endorsed by the 194 Member States of the World Health Assembly (WHA). Multiple stakeholders were involved in development of the GVAP, including the Bill & Melinda Gates Foundation, Gavi, the United Nations Children's Fund (UNICEF), the United States National Institute of Allergy and Infectious Diseases and WHO, as well as many other partners, including government staff and elected officials, health professionals, academia, vaccine manufacturers, global agencies, development partners, civil society, media and the private sector. The GVAP outlines five goals for the Decade of Vaccines (see Box 1). To achieve these goals, the GVAP proposes six strategic objectives, 20 strategies and 85 activities. Successful implementation of the GVAP is estimated to avert an additional 25 million deaths by the end of the decade and result in billions of dollars in gained productivity.

Box 1. GVAP Goals

GOAL 1	Achieve a world free of poliomyelitis
GOAL 2	Meet global and regional disease-elimination targets, including neonatal tetanus, measles and rubella elimination targets
GOAL 3	Meet vaccination coverage targets in every region, country and community
GOAL 4	Develop and introduce new and improved vaccines and technologies
GOAL 5	Exceed the Millennium Development Goal 4 target for reducing child mortality (6)

The SEARVAP has adapted the goals, strategies and activities recommended in the GVAP to the context of the SEA Region. The SEARVAP proposes eight goals and a set of strategic objectives and recommends key activities that are considered essential to achieve GVAP and SEARVAP goals within the decade (see Box 2).

Box 2. SEARVAP Goals

GOAL 1	Routine immunization systems and services are strengthened
GOAL 2	Measles is eliminated and rubella/CRS controlled
GOAL 3	Polio-free status is maintained
GOAL 4	Elimination of maternal and neonatal tetanus is sustained
GOAL 5	Control of Japanese encephalitis is accelerated
GOAL 6	Control of hepatitis B is accelerated
GOAL 7	Introduction of new vaccines and related technologies is accelerated
GOAL 8	Access to high quality vaccines is ensured

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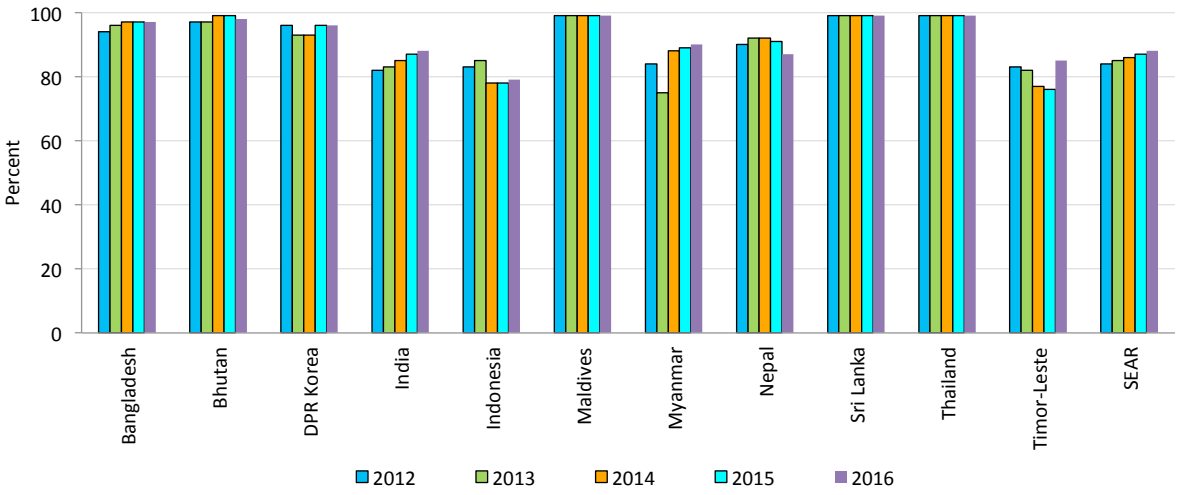
1. Goal 1

Routine immunization systems and services are strengthened

NIPs that are capable of providing all vaccines in the national immunization schedule to all communities will lay the foundation of achieving and sustaining eradication, elimination and control of vaccine preventable diseases. Such NIPs will ensure that whenever a new vaccine is introduced, beneficiaries in the targeted age groups in all communities will receive the new vaccine. Based on the experience of more than three decades in the journey to achieve universal immunization coverage, achieving polio-free status and elimination of MNT, the SEA Region recognizes strengthening routine immunization systems and services as the overarching goal of the SEARVAP. High routine immunization coverage of at least 95% with two doses of measles-rubella vaccine (MR) will contribute to measles elimination and rubella/CRS control by 2020 which is a regional flagship programme.

Despite immunization currently averting an estimated two to three million deaths annually worldwide from diphtheria, tetanus, pertussis and measles, WHO and UNICEF estimate that in 2016, 19 million children under 1 year of age did not receive DTP3 vaccine; 4.2 million of these children live in the countries of the SEA Region. Nonetheless, the SEA Region has experienced improved vaccine coverage: from 2000 to 2016, DTP3 coverage in the SEA Region increased from 64% to 88%. (1)

Figure 1. DTP3 coverage in the SEA Region, 2012-2016



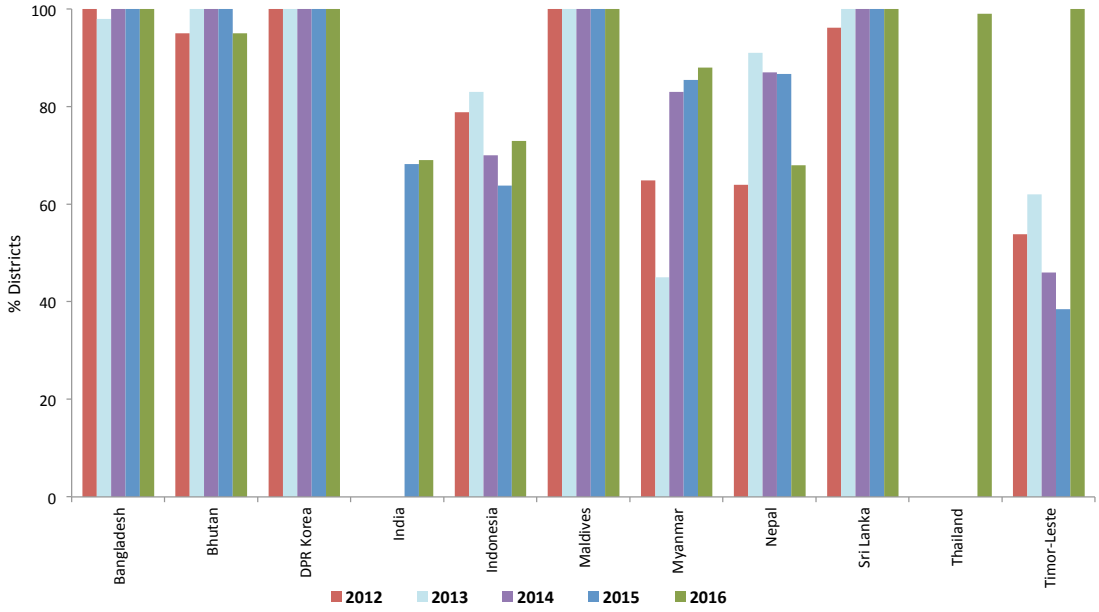
Source: WHO/UNICEF estimates of national immunization coverage. In: World Health Organization. Immunization, Vaccines and Biologicals. Immunization coverage (online database). Geneva: World Health Organization; July 2017 revision. (http://www.who.int/immunization/monitoring_surveillance/routine/coverage/en/index4.html accessed 18 July 2017)

As shown in Figure 1, seven SEAR countries have achieved ≥90% national coverage for DTP3 in 2016. Four countries that have not achieved 90% coverage for DTP3 are India (88%); Indonesia (79%); Nepal (87%) and Timor Leste (85%). Significant progress has been made in DTP3 coverage in India, with coverage rising from 79% in 2010 to 88% in 2016. Similarly, Timor Leste has increased DTP3 coverage from 72% in 2010 to 85% in 2016. However, DTP3 coverage has declined below 80% in Indonesia since 2014 and reached 79% in 2016. In six countries, all districts have achieved >80% coverage (Figure 2).

Although immunization is a priority for all countries in the Region, many countries are challenged to ensure that every child is vaccinated with all the antigens in their NIP. Even in countries with NIPs that perform well, there are pockets of unreached or hard-to-reach populations for whom special efforts are needed. Tools, such as Reaching Every District (RED) and Reaching Every Child (REC), exist but they are not optimally applied to address issues of hard-to-reach children. Implementing the Global Routine Immunization Strategies and Practices (GRISP) approach will help reassert

routine immunization as the foundation for decreasing morbidity and mortality from vaccine-preventable diseases across the life cycle of all individuals. (7) (8) (9).

Figure 2. Proportion of districts with ≥80% DTP3 coverage, SEA Region, 2012–2016



Source: WHO UNICEF Joint Reporting Form (multiple years); data as of June 2017

Strategic objectives and priority areas to strengthen routine immunization systems and services

There are several strategic objectives and priority areas describing overarching technical and operational components required to strengthen routine immunization systems and services. These strategic objectives and priority areas have been adapted from the GVAP as relevant for the Region. Not only will meeting these objectives strengthen routine immunization services and systems, it will also facilitate achieving the remaining seven SEARVAP goals. Key activities are recommended for each strategic objective, providing a framework to achieve the goals. However, the objectives and activities supporting SEARVAP's Goal 1 must be complemented by other activities described elsewhere in this document in order to achieve all SEARVAP goals (see Box 2).

1.1. Strategic objective 1

All countries commit to immunization as a priority

Political commitment to immunization is essential for optimizing the impact of NIPs. Through such commitment, countries recognize vaccination as a critical public health intervention and acknowledge the health, social and economic benefits of immunization.

Countries demonstrate commitment to immunization by: setting attainable national targets and allocating adequate financial and human resources to programmes to achieve these targets; ensuring that national immunization plans are fully integrated into national health plans, formulated with stakeholder participation and with appropriate budgets; and demonstrating good stewardship and implementation of their national health plans.

1.1.1. Priority area 1

Establish and sustain commitment to immunization

All countries in the Region recognize that immunization is the most cost-effective public health intervention that improves not only the health of the people but also their positive contribution to the country's development and economic well-being. Most countries in the Region have legislation or a legal framework that upholds immunization as a priority. In Nepal, the parliament recently approved an Immunization Act to secure domestic funds for immunization after Gavi support ends. Provisions for a budget line for immunization are included in most countries, but many countries need technical assistance to estimate immunization costs and would benefit from learning from other countries about their experiences. Almost all countries have developed and have been implementing a comprehensive national multiyear immunization plan (cMYP), including country-specific targets and estimated cost of activities. Some have developed mechanisms to monitor immunization budgets, disbursements and immunization programme activities, and others need to strengthen such systems and activities.

Recommended activities

- Establish and strengthen the legislative basis for immunization to enhance financial and programmatic sustainability of NIPs.
- Create a separate budget line in the national health budget for vaccines and immunization and ensure that there is sufficient financial allocation to achieve immunization programme objectives.
- Adapt regional guidelines and develop country-specific action plans for vaccine preventable diseases (VPDs) that are targets for eradication, elimination and control in line with global guidelines and action plans.

1.1.2. Priority area 2

Inform and engage opinion leaders on the value of immunization

Some countries in the Region have invited local civil society organizations and professional associations to contribute to national discussions on immunization and health system development, and some have worked with political leaders to communicate the value of vaccines. Others have noted a need for more proactive work in this area.

Most countries in the SEA Region have carried out several activities for developing and disseminating an evidence base on the public health value of vaccines and immunization, and the economic benefits of immunization, although many countries need technical assistance to further expand the evidence base, and to collect, analyse and disseminate evidence.

Recommended activities

- Establish mechanisms to engage opinion leaders and build a strong alliance for the promotion of immunization at all levels.
- Assemble a regional evidence base on the public health value of vaccination and the economic benefits of immunization at the regional level and ensure the evidence is widely disseminated and used.
- Engage local civil society organizations and professional organizations in the development and monitoring of immunization plans and budgets to ensure that such plans are well integrated into the national health planning cycle and implemented according to plan.

1.1.3. Priority area 3

Strengthen national capacity to formulate evidence-based policies

By endorsing the GVAP at the WHA in 2012, countries agreed to establish National Immunization Technical Advisory Groups (NITAGs) that conform to international standards as defined by WHO not later than 2020. As of December 2015, all countries in the WHO SEA Region have established NITAGs. NITAGs are independent committees that advise policy-makers on all immunization-related issues, including vaccine introductions. Since 2009, the SEA Regional Office has been conducting consultative workshops for strengthening NITAGs in the Region and in April 2016, the SEA Region established a NITAG network to encourage collaboration among NITAGs in the Region.

Many countries have established interagency coordinating committees (ICCs) or health sector coordinating committees (HSCCs) as part of their relationships with development partners.

Recommended activities

- Strengthen NITAGs to monitor effectiveness of Expanded Programme on Immunization (EPI) strategies and make recommendations for course corrections.
- Work with NITAGs and the SEA Region's Immunization Technical Advisory Group (ITAG) to use data from epidemiological, immunological, social, and operational studies and investigations of vaccine impact to guide decision-making and advocacy efforts on the value of vaccines.
- Regularly assess the performance and impact of NITAGs against indicators set by WHO and improve links with equivalent regional and global groups of experts and advisory bodies to promote access to immunization policies, strategies and tools.
- Further strengthen existing regional forums and mechanisms for peer-to-peer exchange of information, best practices and tools among NITAGs.

Key monitoring indicators for strategic objective 1

- Number of SEA Region countries that fully (100%) fund their routine immunization programme.
- Number of SEA Region countries with a NITAG that meets WHO criteria.

1.2. Strategic objective 2

Individuals and communities understand the value of vaccines and demand immunization as both their right and responsibility

Significant improvements in coverage and programmatic sustainability are possible if individuals and communities understand the benefits and risks of immunization, are encouraged to seek services, are empowered to make demands on the health system, and have ownership of the planning and implementation of programmes in their local communities. Although there has been a high demand for vaccination services, attaining higher coverage levels, and achieving equity objectives require additional approaches to stimulate demand for vaccination.

1.2.1. Priority area 1

Engage individuals and communities on the benefits of immunization and hear their concerns

Most countries in the Region understand the need to engage communities in more effective discussions about their knowledge, attitudes, and practices as they relate to immunization and health services in general. Many countries in the Region are implementing and evaluating strategies to increase community demand for immunization. They have begun expanding public access to information about immunizations and would like technical assistance to conduct research to develop more effective communication strategies.

Generating and maintaining demand for immunization services will require using conventional and new social and behavioural communications approaches, with the aim of optimizing the role of front-line healthcare workers, identifying and leveraging local immunization champions and agents of change, tailoring immunization programme advocacy, communications, and service delivery to susceptible populations (including mobile, marginalized and migrant populations), and communicating the benefits of immunization and the risks posed by vaccine-preventable diseases.

Recommended activities

- Proactively share information about the risks of VPDs and the benefits and risks of vaccination to build trust in vaccines, immunization services and health authorities.
- Open and maintain dialogue on immunization with communities using multiple communication channels; explore the use of social media and new media technology to transmit information that responds to people's concerns and fears.
- Apply behaviour change communication to influence the care-seeking behaviour of communities, particularly for measles and rubella.
- Conduct social research to improve the delivery of immunization services and the ability to meet the needs of diverse communities.

1.2.2. Priority area 2

Stimulate demand for vaccines in the national immunization schedule and build the risk communication capacity of authorities

There are many reasons why demand for immunization can be difficult to predict or sustain. In some situations, individuals may be complacent about diseases that are no longer perceived to be a threat. Individuals may feel intimidated about accessing health services or skeptical of the benefits of vaccines. In many cases, they simply do not have enough information to form an opinion.

As vaccine preventable disease incidence decreases, people are more sensitive to adverse events following immunization (AEFI). This situation is further compounded at times by anti-vaccine lobbies and their dissemination of negative messages about vaccine safety. Even political entities sometimes use AEFI issues to their local political advantage.

Recommended activities

- Develop evidence-informed communication plans that cover new and underused vaccine introduction, demand generation, crisis communication and outbreak response. In these plans, leverage existing routine immunization communications resources to support new vaccine introduction. At the same time, maximize the opportunity presented by vaccine introduction to promote routine immunization services and advocate for vaccination.
- Develop a regional data and knowledge base on demand generation experiences and proactively analyse, share and disseminate these experiences throughout the Region.
- Include research on public opinion, knowledge and attitudes in all post-introduction evaluations.
- Build capacity among health authorities to collect and interpret safety data, with particular emphasis on newly-introduced vaccines.
- Create a regional crisis communication plan to ensure a timely, transparent and trustworthy response to reported or suspected AEFI, vaccine safety scares or outbreaks of VPD.
- Train health workers on risk communication to maximize the role they play in allaying vaccine safety fears, tackling vaccine hesitancy and emphasizing the benefits and value of vaccines.

1.2.3. Priority area 3

Engage new partners, advocates, champions and ambassadors to convey messages and maintain a positive media environment

Several countries are expanding their advocacy activities with encouraging results in generating greater support for immunization among political leaders and decision-makers. Many of these activities are conducted by staff with minimal or no training in the area and while performing their regular work. This is encouraging because many developing countries in the Region do not have budgetary capacity to create communications and advocacy positions. Funding for information, communication and advocacy is very limited in most of the countries; UNICEF and WHO are playing a critical role in this domain, particularly in Gavi-eligible countries.

Building advocacy capacity by training front-line health workers in effective communication techniques and recruiting new voices to champion immunizations is important in the Region. This could include school-entry immunization requirements, in which teachers become powerful new advocates for immunizations, and thus increase community demand.

Recommended activities

- Engage, enable and support in-country professional associations and societies, academic institutions and civil society organizations to advocate the value of vaccines to communities, policy-makers and the media.
- Cultivate relationships with media, encouraging balanced immunization reporting. Create awareness among national and subnational media of vaccine preventable diseases and immunization facts to increase the share of media that can explain the benefits of vaccines, especially online.
- Map and recruit new voices and agents of change for immunization, including teachers and educators, religious leaders, traditional and social media personalities, family physicians, community health workers, health mediators and trained immunization champions.
- Link national and subnational authorities and immunization service providers with the global elimination and eradication advocacy experts (Global Polio Eradication Initiative (GPEI) and Measles and Rubella Initiative), so that authorities and providers may benefit from the communication and advocacy resources, materials and expertise available from global initiatives.

Key monitoring indicator for strategic objective 2

- Number of SEA Region countries that have assessed (or measured) confidence in vaccination at subnational level.

1.3. Strategic objective 3

The benefits of immunization are equitably extended to all people

Achieving and sustaining greater equity in immunization coverage requires that more eligible individuals are immunized with all appropriate vaccines – regardless of geographic location, age, gender, disability, educational level, socioeconomic level, ethnic group or work condition. Because disease burden tends to be disproportionately concentrated in marginalized populations, reaching these marginalized and underserved populations will not only achieve a greater degree of equity, but also will achieve a greater health impact and contribute to economic development.

1.3.1. Priority area 1

Build knowledge base and capacity for equitable service delivery

Disease eradication and elimination goals cannot be met without achieving and sustaining high and equitable routine immunization coverage. When countries reach national immunization coverage of 80%, improving coverage beyond what has already been achieved becomes difficult. At this stage, it is essential to assess coverage at subnational, district or even local levels to identify pockets of low coverage and unimmunized children and take appropriate actions to improve coverage and reach the unimmunized.

Recommended activities

- Develop/use tools and methods to assess coverage, particularly intra-country heterogeneity, to guide activities to address inequities in vaccine coverage, including sero surveys to measure population immunity and identify immunity gaps.
- Utilize operational and social science research to identify underserved populations and possible underlying causes for inequities.
- Ensure all newborn infants are identified and enrolled for immunization; validate reported or estimated vaccination coverage at state/provincial and district levels; and record and track the immunization status of all eligible children.

1.3.2. Priority area 2

Develop and implement new strategies to address inequities

Several countries in the Region with a high proportion of states/provinces and districts with suboptimal vaccination coverage have started to adopt and implement the REC strategy to improve vaccination coverage at national and subnational levels. Using and further developing the REC strategy, these countries have been trying to take advantage of community structures to enhance communication and delivery of services; engage underserved and marginalized

groups to develop locally tailored, targeted immunization strategies; involve civil society organizations in planning and conducting community outreach; and identify and enrol target children in underserved communities and groups.

While some countries in the Region have developed and have been successfully implementing school-based immunization programmes, including the school-entry immunization requirement, many countries have been establishing or plan to establish a life-course approach to immunization planning and implementation, for which they require external technical support.

Recommended activities

- Develop and implement target-group—specific immunization delivery approaches (e.g., school childrent, migrants, infants born outside of health institutions), particularly when expanding immunization beyond infancy and early childhood within the framework of a life-course approach.
- Train service providers and mid-level immunization managers to implement new strategies and tailored approaches to reach underserved and marginalized populations. Engage existing community structures and civil society organizations in planning, implementing, monitoring and evaluating these approaches.
- Involve representatives of underserved and marginalized populations throughout the process of developing and delivering tailored service-delivery approaches.
- Increase the synergy between routine immunization services and supplementary immunization activities (SIAs) to achieve accelerated disease control or elimination initiatives, such as using SIA micro-planning and validation surveys to identify high-risk communities for subsequent targeting by routine immunization services.
- Implement known interventions to increase coverage, such as missed opportunity assessment, health-care assessment of contraindications, reminder/recall, RED/REC.
- Apply more widely the targeted high-risk community approach to every EPI activity, particularly to any large-scale SIAs (for example, oral poliovirus vaccine (OPV), MR, JE vaccines, etc).

Key monitoring indicator for strategic objective 3

- Number of SEA Region countries with >90% national coverage and >80% coverage in every district or equivalent with DTP3.

1.4. Strategic objective 4

Number of SEA Region countries with ≥90% national coverage and ≥80% coverage in every district or equivalent with DPT3.

Integration of immunization into the broader health systems is essential for a coordinated, multidisciplinary approach to health care. Working in synergy with other public health and individual care programmes, immunization services should be linked to national health policy values, priorities and strategies.

Countries in the SEA Region recognize that a strong immunization programme requires well-trained, competent staff, high-quality data and information, laboratory-based surveillance of vaccine-preventable diseases, coordinated health systems management and effective monitoring, evaluation and communication.

1.4.1. Priority area 1

Develop comprehensive and coordinated approaches to disease control

The relationship between a strong NIP and a well-functioning health system is mutually beneficial. While immunization service delivery can support other public health priorities, other health programmes can support immunization services as well. Vaccination is an important component of a wider public health effort and should be integral to comprehensive disease control strategies and plans. Many countries in the SEA Region are developing national plans for comprehensive approaches to control diseases (e.g., childhood diarrhoea and pneumonia and cervical cancer) in line with WHO guidelines and GVAP recommendations.

Recommended activities

- Ensure that comprehensive approaches to control childhood diarrhoea, pneumonia, viral hepatitis, JE/ Acute Encephalitis Syndrome (AES), maternal/child mortality and cervical cancer are aligned with immunization programme activities and vice versa.
- Ensure that NIP components, such as vaccine procurement, vaccine regulations, vaccine pharmacovigilance, laboratory-based vaccine-preventable disease surveillance and immunization information systems are well integrated with broader health system components.
- Ensure that immunization and other primary health care programmes have adequate human resources to plan and deliver predictable, high-quality services and efficiently use existing human resources.
- Ensure consistency across public and private sectors for new vaccine introduction, immunization practices, data collection and reporting.

1.4.2. Priority area 2

Strengthen surveillance and monitoring systems

Assessing the health and economic impact of disease on a given population is the first step towards prioritization and adoption of appropriate vaccination policies and disease control strategies. After a vaccine has been introduced, assessing the impact of vaccination on disease is an effective way to measure progress, guide programme development and advocate for continuing programme support. This requires reliable data on disease burden, measured by indicators such as morbidity and mortality rates, and collected through ongoing surveillance and reporting activities. Collection, analysis and interpretation of surveillance data is vital to guide vaccination policies and programmes and ensure immunization targets are being reached. The national surveillance system needs to include proficient laboratories. Until now, countries have either strengthened vaccine preventable disease (surveillance within the integrated disease surveillance or improved vaccine preventable disease surveillance by building on the high quality acute flaccid paralysis (AFP) surveillance structure established for polio eradication.

The SEA Region conducts weekly case-base reporting for AFP and maintains a large network of surveillance officers in several countries, backed by a network of 16 polio laboratories, including one global-specialized laboratory and two regional reference laboratories.

Weekly case-based reporting for measles and rubella is carried out in all countries in the Region. Nevertheless, India and Indonesia currently conduct case-based reporting only for measles or rubella outbreaks. They are gradually expanding their case-based surveillance,

and case-based reporting is expected for all measles and rubella cases nationwide by 2018 following national wide-age range MR immunization campaigns.

Five countries (Bangladesh, India, Indonesia, Myanmar, Nepal) use the WHO-supported network of surveillance medical officers, initially established for polio eradication. A SEA regional measles-rubella laboratory network was established in 2003 as an integral part of the WHO global measles rubella laboratory network. The number of measles rubella laboratories in the SEA regional network has increased from 23 laboratories in 2012 to 39 laboratories in 2016 and six new laboratories are proposed by 2018 in India (1), Indonesia (3), Myanmar (1) and Nepal (1). There is one regional reference laboratory in Thailand. Bangladesh, Bhutan, Nepal and Sri Lanka had started CRS sentinel surveillance in 2015.

The Region maintains a network of sentinel surveillance sites for rotavirus, bacterial meningitis (pneumococcal and Haemophilus influenzae type b (Hib)), influenza and JE.

Post-marketing surveillance is of particular importance for informing decision-making on risk mitigation and responding to vaccine safety concerns. At present, all countries in the Region have AEFI surveillance systems in place and national AEFI committees that guide the investigation and the management of AEFIs when they occur. These AEFI committees, however, have different levels of capacity to conduct causality assessments. These committees should continue to be supported and further strengthen their capacity to investigate and conduct scientific causality assessment; this will permit AEFIs to be well-managed at country level, minimizing the risks of false allegations and unnecessary public concern about the safety of immunization.

A majority of countries are developing, with partner support, new data management systems and web-based surveillance data collection and reporting (that is to say immunization registries, surveillance data collection, immunization information, and reporting systems based on mobile apps/text messages). Technical and financial support is still needed to develop and promote the efficient use of new information technologies for collection, transmission and analysis of immunization and surveillance data.

Recommended activities

- Conduct regular EPI and VPD surveillance reviews to ensure that all components of the immunization system perform optimally as defined by regional and national standards.
- Continue high-quality AFP surveillance and provide technical support and supplies to the polio laboratory network (refer also to polio section).
- Expand laboratory-supported case-based VPD surveillance, particularly for measles/rubella, to generate information for decision-making and monitor the impact of immunization.
- Monitor progress towards disease eradication, elimination and control goals, including other priority VPDs (diphtheria, pertussis, influenza, invasive bacterial vaccine-preventable diseases and rotavirus gastroenteritis) to ensure that all countries are on track to achieve goals.
- Strengthen VPD surveillance by providing technical support, training, quality assurance and accreditation, enhancing data management systems and encouraging country ownership and management of such networks.
- Engage countries in special studies such as serosurveys to assess disease prevalence, population immunity or coverage of SIAs where appropriate.
- Develop guidelines and strategic frameworks for countries to identify AEFIs and provide technical assistance to strengthen countries' ability to manage AEFIs.
- Establish surveillance systems and/or implement special studies to define burden of disease for priority VPDs for which new vaccines are available, such as influenza and invasive bacterial diseases.

Photo by: WHO/India/R Kumar

1.4.3. Priority area 3

Strengthen capacity of managers and frontline health workers

Most countries have been collaborating with WHO, UNICEF and other partners to conduct training courses for national and state/provincial EPI managers and frontline health workers using WHO's mid-level managers (MLM) training modules and other training resources. Nonetheless, increasing levels of pre-service, in-service, and post-service training for human resources and developing new, relevant curricula that approach immunization as a component of comprehensive disease control are considered critical or necessary to achieving regional immunization goals.

Recommended activities

- Establish and strengthen national capacity to develop and conduct training programmes to improve technical and managerial capacity of human resources at all levels (for example, develop a national training programme using WHO's training modules for mid-level managers for immunization programmes).
- Increase levels of pre-service and in-service training for human resources, and develop innovative and relevant curricula that approach immunization as a component of comprehensive disease control.
- Apply new learning techniques to intensify capacity-building efforts, and promote and support learning at all levels (for example, e-learning, peer-to-peer learning, twinning and networking).
- Provide training and capacity-building for national laboratory staff.
- Strengthen data management systems so that laboratory-based surveillance and epidemiology data systems are reconciled and support each other.

1.4.4. Priority area 4

Strengthen infrastructure and logistics

In order to provide immunization services the programme must ensure that vaccines are available at the immunization clinics in appropriate condition. Several new vaccines have been introduced in all countries; most of these new vaccines are more expensive than traditional vaccines. They also require more storage capacity at all levels of the cold chain. NIPs need to accurately forecast vaccine requirements, maintain adequate stock levels, reduce wastage, and prevent equipment breakdowns or malfunctions.

Gavi is supporting Gavi-eligible countries to strengthen their health systems and immunization supply chain systems to better deliver vaccination services in an integrated and efficient manner. WHO and UNICEF are complementing this effort with an updated Effective Vaccine Management (EVM) assessment and implementation of improvement plans along with technical assistance, guidelines and tools.

Recommended activities

- Strengthen country capacity to monitor and oversee immunization supply chains, through support to centres of excellence in the region for training and technical expertise on immunization supply chain management and laboratory testing of cold chain equipment.
- Ensure that EVM improvement plans are budgeted and implemented as part of cMYPs or other equivalents.
- Explore the introduction of new cold chain and temperature monitoring technologies and innovative solutions to immunization supply systems and waste management systems (for example, controlled temperature chain, remote temperature monitoring, freeze-safe cooling equipment).
- Staff supply systems with adequately competent, motivated and empowered personnel at all levels.
- Establish information systems to help staff accurately track vaccines and immunization supplies and monitor quality of the cold chain for example, online management information systems (MIS) for cold chain and vaccine management.

Key monitoring indicators for strategic objective 4

- Number of SEA Region countries with a drop-out rate <5% between first and third dose of DTP-containing vaccine.
- Number of SEA Region countries with sustained national coverage of DTP containing vaccines ≥90% for 3 or more years.

1.5. Strategic objective 5

Immunization programmes have sustainable access to predictable funding, quality supply and innovative technologies

According to the 2015 World Bank categorization (see Annex 1), four countries in the SEA Region are low-income (Nepal, Democratic People's Republic of Korea, Myanmar, Bangladesh), five are lower-middle income (Bhutan, India, Indonesia, Sri Lanka, Timor Leste) and two are upper-middle income (Thailand, Maldives) countries. According to Gavi eligibility criteria, two countries (Nepal, Democratic People's Republic of Korea) belong to the

initial self-financing stage, three countries (Bangladesh, Myanmar, India) to the preparatory transition stage, two countries (Indonesia, Timor-Leste) to the accelerated transition stage and two countries (Sri Lanka, Bhutan) to the fully self-financing stage.

Achieving sustainable access to funding, quality supply and innovative technologies in all countries will require increased funding for immunization both from countries and development partners. Countries can ensure the financial sustainability of national immunization programmes by regularly evaluating resource needs, ensuring adequate supply of affordable vaccines of assured quality, improving efficiencies in service delivery, mobilizing domestic financing and filling remaining funding gaps with support from development partners.

1.5.1. Priority area 1

Increase total amount and improve all location of funding for immunization

All 11 countries in the Region have a line item for vaccines in the national budget. Maldives and Thailand are fully funding their routine immunization programmes including vaccines. Indonesia, Sri Lanka and Timor Leste are funding more than 50% of the routine immunization activities including vaccines.

Generating evidence-based information to support greater investment in immunization will require stronger NITAGs and more robust planning for greater financial self-sufficiency. Countries will also require improvements in resource mobilization and tracking of immunization finance resources flow.

Recommended activities

- Establish a commitment from governments to allocate adequate financial resources to immunization as required to meet programme objectives.
- Solicit Gavi support for introduction of new and under-utilized vaccines and related technologies, and mobilize adequate resources before and after introduction.
- Explore alternative and innovative funding sources for immunization and mechanisms to channel those funds into the immunization programme.
- Provide technical assistance to countries to document the costs of immunization supplies, infrastructure and services so there is sufficient allocation to strengthen and expand delivery of services and use the NITAG to advocate for stronger support.
- Enact policies to increase the reliability of funds and ensure timely disbursement and tracking of funds. Examples of such policies include introducing an immunization act, establishing a revolving fund for vaccine procurement through regional corporations, and holding parliamentary forums on immunization.

1.5.2. Priority area 2

Increase affordability of vaccines and related technologies for middle-income countries

Although there has been an intensified focus on improving immunization service delivery in Gavi-eligible-countries, there are unique challenges in two middle-income countries (MICs) in the Region (Thailand, Maldives). Sustaining immunization financing for MICs and previously-Gavi-eligible countries that are currently self-financing (Sri Lanka, Bhutan) will be

a challenge for the Region and the countries themselves.

Gaining access to quality-assured vaccines at affordable prices requires an efficient procurement system and a fully functional regulatory authority. Predictable, transparent pricing and innovative procurement mechanisms are needed to alleviate funding pressure and scale-up the use of existing vaccines at affordable prices. Exploring the best procurement options to meet country needs and gaining a better understanding of the vaccine market will empower self-procuring countries to operate appropriately in the global vaccine market to secure a sustainable, affordable supply.

Recommended activities

- Explore collaborative mechanisms for group procurement of vaccines, particularly for smaller countries to benefit from bulk purchase of larger neighbouring countries.
- Support price transparency efforts regionally and globally through increased sharing of vaccine price information using internet based platforms.

Key monitoring indicator for strategic objective 5

- Number of SEA Region countries that fund at least 50% of the total expenditure on routine immunization from domestic financial resources.

1.6. Strategic objective 6

Country, regional and global research and development innovations maximize the benefits of immunization

In the coming decade, innovative research efforts are needed across the area of vaccine discovery, development and delivery. These efforts will lead to better understanding of the mechanisms of protection, novel antigenic targets for vaccine development, new vaccine formulation and delivery technologies, and the development of disease-burden and cost-effectiveness data for in-country decision-making. In addition, operational research will define the most effective communications strategies and delivery approaches to overcome challenges posed by reaching every community, life-course immunization and vaccinations in outbreak and emergency settings.

1.6.1. Priority area 1

Expand research capabilities and increase engagement with end users

Strengthening country capacity to undertake research relevant to each country's situation across the topics of immunization, vaccine development, manufacturing, supply and procurement and regulation (including clinical trials) will require sustainable funding and collaboration among health ministries, academic institutions and private and public research organizations. Countries in the region should take advantage of regional research networks that support capacity-building and improvement of the quality of research. Immunization policy-makers will need to have the opportunity to analyse research findings and translate these into policy and practice.

Areas of research include:

1. Evaluating the effectiveness of different delivery, supply and communication strategies.
2. Evaluating vaccination impact, cost and cost-effectiveness.
3. Conducting serological studies to identify age-specific immunity gaps.
4. Conducting studies to optimize vaccination schedules.

Countries have committed themselves to strengthening their national health research and information and knowledge management systems. National and regional research bodies should be involved to validate assumptions on immunization approaches and to document the lessons learnt. Research in the Region should investigate first and foremost how to best alleviate obstacles to universal access to immunization, considering the evolving context, demand, needs and capacity in the Region.

Recommended activities

- Engage with public health experts, health authorities, and communities to define a research agenda that is relevant to the Region and each country's burden of disease, health system and immunization services capacity and funding.
- Build more capacity in the Region to conduct immunization-related epidemiologic studies, economic evaluation, operational research and clinical research on vaccines.
- Introduce research methods to monitor public perceptions, knowledge, attitudes and opinions and to assure evidence-informed communication and messaging.
- Conduct operational and social research to identify factors affecting demand for immunizations and to guide development of more effective communication strategies.
- To collect data in the countries that introduced fractional dose of inactivated poliovirus vaccine (IPV) to document the opportunities and the challenges presented by using a reduced dose of IPV as a strategy to address a global shortage of the vaccine.
- Promote research to understand operational barriers to immunization and to test new approaches to delivering vaccines.
- Conduct representative epidemiological, socioeconomic, operational and clinical studies of vaccine impact to guide health economics analysis and prioritization of new vaccines.

Key monitoring indicators for strategic objective 6

- Number of SEA Region countries incorporating an agenda for research on immunization and vaccines in their national immunization plan.
- Number of SEA Region countries with the capacity to conduct clinical trials meeting good clinical practice (GCP) requirements.

Photo by: WHO/Timor-Leste/S Singh

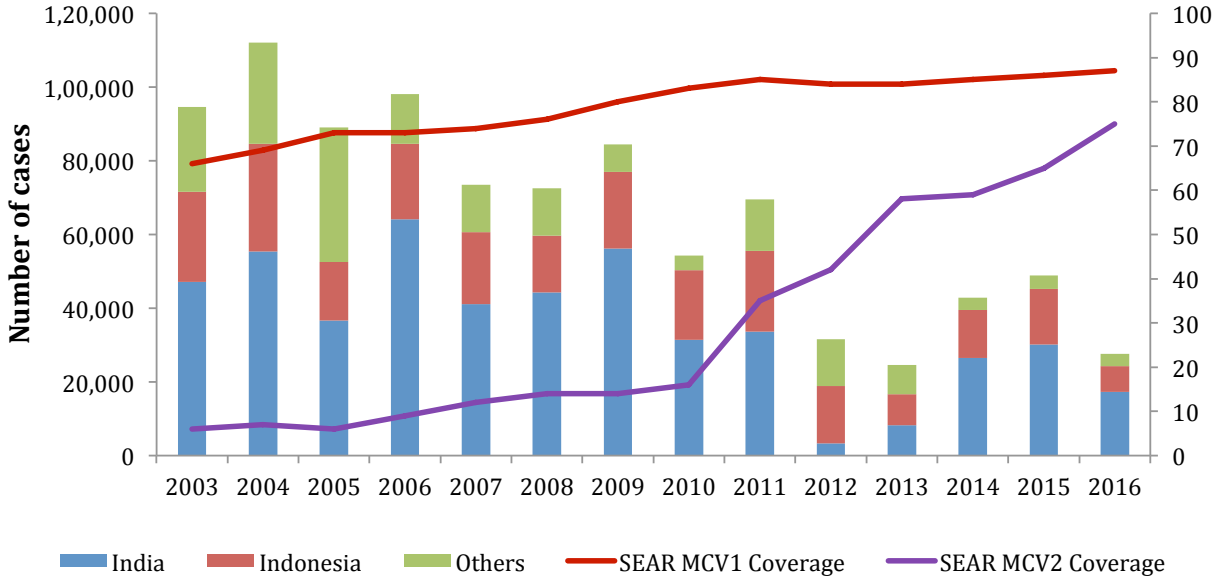
2. Goal 2

Measles is eliminated and rubella / CRS controlled

In 2013, the Sixty-sixth SEA Regional Committee adopted the goal of measles elimination and rubella/ CRS control by 2020 following rigorous prior consultations (10). Measles elimination and rubella/CRS control by 2020 is one of the flagship programmes of the SEA Region.

Significant progress has been made in the last decade. Between 2003 and 2016, immunization coverage in the SEA Region for the first dose of measles containing vaccine (MCV1) has increased from 66% to 87% while the second dose of measles containing vaccine (MCV2) coverage increased from 6% to 75% in the same period (Figure 3).

Figure 3. Reported measles cases and MCV1 and MCV2 coverage, SEA Region 2003 – 2016



Source: WHO/UNICEF estimates of national immunization coverage. In: World Health Organization. Immunization, Vaccines and Biologicals. Immunization coverage (online database). Geneva: World Health Organization; 2016.
(http://www.who.int/immunization/monitoring_surveillance/routine/coverage/en/index4.html accessed 17 July 2017).

In 2016, five of the 11 SEA Region countries reported >95% coverage for MCV1 (Table 1). An estimated 368 million additional doses of MCV were provided through SIAs between 2001 and 2015 (inclusive), reaching 95% of all individuals targeted during these activities during that period. As of 2016, all 11 countries have introduced a two-dose schedule of MCV. These measles vaccination activities together have resulted in an estimated 66% reduction in measles mortality between 2000 and 2015. An estimated 52 000 children are born every year with CRS in the Region. Eight countries have already introduced rubella-containing vaccine (RCV) in routine immunization. India and Indonesia plan to introduce the vaccine in 2017.

Table 1. Estimated coverage of MCV1, MCV2 & measles cases reported, SEA Region, 2003 & 2016

Year	2003			2016		
Country	WHO / UNICEF estimated Coverage		No. of reported measles cases (JRF)	WHO / UNICEF estimated Coverage		No. of reported measles cases (JRF)
	MCV- 1	MCV- 2		MCV- 1	MCV- 2	
Bangladesh	76	-	4,067	94	93	972
Bhutan	88	-	0	97	90	45
DPR Korea	95	-	0	99	98	0
India	62	-	47,147	88	76	17,250
Indonesia	74	21*	24,457	76	56	6,962
Maldives	96	-	75	99	99	0
Myanmar	80	-	830	91	86	266
Nepal	75	-	13,344	83	25	1,269
Sri Lanka	99	90	65	99	99	112
Thailand	96	92	4,519	99	95	652
Timor-Leste	55	-	94	78	22	2
Total	66	6	94,598	87	75	82,006

Abbreviations:
MCV=Measles containing vaccine | hyphen used (-) when MCV is not introduced in routine immunization `
Source of data:
WHO/UNICEF estimates of national immunization coverage.
In: World Health Organization. immunization, vaccines and biologicals. immunization coverage (online database).
Geneva: World Health Organization; 2016.
(http://www.who.int/immunization/monitoring_surveillance accessed 17 July 2017).

*Sub-national introduction in schools of West Java at 7 yrs.

All 11 SEA Region countries have begun laboratory supported case-based measles-rubella surveillance and three more countries have also initiated CRS surveillance either through sentinel sites or community, bringing the number to seven. However, the measles-rubella case-based surveillance is still expanding in India and Indonesia and is expected to be nationwide in these countries by 2018. Measles-rubella surveillance in the region is supported by a WHO accredited network of measles-rubella laboratories with at least one proficient laboratory in each of the countries.

A Regional Verification Commission (RVC) and National Verification Committees (NVCs) have been formed to support countries in reviewing progress towards measles elimination and rubella/CRS control.

Strategic objectives

- Achieve and maintain ≥95% coverage with two doses against measles and rubella within each district of each country in the Region through routine and/or supplementary immunization.
- Develop and sustain a sensitive and timely case-based measles and rubella and CRS

surveillance system in each country in the Region that fulfils recommended surveillance performance indicators.

- Develop and maintain an accredited measles and rubella laboratory network that supports every country or area in the Region.
- Strengthen support and linkages to achieve the three strategic objectives listed above.=

Recommended activities

The recommended key activities to reach the strategic objectives above are detailed in the 'Strategic Plan for Measles Elimination and Rubella and Congenital Rubella Syndrome Control in The South-East Asia Region':

http://www.searo.who.int/entity/immunization/documents/sear_mr_strategic_plan_2014_2020.pdf

Milestones

As reaching measles elimination and rubella/CRS control by 2020 is a regional flagship programme, time-bound, goal specific milestones have been set, as outlined below:

By the end of 2017

- All countries have updated their National Strategic Plan for Measles Elimination and Rubella Control.
- At least one country in the Region is verified as having eliminated measles transmission.
- A mid-term review of the prospect of reaching the 2020 goals has been be conducted at the regional level.

By the end of 2018

- All countries have completed national, wide age range measles–rubella vaccination campaigns to close the immunity gap in younger age groups and have introduced rubella containing vaccine (RVC) in routine immunizations.
- All countries have established nationwide well-functioning laboratory–supported case-base surveillance.
- At least two countries in the Region are verified as having eliminated measles transmission.

By the end of 2019

- At least six countries have been verified as measles eliminated.

By the end of 2020

- The RVC reports on the status of all countries and the prospects for meeting the 2020 goals.
- Post-elimination sustainability plans are available and endorsed for all countries.

Key monitoring indicators

1. *Immunization:*

- Number of countries achieving ≥95% coverage for two doses of measles-rubella containing vaccine (MRCV) in routine immunization.
- Number of countries which completed SIAs with ≥95% coverage in all districts.

2. *Surveillance:*

- Reporting rate of non-measles, non-rubella cases at national level (target: ≥2 per 100,000 population).
- Number of countries reporting at least two non-measles non-rubella cases per 100,000 population at second administrative units (target ≥80%).

3. *Laboratory:*

- Number of measles and rubella network laboratories that are proficient for serologic and, if relevant, for virology testing (target: 100% of laboratories).
- Number of specimens with serologic results reported by the laboratory within four days of receiving the specimen (target: ≥80% of specimens received).

4. *Linkages:*

- Number of countries with a National Strategic Plan or its equivalent for measles elimination and rubella / CRS control.
- Number of countries with a well functional NVC that has submitted the last annual progress report to SEA-RVC.
- Number of countries with an outbreak preparedness and response plan for suspected measles or rubella outbreaks.

Challenges

Achieving ≥95% coverage of two doses of MRCV in routine immunization at national and sub-national level will require accelerated strengthening of routine immunization. This will be resource intensive and is without precedent. Achieving this level of coverage is a particular challenge in countries with large birth cohorts.

Expanding the laboratory-supported case-based surveillance nationwide and enhancing the sensitivity of the surveillance system will take time in big countries such as India and Indonesia. Nationwide laboratory support for case-based surveillance will not be feasible until these countries conduct wide-age range immunization campaigns with MRCV, which will not happen before 2018. Until then, most cases will not be reported or adequately investigated.

Tackling re-emergence in countries with no or low indigenous transmission (for example, Bhutan and Sri Lanka have experienced recent outbreaks) is challenging, as large susceptible populations may have accumulated over a long period of time without regular supplemental immunization activities and only one dose of MCV.

Securing sufficient global and national financial support to implement activities required for measles elimination and rubella control can be difficult in the face of other priorities.

Opportunities

High level political commitment from countries creates a huge opportunity for measles elimination and rubella control in the Region. The strategies to reach Goal 2 are well known and proven. They have been translated to the regional context with the background that the Region has been recently declared polio free and MNT eliminated, proving that the Region has the structure and functions to eliminate VPDs. To do so, the Region can rely upon documented lessons learnt regarding ways to improve surveillance and increase vaccination coverage. The current polio assets in five priority countries in the Region also provide a well-functioning platform to establish laboratory supported case-based surveillance for measles and rubella.

Photo by: WHO/Maldives

Photo by: WHO/India

3. Goal 3

Polio-free status is maintained

In 1988, when the WHA passed resolution WHA 41.28 calling for the global eradication of poliomyelitis (polio), the WHO SEAR reported 25 711 paralytic polio cases, which accounted for more than 70% of the global polio case burden. The SEA Region steadily progressed to achieve the goal of polio eradication and reported the last wild poliovirus (WPV) case from India on 13 January 2011 while the other ten member countries reported their last indigenous WPV cases on or before 2000. The Region was certified polio-free on 27 March 2014, and has remained polio-free since.

Despite being polio-free for the past five years, all countries in the Region continue to be at risk of importation of WPV from countries currently infected and of a subsequent spread of the virus within the Region. Countries are also still at risk of an outbreak due to circulating vaccine-derived poliovirus (cVDPV). In 2015, Myanmar reported an outbreak due to cVDPV (type 2) which was effectively contained through an aggressive response undertaken by the country's Ministry of Health and Sports and partners. Sporadic VDPV isolations in India have been met with comprehensive investigations, risk assessment and response measures, as per global standards.

To mitigate the risk of poliovirus importations and VDPV emergence, countries must sustain high population immunity against polio, maintain quality surveillance for poliovirus detection, including laboratory testing, and have outbreak response plans in place to respond to any poliovirus resurgence that may occur. To further mitigate the risk of cVDPV, the Polio Eradication and Endgame Strategic Plan 2013–2018 (11) calls for a phased withdrawal of OPV from all OPV-using countries, beginning with the type 2 component, with the objective of mitigating the risk of paralysis associated with use of OPV. As of April 2016, all countries in the SEA Region have withdrawn the OPV type 2 component by switching from trivalent OPV (tOPV) to bivalent OPV (bOPV), and by July 2016 all countries had completed the introduction of IPV.

Poliovirus laboratory containment activities are being undertaken throughout the SEA Region, as outlined in the 'WHO Global Action Plan to minimize poliovirus facility-associated risk after type-specific eradication of wild polioviruses and sequential cessation of oral polio vaccine use' (GAPIII).(12). The Regional Certification Commission for Polio Eradication (RCCPE) and National Certification Committees for Polio Eradication (NCCPEs) in all 11 countries are functional and providing oversight and guidance for polio eradication activities.

Planning for the transition of human resources and other polio assets in countries is also being initiated to ensure that the existing polio networks and infrastructure can contribute to broader public health goals while maintaining polio-free status. Polio assets - that include human workforce, infrastructure, equipment, systems and processes - are concentrated in five countries of the Region, namely Bangladesh, India, Indonesia, Myanmar and Nepal. These capacities in the Region have been developed over the past two decades, and collectively contributed to the polio eradication initiative by supporting surveillance for poliovirus detection, achieving and maintaining high population immunity against polio through SIAs and by supporting response to polio outbreaks.

Surveillance and laboratory infrastructure established for the polio eradication programme is a recognized source of technical expertise not only for polio eradication efforts and national immunization programmes, but also for a wide range of other public health interventions. Maintaining continuity of this infrastructure is undoubtedly a programmatic priority which will go a long way in contributing to the achievement of immunization and wider public health goals.

Depending upon the technical, financial and managerial capacity of the countries, it may or may not be feasible to transition the networks completely to the national governments. Without concerted efforts and investments by countries and the global health community, there is a high-risk of this fully institutionalized infrastructure, set up over the past two decades, being unsystematically dismantled.

With strong leadership and oversight by the WHO executive management, all five countries with significant polio assets are progressing well in the development of systematic polio transition plans. The WHO leadership at the regional and country levels has engaged the senior government leadership with the purpose of building a consensus on the expectations from the polio network, articulating the risks associated with the ramp down and seeking alternative mechanisms to mitigate the risks to the other public health programmes in the country. A country-by-country approach is being adopted in view of the variable capacities of the countries to absorb and/or support polio and other public health interventions that are supported by the polio networks.

Strategic objective and recommended activities

- Achieve high immunization coverage (≥90%) with polio vaccines in routine immunization.
  - Ensure high coverage with three doses of OPV and achieve high coverage with IPV.
  - Consider introduction of fractional dose of IPV (fIPV) in situations where IPV supply is compromised.
  - Conduct supplementary immunization with OPV based on risk assessment.
- Achieve and maintain high quality /certification level AFP surveillance.
  - Conduct regular surveillance quality assessments.
  - Maintain a quality regional polio laboratory network operating under WHO accreditation standards.
  - Expand environmental surveillance, including laboratory testing capacity.
- Conduct regular regional and national risk assessments with clear objectives, methodology and response strategies.
- Have updated polio outbreak response plans in place as per global guidelines.
  - Conduct simulation exercises appropriate for country specific situations.
- Maintain the certification process through active oversight by RCCPE and NCCPEs.
- Complete poliovirus laboratory containment as per GAPIII requirements.
  - Implement the containment certification scheme (CCS) in countries with designation of poliovirus essential facilities (PEFs).
- Finalize transition plans, with clear road-maps, in all five countries where polio assets are concentrated, outlining the agreed priorities, challenges and risk-mitigation strategies.

Key monitoring indicators

- Number of countries achieving and maintaining polio vaccine coverage ≥90% nationally and ≥80% at each district or equivalent.
- Number of countries achieving and sustaining certification level polio surveillance for case detection (non-polio AFP rate ≥1 per 100 000 <15 years annually) and confirmation (≥80% of AFP cases with adequate stool samples).

- Number of WHO accredited polio laboratories.
- Number of polio laboratories reporting intratypic differentiation (ITD) results within seven days (target: ≥80%).
- Number of countries having a comprehensive and updated - officially approved - polio response plan in place.
- Regular RCCPE (that is, annually) and NCCPE (that is, quarterly) oversight meetings.
- Number of countries with active national poliovirus laboratory containment taskforce coordinating adherence to GAPIII requirements.

Challenges

- Maintaining high-quality AFP surveillance and sustaining high population immunity against polioviruses will become increasingly difficult during the post-eradication phase as countries turn towards other priorities and become complacent in implementing activities targeted to maintain polio-free status.
- The two manufacturers who supply IPV globally are facing technical difficulties in scaling up production, leading to a global shortfall of IPV, which is expected to continue through 2018. All countries in the SEA Region are affected and are facing difficult decisions in how to manage the shortfall of IPV supply.
- Funding from the GPEI for polio assets (human resources, systems and processes) is expected to decline from 2017 to 2019 and eventually stop, making it increasingly difficult to sustain activities required to maintain the polio networks that are not only supporting activities to maintain polio-free status but are also supporting other public health initiatives in the Region.
- Although containment activities have been agreed upon and are in process, decreased funding and the need to address other priorities may distract countries from completing poliovirus containment activities in accordance with GAPIII to minimize poliovirus facility-associated risk after type-specific eradication of wild polioviruses and sequential cessation of routine OPV.

Opportunities

By building on the success of polio eradication, including the polio infrastructure, placing the community at the core of the programme, treating equity as the cross-cutting theme, and using the leverage provided by a measles elimination goal, countries are working to strengthen routine immunization to sustain the polio-free status, achieve measles elimination, and prevent and control other VPDs.

Surveillance and laboratory infrastructure established for the polio eradication programme is a recognized source of technical expertise not only for polio eradication efforts and national immunization programmes, but also for a wide range of other public health interventions. Maintaining continuity of this infrastructure is undoubtedly a programmatic priority which will go a long way in contributing to the achievement of wider public health goals.

Other regional priority programmes identified to benefit from the skills of the polio team include the elimination of Neglected Tropical Diseases (NTDs), elimination of malaria and strengthening disease surveillance programmes.

Photo by: WHO/Indonesia

4. Goal 4

Elimination of maternal and neonatal tetanus is sustained

In 1988, the WHO WHA passed a resolution to eliminate neonatal tetanus (NT) globally by the year 2000. At that time it was estimated that the disease killed about 800 000 neonates a year, causing 6 to 7 deaths per 1000 live births (LB). By the end of 1999, 57 countries including Bangladesh, India, Indonesia, Myanmar and Nepal were still to achieve the target and a renewed initiative was launched by WHO and its partners, UNICEF and the UN Population Fund (UNFPA). Timor Leste joined this grouped when the country became independent.

Elimination of maternal tetanus was added because it is prevented by the same measures targeting NT. Implementation of the MNT Elimination Initiative has involved three main strategies: immunization, clean deliveries and cord care practices and disease surveillance. The aim of MNT elimination is to bring the number of NT cases down to very low levels; that is <1 NT case per 1000 LB in every district in every country.

NT deaths represent a triple failure of health-care systems to adequately immunize women against tetanus before or during pregnancy, provide skilled birth attendance and clean delivery facilities, and offer proper treatment of tetanus when it occurs. In developing countries without elimination efforts tetanus is estimated to be responsible for 5% to 7% of neonatal and 5% of maternal mortality.

With the recommended strategies, Nepal, Bangladesh, Myanmar and Timor Leste reached the elimination goal and were validated by WHO in 2005, 2008, 2010 and 2012 respectively. Recognizing the high NT burden in the country, estimated at 150 000 to 200 000 cases annually based on studies, India committed to achieve MNT elimination through strengthening of routine immunization activities, including increasing tetanus toxoid containing vaccine (TTCV) coverage, improving clean delivery practices through institutional births, and training of birth attendants. The launch of the National Rural Health Mission (NRHM) in 2005 helped to strengthen these initiatives. India approached MNT elimination in a phased manner and on 15 April 2015, WHO confirmed that India had successfully eliminated MNT. This landmark achievement was the conclusion of an in-depth data review and community-based validation surveys, the last of which was conducted in Nagaland in April 2015, confirming that this state had reached the target.

Indonesia likewise pursued MNT elimination validation in a phase manner; with three regions of the country achieving the goal in 2010 and 2011. On 19 May 2016 the last region of the country achieved validation, following extensive data review and field surveys in Papua, considered the lowest performing province. By extension MNT elimination was concluded to have been reached in Indonesia as a whole. Indonesia's success is based on a combination of routine TTCV immunization of pregnant women and "brides-to-be", school based immunization (BIAS) with diphtheria tetanus toxoids (DT pediatric fomulation/Td adult/adolescent formulation) as well as targeted supplemental TTCV immunization of all women of child bearing age in areas considered high risk for neonatal tetanus and also clean and safe deliveries,

With the assumption that the Bhutan, the Democratic People's Republic of Korea, Maldives, Sri Lanka and Thailand had already achieved MNT elimination before 2000 through strong routine immunization and quality surveillance systems, the May 2016 validation in Indonesia also meant that the Regional goal had been achieved.

All countries in the Region follow the WHO recommendation of vaccinating pregnant women with TTCV. Coverage of > 80% with two or more doses of TTCV in pregnant women (TT2+) has been

reported by seven countries for several years. Regional TT2+ coverage improved from 64% in 2014 to 77% in 2016 and has been maintained at this level. However, lower coverage does not necessarily indicate weak programme performance; as women of child bearing age (WCBA) accumulate repeated vaccine doses over the course of multiple pregnancies and during SIAs, eventually becoming ineligible for vaccination during pregnancy while still contributing to the target denominator. Field surveys conducted during MNT elimination validation exercises have indicated much higher protection at birth than reported TT2+ coverage suggests.

Infant immunization with TTCV (DTP and Penta vaccines) rose from 56% in 2000 to 88% in 2016. Several countries have booster doses of TTCV in early childhood or have integrated TTCV vaccination into their school health programmes. NIPs also provide a combination of tetanus and diphtheria toxoid as late childhood booster doses and/or for pregnant women.

In 1988, countries in the region reported almost 15 000 NT cases. However, this number was estimated to only represent 10% of the true cases as the majority of NT cases were not reported. As a result of immunization efforts and improved NT surveillance, often integrated with other VPD surveillance, 366 NT cases, originating from five countries, have been reported in May 2017 through WHO's JRF. However, this case count does not include data from Bhutan or Indonesia, and figures from India remain provisional. None of these five countries exceeded the "elimination" definition of <1 NT case per 1000 LB in each district, or third administrative level of the country.

Strategic objectives and recommended activities

To maintain MNT elimination core strategies for achieving elimination need to continue:

- High immunization coverage with TTCV in pregnant women, infants and in those targeted for TTCV booster doses.
- Sensitive NT surveillance in every district to confirm a reported/estimated annual NT rate below 1/1000 LB.
- Promotion of clean deliveries and cord care practices.
- Periodic joint review by the EPI, maternal and neonatal child health (MNCH) programme, surveillance managers and partner representatives of district level performance in countries which have achieved MNT elimination since 2000, with use of the assessment's findings to implement corrective measures.
- Optimization of immunization schedules for TTCV to ensure full and early protection against tetanus with booster doses for both genders during childhood and adolescence.

Key monitoring indicators

- Number of countries reported NT rates of <1 NT case per 1000 LB in every district or third administrative level.
- Number of countries reporting TT2+ coverage for pregnant women ≥80%.
- Number of countries reporting skilled birth attendance (SBA) coverage ≥70%.

Challenges

- Maintaining MNT elimination status is challenging throughout the Region due to
  - The existence of areas of low immunization coverage.
  - The occurrence of a significant number of births without skilled attendants.
  - An inadequate focus on NT surveillance.
- In areas with suboptimal antenatal care, the protection of pregnant women against tetanus has not been fully achieved. Providing an adequate number of booster doses of tetanus vaccine is still demanding for some NIPs.
- Better overall maternal and neonatal care requires access to SBAs and clean delivery and cord care practices, both out of the direct control of the immunization programme.
- Because NT cases are not often reported, it can be difficult to assess the quality of NT surveillance, and therefore difficult to monitor elimination status and identify areas where MNT is still occurring.

Opportunities

Maintenance strategies do not only allow for a life cycle vaccination approach against tetanus but also promotion of good access to and use of clean delivery practices, contributing to better maternal and neonatal care. Quality NT surveillance to monitor continued elimination and identify areas where MNT is still occurring can strengthen an integrated vaccine preventable disease surveillance approach.

Neonatal and maternal deaths continue to place a huge burden on health systems as well as on women and families. Most of these deaths are preventable and are due to failure to implement simple, known interventions and the failure to identify and address socioeconomic and cultural barriers to seeking and receiving care. Strategies to reduce neonatal deaths must be delivered where births and deaths take place, not only in health facilities, but also communities and in the home – places that EPI often already manages to get to while other basic health services still do not.

Maternal mortality in particular is an indicator of disparity and inequity for women and its extent is a sign of women's place in society and their access to social, health and nutrition services and to economic opportunities. In this context approaches for MNT elimination do not only target elimination of a specific disease but, more importantly, strengthen access of women to health care services and subsequently better opportunities for personal development.

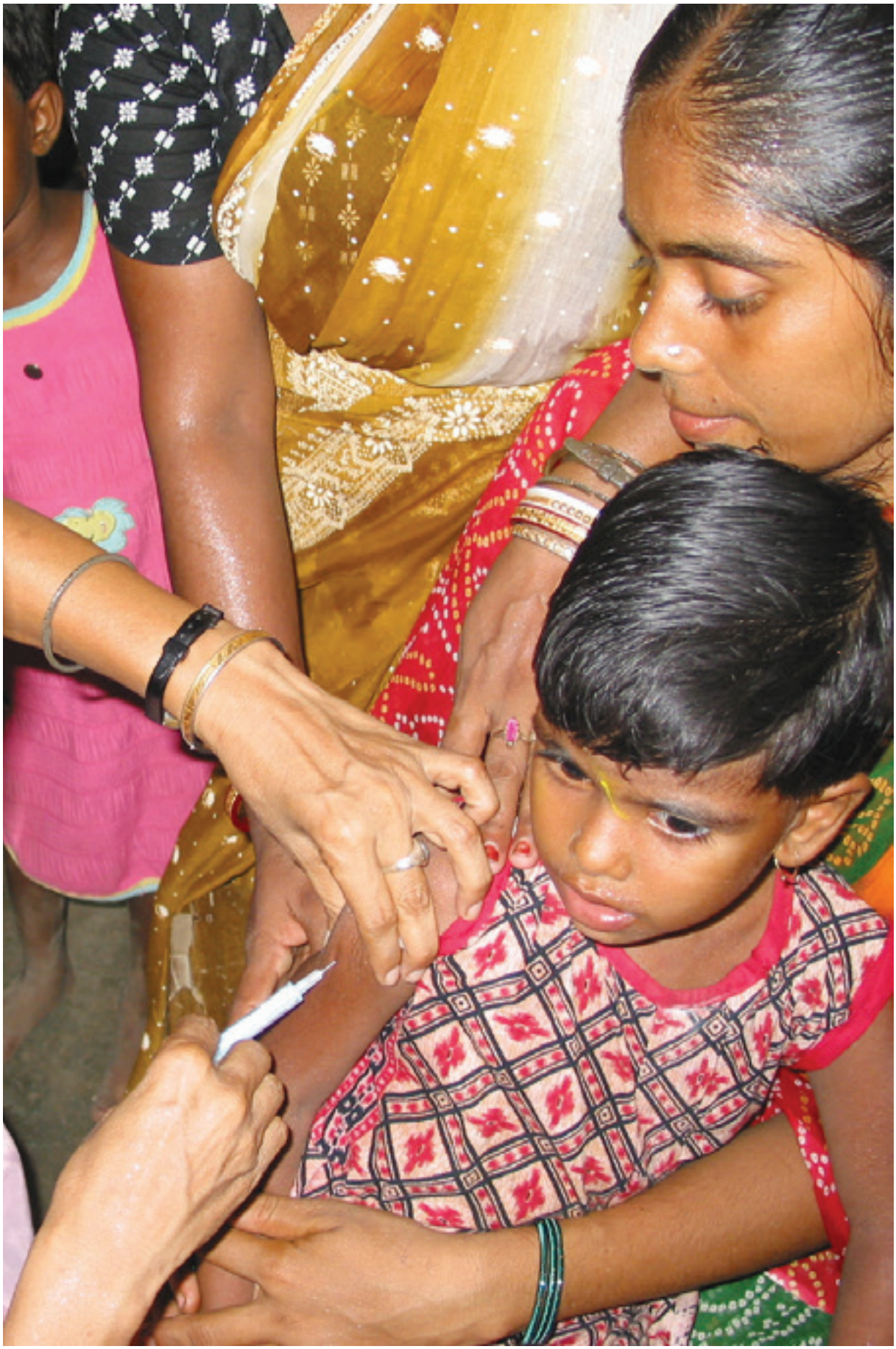


Photo by: PATH/Dr Julie Jacobsen

5. Goal 5

Control of Japanese encephalitis is accelerated

JE is a vector-borne zoonotic viral disease prevalent in tropical and subtropical areas of WHO's SEA and Western Pacific Regions. Currently, 10 out of 11 countries in the SEA Region are endemic for JE with the exception of Maldives. Vaccination is the most cost-effective strategy to prevent and control JE and immunization has been demonstrated to reduce the economic burden of JE disease. JE vaccination should be integrated into national immunization schedules in all areas where JE is recognized as a public health priority.

Even if the number of JE-confirmed cases is low, vaccination should be considered where there is a suitable environment for JE virus transmission, i.e. presence of animal reservoirs, ecological conditions supportive of virus transmission, and proximity to other countries or regions with known JE virus transmission. Adjunctive interventions, such as bed nets and mosquito control measures, should not divert efforts from childhood JE vaccination.

In the SEA Region in the mid-1980s, the disease was reported in Sri Lanka and Thailand predominantly as outbreaks. Both countries introduced mouse-brain-derived inactivated JE vaccines (MBDJEV) in high-risk areas in the late 1980s, and noted a significant reduction in the number of disease outbreaks and cases. Subsequently, both countries added JE vaccine to the national childhood immunization schedule to expand access to all children, nationwide.

In other parts of the Region, large outbreaks were reported in India and Nepal, and JE vaccine was introduced in high-risk areas as a control strategy. Nepal and India introduced SA 14 14 2, the newly-developed live-attenuated JE vaccine (LJEV) in their NIPs in 2005 and 2006 respectively. In 2009, Sri Lanka shifted from MBDJEV to LJEV. Thailand is currently replacing the MBJEV with the LJEV.

With the introduction of the JE vaccine, either nationwide or in selected high-risk areas as SIAs followed by routinely for infants, JE is under control in Nepal, Sri Lanka and Thailand. In these countries, the disease appears only sporadically, with small outbreaks occurring among unvaccinated adults or in certain geographical areas in which JE vaccine has not been introduced.

In India, despite SIAs in 216 high-risk districts and the inclusion of JE vaccine for infants in the NIP in same districts for almost a decade, certain states still experience seasonal outbreaks, perhaps due to low immunization coverage. Since the disease is reported in significant numbers among unvaccinated adults, several states of India have now expanded JE vaccination to include adults.

The Democratic People's Republic of Korea identified high-risk provinces and conducted SIAs with JE vaccine in those areas in 2009 and 2010 and in 2014. The country has yet to include the JE vaccine in its routine immunization programme.

In 2014, Myanmar reported an outbreak of JE in Rakhine State and introduced the JE vaccine on a limited scale. The country plans to introduce the JE vaccine nationally by conducting a nationwide JE vaccination campaign for children 9 months to 15 years in 2017 followed by including JE vaccine in the routine immunization programme with support from Gavi. Similarly, Indonesia has recently re-established JE surveillance and plans to introduce the JE vaccine on the island of Bali with Gavi support in 2017.

Bhutan and Timor-Leste have already started conducting JE surveillance, and Bangladesh plans to do so. In 2015, a total of 2830 AES cases, including laboratory confirmed JE, were reported in the

SEA Region. While 91% of AES cases were reported in India and Nepal, experts suspect that only about 10% to 20% of AES cases in those countries could be JE.

Strategic objectives

- Develop and sustain AES surveillance through integrated national surveillance system or sentinel surveillance with accredited national laboratories in endemic countries.
- Analyse the disease burden for JE and risk factors for transmission of the disease.
- Achieve ≥90% coverage in all existing JE immunization programmes in countries and introduce JE vaccination through routine immunization in countries with demonstrated JE risk.
- Conduct wide age rage immunization campaigns based on the disease burden.
- Create partnership for advocacy and resource mobilization of JE control.

Challenges

- Since JE control in the SEA Region has been based on specific country driven initiatives until recently, development of specific goals and timelines for achieving specific targets would need more consultation at national and regional level.
- JE/AES surveillance and laboratory confirmation of JE cases is suboptimal in all JE-endemic countries in the SEA Region. JE sentinel surveillance is carried out in some countries by WHO-supported surveillance systems. With the exception of India, and Thailand, the remaining JE-endemic SEA countries are still dependent on WHO support for the supply of laboratory test kits.
- In countries with limited primary health care facilities and insufficient laboratory support, a large number of non-JE cases and deaths are labelled and reported as JE/AES cases.
- JE-endemic countries that have not had outbreaks find it difficult to prioritize JE vaccine introduction given other priority vaccine-preventable diseases.
- Countries such as Bhutan and Indonesia which are potentially endemic for JE have lost the opportunity to obtain Gavi support for JE vaccine introduction because their economic status means that they are no longer eligible or are becoming ineligible for Gavi support. If JE disease burden is not assessed and vaccination programmes initiated as appropriate, Bangladesh and the Democratic People's Republic of Korea will also miss the opportunity for Gavi support for JE vaccine introduction.

Photo by: Ministry of Health/Epidemiology unit/Sri Lanka

Photo by: Ministry of Public Health/Democratic People's Republic of Korea

6. Goal 6

Control of Hepatitis B is accelerated

In 2015 prevalence of chronic hepatitis B in the SEA Region was estimated to range from 3% to 5%, depending on the source of information. Subsequently, WHO estimated that there were approximately 100 million persons with chronic hepatitis B virus (HBV) infection (approximately 5% of the population), resulting in an estimated 300 000 deaths annually across the region. These deaths are a consequence of the long term complications of chronic hepatitis B infections, including liver cirrhosis and hepatocellular carcinoma. The prevalence of chronic hepatitis B infection varies by country and age group considered. In addition, intra-country variability of infection rates has also been observed.

The risk of progression to chronic HBV infection is inversely related to age at initial infection with the virus. Chronic HBV infection develops in 90% of infants infected before 1 year of age, in 25% to 50% of children infected between 1 and 5 years of age, and in 5% to 10% of persons infected after 5 years of age.(13) HBV infection is preventable through vaccination. The Strategic Advisory Group of Experts (SAGE) recommends that all infants receive hepatitis B vaccine (HepB) at birth, known as a hepatitis B birth dose (HepB-BD), ideally within 24 hours of birth. If this is not feasible, the birth dose can still be effective at preventing perinatal infection 7 days after birth, followed by two or three additional doses of vaccine during infancy.

In 2016, a regional hepatitis B control goal of reaching ≤1% prevalence of hepatitis B surface antigen (HBsAg) among 5-year-old children by 2020 has been endorsed by the SEA Region's ITAG, which is in line with the 2020 goal set by the Global Health Sector Strategy on Viral Hepatitis (GHSSVH).(14) The GHSSVH also calls for 30% reduction in new cases and 10% reduction in mortality by 2020. By 2016, all 11 countries in the SEA Region had introduced HepB into their routine immunization schedules as part of combination vaccines, and eight countries (Bhutan, Democratic People's Republic of Korea, India, Indonesia, Maldives, Myanmar, Thailand, Timor-Leste) had introduced a universal HepB-BD.

The overall coverage with a third dose of HepB (HepB3) in the region increased from 53% in 2010 to 88% in 2016. Although HepB3 coverage was reported to be ≥90% in eight countries, in 2016 it did not yet reached these levels in India (at 88%) and in Indonesia (at 79%).(1) The two countries account for the largest births cohorts in the region.

Among the eight countries with HepB-BD in their vaccination schedule in 2016, coverage was >90% in four (Bhutan, the Democratic People's Republic of Korea, Maldives, Thailand). India, which contributes 70% of the births annually in the Region, reported HepB-BD coverage of 47% (JRF 2016). Figures relate to vaccination within 24 hours of birth in the Democratic People's Republic of Korea and India and within 7 days of birth in the other countries reporting. Timor Leste reported 32%, following vaccine introduction in February 2016. No relevant coverage figures were yet available for Myanmar due to introduction in late 2016.

Strategic objectives and recommended activities

Immunization with HepB is the primary tool for prevention of HBV infection. Given that the persons infected as infants or children are more likely to remain chronically infected than those infected at an older age, reaching these younger groups with timely vaccination (ideally within 24 hours of birth) and with HepB3 should be the foundation of any hepatitis B prevention plan. Depending on local epidemiology, immunization of other groups, including older children or specific groups at risk, may also be appropriate to accelerate progress toward the achievement of the control target.

6.1. Strategic objective 1

Achieving high levels of coverage with at least three doses of HepB among children through routine immunization

Based on estimated burden of disease, modelling suggests that a minimum HepB3 coverage of 90% is needed to reduce chronic infection <1% among children. Since all of the SEA Region countries use combination vaccines, this coverage is in line with the GVAP indicator of reaching 90% coverage at national level with three doses of diptheria-tetanus-pertussis containing vaccines (3).

Recommended activities

- Use of tools, such as microplanning, the RED strategy, better logistics and inventory management of vaccines and injection supplies to streamline and strengthen routine immunization services to reach every child.
- Improved supervision at all levels, and use of relevant indicators to monitor performance of immunization systems.

Key monitoring indicators

- Number of countries reporting ≥90% HepB3 coverage at national level and ≥80% at each subnational / district level.
- Number of countries reporting drop-out rates from first dose HepB (HepB1) to HepB3 <5%.

6.2. Strategic objective 2

Timely administration of first dose of HepB at birth, ideally within 24 hours of birth (birth dose)

In countries with intermediate and high endemicity of chronic hepatitis B, perinatal transmission contributes to the majority of chronic infections. Almost 90% of children with perinatally acquired infections will remain chronically infected. Prevention of these infections is critical to reducing the overall burden of chronic infection in the Region. The baby of an HBsAg-positive mother has a 70% to 90% risk of infection if the mother is hepatitis B e antigen (HbeAg) -positive , and a 5% to 20% risk if she is HBeAg-negative. Post-exposure prophylaxis with HepB immediately after birth (birth dose) dramatically reduces the risk of infection. Receipt of the first dose ≤24 hours after birth among infants of highly infectious

mothers (HBeAg-positive) in a three- or four-dose schedule provides protection in 70% to 95% of vaccinated infants, as opposed to the 50% to 57% if the first dose is given one week after birth. Consequently, timely delivery of birth dose within 24 hours for all newborn infants is the preferred strategy.

Required coverage levels should be determined through modelling using estimated prevalence of chronic hepatitis B among pregnant women and taking into account the percentage of these who would realistically be HBeAg positive.

Recommended activities (for countries that provide or should introduce a HepB-BD)

Develop and implement systems to deliver and monitor the provision of timely birth doses in all health facilities. This should include:

- Issuing standing orders for all health facilities that provide maternity services to give HepB to newborn infants as soon as possible after birth (ideally within 24 hours).
- Establishment of systems for HepB supply and storage (in or out of the cold chain) in these facilities.

Develop and implement systems to deliver and monitor the provision of timely birth doses for non-institutional birth to the extent possible.

Key monitoring indicator (for countries that provide or should introduce a birth dose)

- Number of countries reporting the percentage of newborn infants given HepB BD within 24 hours of birth, for health-facility births and for home births.

6.3. Strategic objective 3

Catch up immunization of older children

The strategy of catch-up immunization for older children is recommended only for those countries which have already demonstrated sustained high infant routine immunization coverage, including timely Hep BD, and which have additional financial and human resources for enhanced hepatitis B control. Any extension of immunization for older children should be based on careful epidemiological and economic analysis, and may include:

Children up to a specified age born before hepatitis B vaccine started to be offered ('catch up').

Children under 5 years of age who missed immunization as infants ('patch up').

The first priority would be to provide 'catch up' or 'patch up' vaccination of children under the age of 5 years, as they are more likely to remain chronically infected with HBV if they become infected than are persons who become infected at an older age.

Recommended activity

- Vaccination of unvaccinated children at school entry.

Key monitoring indicator

- Number of countries reporting coverage achieved in catch-up campaigns for the eligible population; if implemented.

6.4. Strategic objective 4

Immunization of high risk adult populations

The immunization of high-risk adult populations should only be prioritized after infant routine immunization and catch-up/patch-up campaigns for older children have reached high coverage. Vaccination of high risk adults will not have a significant impact on chronic hepatitis B burden in the population. Although the incidence of acute symptomatic hepatitis B is highest among adolescents and adults, the risk of developing chronic HBV infection and subsequent liver disease is low among those infected as adults compared to those infected as infants and children.

High-risk adult groups include contacts of HBsAg-positive persons, sex workers, health workers, people who inject drugs (PWID), and recipients of blood or plasma transfusions.

Health-care workers are one high risk group which is accessible and easy to identify. Vaccination programmes for health-care workers may require relatively fewer programmatic efforts and resources than those required for other high-risk groups, and thus may be started at the same time as infant immunization. All health-care workers should mandatorily be offered free vaccination at job entry. A catch-up campaign may be conducted initially to immunize all current clinical health-care workers, followed by regular immunization of new workers at the time of job entry. If resources allow, pre-vaccination screening may be conducted by testing hepatitis B core antibody (anti-HBc) . All anti-HBc-negative health workers should be offered the complete three-dose vaccination series. However, if there are limited resources, prevaccination screening can be waived and all health workers offered vaccination. The results of screening for HBV infection, performed either at the time of job entry or otherwise, should not be used to discriminate against health-care workers or exclude them from their jobs.

Other groups to consider for vaccination after achieving high coverage with at least three doses of HepB among children through routine immunization and the HepB-BD, catch up immunization of older children and vaccinating health-care workers, include sex workers, PWID, blood donors, and contacts of HBsAg-positive persons. Sex workers and PWID can be vaccinated if they seek care at human immunodeficiency virus (HIV) counseling and testing sites or upon admission to drug rehabilitation centres. Blood donors can be vaccinated after blood donation and should be told to return to complete the vaccination schedule, or can be referred to clinics for vaccination. Upon the diagnosis of infection in a family member, contacts of HBsAg-positive patients should be counselled method to prevent HBV infection, including vaccination, and be referred to appropriate clinics.

Key monitoring indicator

- Number of countries with an official policy requiring and providing hepatitis B vaccination for all the health workers.

Challenges

- Countries lacking prevalence and surveillance data on hepatitis B may have difficulties in prioritizing its controland marshalling sufficient political and financial support.

- High immunization coverage for HepB BD has not been attainable in countries where home births and unskilled birth attendance are the norm.
- Monitoring private-sector immunization with HepB BD requires new systems for communication and data sharing between private providers and the government.

Opportunities

The Region has made considerable progress towards HBV prevention through vaccination, however additional work is needed. Strong political commitment and secured vaccine financing in the Region and among countries will be essential in order to prioritize HBV prevention and reach the control goal by 2020, and subsequently eliminate hepatitis B by 2030 as outlined in the GHSSVH.(13). Various strategies, such as promoting health facility births, developing strong maternal, MNCH and EPI coordination, and supporting alternative vaccine delivery methods to reach children born at home or in facilities without cold chain, could be used to improve HepB-BD and HepB3 coverage. Clear policies and guidelines communicated to all sectors involved in immunization will reduce missed opportunities for vaccination. Assessing vaccine impact and estimating disease burden will be needed as countries move toward verification of the achievement of the hepatitis B control goal.

Photo by: WHO/Bhutan

Photo by: WHO/Bangladesh

7. Goal 7

Introduction of new vaccines and related technologies is accelerated

New and increasingly sophisticated vaccines have become available in the last decade for diseases that have not traditionally been targeted by NIPs. These vaccines provide protection against causes of such diseases as pneumonia, diarrhoea and cervical cancer which are responsible for substantial mortality and morbidity. In addition to reducing mortality, these new vaccines will decrease morbidity, resulting in economic returns even in countries that have already succeeded in reducing mortality rates from these diseases. These vaccinations are complementary to pre-existing diarrhoeal disease, acute respiratory infections and cervical carcinoma control programmes in countries.

With the launch of Gavi in 2000, there has been a tremendous boost in the development of and access to new vaccines and related technologies, even for low income countries. As a result, many developing countries have added two or more new vaccines to the national immunization schedule during the last decade, and have strengthened their NIPs in the process.

Even countries in the SEA Region not eligible for funding from Gavi, such as Maldives and Thailand, have started introducing new vaccines. As shown in Table 2, all countries in the SEA Region have introduced HepB-containing vaccines in the national immunization schedule, and eight countries (Bhutan, Democratic People's Republic of Korea, India, Indonesia, Maldives, Myanmar, Thailand, Timor-Leste) have introduced HepB BD. All countries in the Region, except Thailand, have introduced Haemophilus influenza b vaccine (Hib) in a pentavalent formulation.

Four countries (India, Nepal, Sri Lanka and Thailand) have introduced the SA-14-14-2 JE vaccine, and two countries (Bhutan and Thailand) have introduced human papillomavirus (HPV) vaccine. Bangladesh and Nepal have conducted HPV vaccination demonstration projects with Gavi support and have plans for national introduction. Bangladesh, Nepal and Myanmar have introduced pneumococcal conjugate vaccine (PCV). India is planning to introduce PCV on a state-by-state basis. India and Thailand have introduced rotavirus vaccine. As a part of the polio eradication end-game strategy, all SEA Region countries have introduced IPV and switched from tOPV to bOPV in their national immunization schedules.

Priority vaccines for the consideration based on the disease burden of the countries are PCV, HPV, JE vaccine and rotavirus vaccine. In addition cholera, mumps, seasonal influenza and typhoid vaccines could be considered for specific geographical areas and age groups.

Table 2. Introduction of new vaccines in the South-East Asia Region, as of 2016.

Country	Hep B	Hib	IPV	Rubella	JE	HPV	Mumps	aTd	PCV	ROTA
Bangladesh	2003	2009	2015	2012	-	2016*	-	-	2015	-
Bhutan	1997	2009	2015	2008	-	2010	-	2012	-	-
DPR Korea	2003	2012	2015	-	-	-	-	-	-	-
India	2002	2011	2015	-	2007	2016*	-	-	-	2016
Indonesia	1997	2013	2016	-	-	-	-	-	-	-
Maldives	1993	2013	2015	2006	-	-	2007	1985	-	-
Myanmar	2003	2012	2015	2015	-	-	-	-	2016	-
Nepal	2005	2009	2014	2015	2007	2016*	-	-	2015	-
Sri Lanka	2003	2008	2015	1996	1988	-	2013	2001	-	-
Thailand	2008	-	2015	1986	1990	2014@	1997	2015	-	2011@
Timor-Leste	2007	2012	2016	2015	-	-	-	2016+	-	-

*in one district +refers to DTP and DT booster doses @ In one province
Source: WHO UNICEF joint reporting form

Strategic objectives

Objectives of introducing new vaccines will be same as the objectives described under Goal 1. In the process of the introduction of a new vaccine, specific activities that need attention are integrating surveillance of the disease targeted with a new vaccine with national surveillance or establishing sentinel surveillance, analysing disease burden, involvement of national technical advisory group in decision making, conducting cost effectiveness evaluations of the introduction of the vaccine, reviewing the sustainability of maintaining the vaccine in the national immunization schedule, developing comprehensive plans based on the experience from previous introductions of new vaccines, monitoring uptake of and adverse reactions to the vaccine after introduction and conducting post introduction evaluations. The opportunities provided by Gavi for new vaccine introduction and the timeframe for transitioning from Gavi support as economic status improves need to be considered to ensure the opportunity to introduce a new vaccine is not missed.

Challenges

- Several countries in the SEA Region have delayed or declined the introduction of one or more new vaccines because of questions regarding the long-term sustainability of maintaining the new vaccine in the national immunization schedule given the implications of this for the national budget. Even countries eligible for Gavi support for at least five years following the introduction of some new vaccines have difficulties to justify the costs associated with these vaccines. These countries are missing out on the opportunity to add new antigens to their national immunization schedules.
- Countries lack reliable disease burden information on which evidence-based decisions can be made to introduce a new vaccine. Countries need to strengthen their vaccine-

preventable disease surveillance and make special efforts to generate disease burden information.

- Despite demonstrated disease burden, policy makers would like to know the economic benefits and cost effectiveness of a new vaccine before deciding to include the vaccine in the national immunization schedule; this is particulary the case when there are competing demands for funding of public health programmes in the country.
- Although there has been an intensified focus on improving immunization service delivery in Gavi eligible-countries, there are unique challenges in two MICs in the Region (Thailand and Maldives). Sustaining immunization financing for MICs, previously Gavi-eligible countries that are currently self-financing (Sri Lanka and Bhutan) and Gavi transitioning countries (Indonesia and Timor Leste) will be a challenge.

Photo by: WHO/Bangladesh

Photo by: WHO/Nepal/R Kumar

8. Goal 8

Access to high quality vaccines is ensured

Access to affordable vaccines of assured quality is central to the performance of immunization programmes. Vaccine development and production capacity in the Region is growing and playing an increasingly positive role both at regional and global levels. A positive enabling environment for vaccine development requires longer-term strategies, heavy investment and well-functioning national regulatory agencies and advisory bodies. Networking and information exchange among national regulatory authorities (NRA) in the Region will result in effective standardization, alignment and compatibility of normative and regulatory processes. There is a strong need in the Region to invest in research, development and manufacturing techniques to identify best ways to access appropriate technology and expertise, to manage intellectual property rights and to develop thermostable and suitable products as well as new bioprocessing and manufacturing technologies.

Three of the 11 countries of the SEA Region are WHO prequalified (PQ) vaccine-producing nations, representing a significant supply to the global market and in particular to UNICEF Supply Division and the Pan American Health Organization (PAHO) Revolving Fund. Indonesia has one large public-sector manufacturer with several WHO-prequalified products, whereas the India has several private-sector manufacturers with multiple WHO-prequalified vaccines. One Indian company alone supplies more than 70% of UNICEF's procurement of measles vaccine. Thailand produces a WHO pre-qualified live attenuated JE vaccine. The NRA and the National Control Laboratory (NCL) in these WHO PQ vaccine producing countries must meet all WHO required regulatory functions to oversee safety, quality and efficacy of vaccines and must be assessed as functional to keep their vaccines locally manufactured listed as WHO-prequalified vaccines, an important requirement for UN and other international procurement agencies.

At present, only Indonesia, India and Thailand have NRAs assessed functional by WHO. Bangladesh has established significant vaccine manufacturing capacity, and is currently positioned to manufacture cholera vaccine for the UN, which could help address a global shortage situation. However, as of January 2016, Bangladesh's NRA is not in compliance with the WHO indicators for NRA functionality and a significant investment in capacity-building is needed to achieve functionality. The WHO Regional Office for SEA, together with WHO headquarters and international partners, will contribute to the capacity-building of Bangladesh's NRA. In addition, the Regional Office for SEA, in collaboration with WHO headquarters and other partners, will provide support to manufacturers in Bangladesh to develop and manufacture vaccines of assured quality, safety and efficacy for the national and international market.

Governments can promote enabling environments for NRA, manufacturers by communicating regularly and working in partnership with researchers, biotech companies and universities to develop new vaccines and technologies.

Strategic objectives

To enhance regional cooperation through the expansion of centres of excellence (WHO-Global Learning Opportunities / GLO) to provide training and technical support to countries in the Region in the areas of vaccine regulatory and immunization supply chain management.

Recommended activities

- Facilitate the interaction of NRAs, NCLs, manufacturers and EPI programmes through forums where regulatory issues related to medicines and vaccines of public health importance are discussed and consensus is forged for the way forward.
- Conduct regular assessments of NRAs and NCLs against established international standards for required functions and support institutional development planning to further strengthen national regulatory systems and harmonize regulations across the Region.
- Sustain existing GLO network in the SEA Region and expand GLO to include medicines and other regulatory functions such as good manufacturing practices, pharmacovigilance, etc.
- Strengthen country capacity to monitor and oversee immunization supply chains in concluding enforcement of good distribution practices (GDP), through support to centres of excellence in the region for training and technical expertise on immunization supply chain management and laboratory testing of cold chain equipment.
- Ensure that EVM improvement plans are budgeted and implemented as part of cMYPs or other equivalents.
- Explore the introduction of new cold chain and temperature monitoring technologies and innovative solutions to immunization supply systems and waste management systems (for example, controlled temperature chain, remote temperature monitoring, freeze-safe cooling equipment).
- Establish information systems to help staff accurately track vaccines and immunization supplies and monitor the quality of the cold chain (for example, online MIS for cold chain and vaccine management).

Key monitoring indicator

- Number of countries that regularly update Vaccine product price procurement (V3P) information

Challenges

- With new and more complex technologies being used to manufacture vaccines, it has become increasingly complicated, costly and time-consuming to maintain a positive enabling environment for manufacturers, to convince them to maintain focus on vaccines that address public health priorities, and to ensure that NRAs remain fully functional.
- Manufacturers have invested in quality control system to enable them to expand their market and sell medicines and vaccines outside of their country. However, in low and middle income countries the public sector financing that NRAs have access to often requires a lengthy clearance process to obtain an amount of financing that is not commensurate with the regulatory requirements of ever more sophisticated products and technologies to manufacture medicines.
- Countries that do not rely on UNICEF for group procurement lack sufficient vaccine price transparency, procurement expertise or bargaining power to purchase vaccines. Alleviating these challenges will require more active global support.
- Sustaining financing for vaccines and immunization is always difficult in the face of

competing demands and the need to respond to outbreaks and emerging or re-emerging pathogens.

Opportunities

Gavi is supporting eligible countries to strengthen their health systems and immunization supply chain systems to better deliver vaccination services in an integrated and efficient manner. WHO and UNICEF are complementing this effort with an updated EVM assessment and implementation of improvement plans along with technical assistance, guidelines and tools.

Countries in the SEA Region are using this assistance to ensure that sufficient immunization supplies, including vaccines, diluent, syringes and waste disposal equipment, are available at the right time, at the right place and in the right condition to serve the needs of all communities, including those that are difficult to reach.

Photo by: WHO/India

monitoring & evaluation

In May 2012, when the GVAP 2011–2020 was endorsed, the WHA urged countries to report every year to Regional Committees on lessons learnt, progress made, remaining challenges and updated actions to reach national immunization targets (WHA65.17). In May 2013, WHO headquarters proposed a framework for monitoring, evaluating and accountability of GVAP implementation (Annex 2). This framework is used to guide the content of annual progress reports submitted to the Regional Committees and the WHA through the Executive Board (WHA66.19).

NITAGs of countries are responsible for monitoring SEARVAP implementation annually and reporting to the SEA Region's ITAG. Countries may use the WHO/UNICEF JRF to capture monitoring and evaluation data; the same timelines for reporting will be used.

The Secretariat will prepare annual progress reports on the implementation of SEARVAP (including reporting on GVAP indicators) in the Region on the basis of these data, which will be reviewed by the SEA Regional ITAG and submitted to the SEA Regional Committee and the SAGE.

The framework for monitoring and reporting on SEARVAP implementation is based on GVAP indicators, and has been adapted and modified according to Region-specific immunization goals and objectives. (Table 3 & 4).

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Table 3. Key regional indicators and targets for monitoring progress towards immunization goals

Goals	Indicator	Baseline (2015)	Target for 2020
Goal 1: Routine immunization systems and services strengthened	Number of SEA Region countries with 90% national coverage and 80% coverage in every district or equivalent for all vaccines in national programme, unless otherwise recommended	Five SEA Region countries have 90% national coverage and 80% coverage in every district or equivalent for all vaccines in national programmes (WUENIC 2016 & JRF 2015)	All SEA Region 11 countries will have 90% national coverage and 80% coverage in every district or equivalent for all vaccines in national programmes
Goal 2: Measles is eliminated and rubella/CRS controlled	Number of SEA Region countries with absence of endemic measles transmission for ≥12 months in the presence of a well-performing surveillance system	None of the SEA Region countries have an absence of endemic measles transmission for ≥12 months in the presence of a well-performing surveillance system	All 11 SEA Region countries will have an absence of endemic measles transmission for ≥12 months in the presence of a well-performing surveillance system
	Number of SEA Region countries that have achieved rubella/CRS control defined as 95% reduction of rubella and CRS cases as compared with the 2008 national baseline	None of the SEA Region countries have achieved rubella/CRS control	All 11 SEA Region countries will have achieved rubella/CRS control
Goal 3: Polio-free status is maintained in the Region	Number of WPV and cVDPV cases in the Region	No WPV transmission is re-established in the Region and cVDPV responded to as per global guidelines	No WPV transmission is re-established in the Region and cVDPV responded to as per global guidelines (to be confirmed by the RCCPE)
Goal 4: Elimination of maternal and neonatal tetanus is sustained	Number of SEA Region countries with validated MNT elimination defined as < 1 NT case/1000 LB in each district	Ten SEA Region countries have validated MNT elimination defined as < 1 NT case/1000 LB in each district	Eleven SEA Region countries continue to have maintained MNT elimination defined as < 1 NT case/1000 LB in each district
Goal 5: Control of Japanese encephalitis is accelerated in the Region	Number of SEA Region countries that have introduced immunization against JE in nationally-defined high-risk areas	Four SEA Region countries have introduced immunization against JE in nationally-defined high-risk areas	Seven SEA Region countries will have introduced immunization against JE in nationally-defined high-risk areas
Goal 6: Control of hepatitis B is accelerated in the Region	Number of SEA Region countries that have reduced the seroprevalence of chronic hepatitis B infection, measured through hepatitis B surface antigen (HBsAg) to less than 1% in 5-year-old children at national level	In three countries nationally representative post-hepatitis B vaccine introduction impact serosurveys indicate HBsAg below 1% in 5-year –old children	Ten SEA Region countries will have reduced the seroprevalence of chronic hepatitis B infection, measured through HBsAg to less than 1% in 5-year-old children at national level
Goal 7: Introduction of new vaccines and related technologies is accelerated	Number and type of additional new or under-utilized vaccines that have been introduced in SEAR countries from 2016 - 2020	Each country in the SEA Region has introduced at least two additional new or underutilized vaccines between 2010 and 2015	Each country in the SEA Region will have introduced at least two additional new or underutilized vaccines from 2016 to 2020
Goal 8: Adequate production and availability of safe and efficacious vaccines is ensured	Number of SEA Region countries manufacturing vaccines of assured quality	Three SEA Region countries manufacture vaccines of assured quality	Five SEA Region countries will manufacture vaccines of assured quality
	Number of SEA Region countries with (a) no national-level stock-outs for any routine vaccine and (b) no subnational level stock-outs for any routine vaccine	Nine SEA Region countries had no stock outs at national and no subnational level stock outs (JRF 2015)	Eleven SEA Region countries will have no stock outs at national and subnational levels

Table 4. Key indicators for monitoring strategic objectives

Routine immunization systems and services strengthened

#	Strategic Objective	Indicator	Baseline (2015)	Target for 2020
1	All countries commit to immunization as a priority	Number of SEA Region countries that fully (100%) fund their routine immunization programme	Two SEA Region countries fully (100%) fund their routine immunization programme	At least six SEA Region countries will fully (100%) fund their routine immunization programme
		Number of SEA Region countries with a NITAG that meets WHO criteria	All eleven countries have established NITAG	All countries to maintain functional NITAGs
2	Individuals & communities understand the value of vaccines & demand immunization both as a right and a responsibility	Number of SEA Region countries that have assessed (or measured) confidence in vaccination at subnational level	Not measured	At least four SEA Region countries will have assessed (or measured) confidence in vaccination at subnational level
3	The benefits of immunization are equitably extended to all people	Number of SEA Region countries with ≥90% national coverage and ≥80% coverage in every district or equivalent with the third dose of DTP-containing vaccine	Five SEA Region countries have ≥90% national coverage and ≥80% coverage in every district or equivalent with the third dose of DTP-containing vaccine	Eleven SEA Region countries will have ≥90% national coverage and ≥80% coverage in every district or equivalent with the third dose of DTP-containing vaccine
4	Immunization programmes are integrated into a well-functioning health system	Number of SEA Region countries with a drop-out rate less than 5% between first and third dose of DTP-containing vaccine	Nine SEA Region countries have a drop-out rate less than 5% between first and third dose of DTP-containing vaccine (WUENIC 2016)	Eleven SEA Region countries will have drop-out rates less than 5% between first and third dose of DTP-containing vaccine
		Number of SEA Region countries with sustained national coverage of DTP containing vaccines ≥90% for 3 or more years	Seven SEA Region countries have sustained national coverage of DTP containing vaccines ≥90% for 3 or more years (WUENIC 2016)	Eleven SEA Region countries will have sustained national coverage of DTP containing vaccines ≥90% for 3 or more years
5	Immunization programmes have sustainable access to predictable funding, quality supply and innovative technologies	Number of SEA Region countries that fund at least 50% of the total expenditure on routine immunization from domestic financial resources	Currently four SEA Region countries fund at least 50% of the total expenditure on routine immunization from domestic financial resources	Eight countries in SEA Region will fund at least 50% of the total expenditure on routine immunization from domestic financial resources
6	Country, regional and global research and development innovations maximize the benefits of immunization	Number of SEA Region countries incorporating an agenda for research on immunization and vaccines in their national immunization plan	Six SEA Region countries have incorporated an agenda for research on immunization and vaccines in their national immunization plan	Eleven SEA Region countries will have incorporated an agenda for research on immunization and vaccines in their national immunization plan
		Number of SEA Region countries with capacity to conduct clinical trials meeting GCP requirements	Five SEA Region countries currently have capacity to conduct clinical trials meeting GCP requirements	Eleven countries will have capacity to conduct clinical trials meeting GCP requirements

Measles elimination and rubella / CRS control

#	Strategic Objective	Indicator	Baseline (2015)	Target for 2020
1	Achieve and maintain at least 95% population immunity with two doses against measles and rubella within each district of each country in the Region through routine and/or supplementary immunization	Number of countries achieving more than 95% coverage for two doses of MRCV in routine immunization at national level	Five countries	All
		Number of countries with more than 95% subnational units (equivalent to districts) achieving more than 95% coverage for two doses of MRCV in routine immunization	Zero	All
		Number of countries which completed measles-rubella SIAs with at least 95% coverage in all districts	Zero	All
2	Develop and sustain a sensitive and timely case-based measles and rubella and CRS surveillance system in each country in the Region that fulfils recommended surveillance performance indicators	Number of countries reporting zero cases of endemic measles	Zero	All
		Number of countries reporting non-measles / non-rubella rates of >2 per 100,000 population at national level	Zero	All
		Number of countries reporting at least two-non-measles non-rubella cases per 100 000 population from at least 80% of second administrative units	Zero	All
		Number of countries reporting 80% of laboratory confirmed cases (chain of transmission) with adequate specimen analysed for virus detection in accredited laboratory	Zero	All
		Number of countries conducting sentinel site CRS surveillance	Four countries	All
		Number of countries reporting more than 80% of suspected CRS cases with adequate investigation	Zero	All
3	Develop and maintain an accredited measles and rubella laboratory network that supports every country or area in the Region	Number of measles and rubella network laboratories that are "proficient" for serologic and, if relevant, for virology testing (target: 100% of laboratories)	92 %	100 %
		Number of laboratories reporting serologic results of at least 80% of specimen received within four days of receiving the specimen	64 %	100 %
4	Strengthen support and linkages to achieve the above three strategic objectives	Number of countries with a National Strategic Plan or its equivalent for measles elimination and rubella/CRS control	Four countries	11
		Number of countries with a well functional National Verification Committee that have submitted the last annual progress to report to SEA-RVC	10	11
		Number of countries with an outbreak preparedness and response plan for suspected measles or rubella outbreaks	Four countries	All

Polio-free status in maintained

#	Strategic Objective	Indicator	Baseline (2015)	Target for 2020
1	Achieve high immunization coverage (≥90%) with polio vaccines in routine immunization	Number of countries that achieve and maintain polio vaccine coverage ≥90% nationally and ≥80% in every district or equivalent	Six countries	All
2	Achieve and maintain high quality /certification level AFP surveillance	Number of countries that achieve and sustain certification level polio surveillance for case detection and confirmation; with - Non-polio AFP rate ≥2per 100,000 <15 years - ≥80% of AFP cases with adequate stool samples	Seven countries non-polio AFP rate ≥2per 100,000 <15 years Six countries ≥80% of AFP cases with adequate stool samples	All for both indicators
3	Maintain a quality regional polio laboratory network operating under WHO accreditation standards	Number of WHO accredited polio laboratories Number of polio laboratories reporting ITD results within seven days (target: ≥80%)	94 % 91 %	100 % 100 %
4	Have updated polio outbreak response plans in place as per global guidelines	Number of countries that have a comprehensive and updated - officially approved - polio response plan in place	One country	All
5	Maintain the certification process through active oversight by RCCPE and NCCPEs	Annual RCCPE meetings and number of countries conducting regular NCCPE (ie quarterly) oversight meetings	Annual RCCPE meeting and all countries with active NCCPEs though not all meeting quarterly	All achieved
6	Complete poliovirus laboratory containment as per GAPIII requirements	Number of countries with active national poliovirus laboratory containment taskforce coordinating adherence with to GAPIII	Six countries	All

Elimination of maternal and neonatal tetanus is sustained

#	Strategic Objective	Indicator	Baseline (2015)	Target for 2020
1	High immunisation coverage with TTCV in pregnant women, infancy and for booster doses	Number of countries ≥ 80% TT2+ coverage in pregnant mothers	Eight countries	All
2	Sensitive NT surveillance in every district to confirm a reported /estimated annual NT rate below 1/1,000 LB	Number of countries that NT rate of <1 case per 1,000 LB in each district (3rd administrative level)	Eleven countries	Eleven countries
3	Promotion of clean deliveries and core care practices	Number of countries reporting SBA coverage ≥70%	Six countries	Nine countries

Control of Hepatitis B is accelerated

#	Strategic Objective	Indicator	Baseline (2015)	Target for 2020
1	Achieving high levels of coverage with at least three doses of HepB among children through routine immunization	Number of countries reporting ≥ 90% HepB3 coverage at national level and ≥80% at each subnational/district level	Five countries	All
		Number of countries reporting drop-out rates from HepB1 to HepB3 <5%	Nine countries	All
2	Timely administration of first dose of HepB at birth, ideally within 24 hours of birth (birth dose)	Number of countries reporting the percentage of newborn infants given a birth dose within 24 hours of birth, for health-facility births and for home births (HepB-BD)	Six countries (though not disaggregated for health facility and home births)	Eight countries
3	Catch up immunization of older children	Number of countries reporting coverage achieved in catch-up campaigns for the eligible population; if implemented	None	All
4	Immunization of high risk adult population groups	Number of countries with an official policy requiring and providing hepatitis B vaccination for all the health workers	Eight countries	All

Access to high quality vaccines is ensured

#	Strategic Objective	Indicator	Baseline (2015)	Target for 2020
1	To enhance regional cooperation through the expansion of centres of excellence (WHO GLO) to provide training and technical support to countries in the region in the areas of vaccine regulatory and immunization supply chain management	Number of countries that regularly update V3P information	Two countries	All eleven SEAR countries

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roles & responsibilities of stakeholders

The Government

Governments have both an opportunity and a responsibility to protect the health of their citizens. Immunization has been shown to be one of the cost-effective investments a government can make to improve the lives and well-being of individuals, communities and populations. In this regard and given the sustained improvement in economic development in the Region, governments can support immunization programmes by:

- Increasing domestic financial support for NIPs.
- Developing and introducing laws, regulations, and policies that support immunization programmes.
- Developing region- and country-specific immunization plans with stakeholders.
- Responding with timely information to public concerns.
- Ensuring that immunization services are adequately staffed.
- Introducing educational courses on vaccines at universities and other institutions training health workers and institutionalizing health worker training.
- Holding private sector providers accountable for the immunization services that they provide.
- Increasing awareness of the importance of immunization and engaging in dialogue with communities and the media.
- Encouraging and supporting research on vaccine development and manufacturing as well as on vaccination issues.
- Participating in open dialogue with vaccine manufacturers and other concerned stakeholders.

Health professionals

Health professionals, including NIP managers, medical officers and other health staff are responsible for maintaining and improving the quality of immunization services that they provide. National immunization managers play a leadership role in overseeing all the different aspects of the programme. They can improve immunization programmes by:

- Mobilizing immunization champions both inside and outside the government for support.
- Forming stronger linkages with civil society organizations (e.g., those involved in the ICC) to increase demand for immunization services.
- Building human resource capacities to achieve technical self-sufficiency.
- Bringing in private and nongovernmental vaccination providers to help reduce inequities.
- Ensuring good stewardship of resources across immunization services.
- Overseeing supply and logistics operations to ensure timely access to safe and effective

immunization services.

- Closely coordinating with other branches of the health system on disease control efforts.
- Emphasizing the need for real-time data management.
- Instituting a culture of learning and evidence-based decision-making in immunization services.

Communities and civil society

Communities enjoy greater health and prosperity when they are able to protect their families from disease and disability. Individuals and civil society organizations can play a powerful role in improving the health of their communities by demanding reliable and safe immunization services and by holding the government accountable for the services they provide. Specifically, they can help by:

- Getting involved in planning, promoting and implementing immunization programmes.
- Participating in the development and testing of innovative approaches to deliver immunization.
- Educating, empowering and engaging vulnerable groups and communities.
- Building grassroots initiatives to track progress and hold governments and stakeholders accountable.
- Contributing to improvement of monitoring and evaluation of the immunization programme.
- Engaging in advocacy at the local, regional and global levels and collaborating with others to build momentum for improved health through vaccines and immunization.

UN and other global agencies

Global agencies such as WHO and UNICEF have a mandate to improve health and the well-being of families, particularly the poor and most vulnerable. These agencies can improve immunization services around the world by:

- Enabling countries to take ownership of their immunization programmes.
- Strengthening national capacity and regional infrastructure for immunization and surveillance.
- Supporting vaccine provision and immunization-related activities.
- Facilitating access to vaccine technologies, know-how and related information.
- Working with other stakeholders to improve technical assistance, based on an inventory of each stakeholder's comparative advantage.
- Supporting evidence-based decision-making.
- Engaging communities to generate demand for immunization.
- Promoting sustainable national funding options.
- Developing mechanisms for mutual accountability.
- Promoting the use of innovative financing and procurement mechanisms.

Gavi

Gavi includes representation of all major immunization stakeholders, and can help coordinate and align technical and financial support of partners, taking into account the national priorities of the countries eligible for support. Gavi partners can provide strategic thinking and can improve access to new technologies, infrastructure for system strengthening, and financial resources for eligible countries. Gavi's financial incentives are designed to encourage countries to achieve agreed-upon targets in exchange for continued financial support.

Other development partners

Development partners such as bilateral agencies, foundations and nongovernmental organizations (NGOs) recognize the value of immunization as an efficient and cost-effective way to support the economic and physical well-being of communities around the world. They can further improve immunization services by actively supporting countries and regional entities to achieve immunization goals, by helping countries integrate immunization into comprehensive packages of essential health services and by promoting country ownership of immunization. They can also facilitate access to vaccine discoveries and technologies, provide technical assistance and predictable and transparent long-term funding aligned with national plans, build civil society capacity and participate in international advocacy efforts. They can support research and development (R&D) for newer technologies, devices and tools as well as new operational approaches to immunization service delivery.

Academia

Academia plays a special role in optimizing the long-term potential of immunization. Researchers around the world can accelerate scientific progress by pursuing a multidisciplinary research agenda and by partnering with regulators and manufacturers to explore vaccines and technologies that can address the specific needs of the populations and environments in which they are used. Academic researchers can also contribute to immunization programmes by providing data, methods and arguments to form an evidence base for the value of vaccines and best practices in immunization. They are strong advocates for funding for vaccine and immunization research.

Vaccine manufacturers

Vaccine manufacturers in both industrialized and developing countries play an important role in supplying the world with programmatically-suitable vaccines of assured quality. They contribute to the research and education agenda for immunization, promote awareness of immunization through the media and are capable of rapidly scaling up the adoption of new and improved vaccines. They can further enhance immunization services by participating in open dialogue on vaccine access and working together to enhance manufacturing capability.

Media

The media influences the way individuals and communities think about immunization. They can be a voice for vulnerable communities and can also teach health literacy and explain how immunization works. They can be powerful advocates for immunization by holding the government accountable for the services it provides, engaging experts to address community concerns and advocating for the needs of poor and vulnerable communities.

Private sector vaccination providers

For-profit and non-profit private sector health players can provide immunization services to specific population segments as agreed upon with the government. They can play a positive role by following national policies, maintaining high standards of service, reporting regularly and following government guidelines when charging fees.

Corporate philanthropic partners

Corporate and philanthropic institutions can support the diversification of funding sources for immunization programmes and engage in country, regional and global advocacy for immunization. These partners can also engage in social marketing to enhance demand for immunization and provide logistical and other technical support to enhance immunization services.

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Annex 1

Characteristics of countries and country grouping

Country	DTP3 Coverage 2015 (1)	World Bank Income Group (15)	Status Gavi (2)	Gavi Co-financing Grouping in 2016 (2)
Bangladesh	94	LIC	Eligible	Preparatory transition
DPR Korea	96	LIC	Eligible	Initial self-financing
Nepal	91	LIC	Eligible	Initial self-financing
Myanmar	75	LIC	Eligible	Preparatory transition
India	87	LMIC	Eligible	Preparatory transition
Indonesia	81	LMIC	Eligible	Accelerated transition phase
Timor - Leste	76	LMIC	Eligible	Accelerated transition phase
Bhutan	99	LMIC	Eligible	Fully self-financing vaccines
Sri Lanka	99	LMIC	Eligible	Fully self-financing vaccines
Maldives	99	UMIC	Non-Eligible	NA
Thailand	99	UMIC	Non-Eligible	NA

LIC: low-income countries; LMIC: Lower-middle-income countries: UMIC: Upper Middle Income Countries

Annex 2

GVAP monitoring and evaluation / accountability framework: Goals, Strategic objectives and Indicators to evaluate progress

Goals

Goals / Strategic Objectives	Indicators
1. Achieve a world free of poliomyelitis	1.1 Interrupt wild poliovirus transmission globally 1.2 Certification of poliomyelitis eradication
2. Meet global and regional elimination targets	2.1 Neonatal tetanus elimination 2.2 Measles elimination 2.3 Rubella/congenital rubella syndrome (CRS) elimination
3. Meet vaccination coverage targets in every region, country and community	3.1 By 2015, reach 90% national coverage and 80% in every district or equivalent administrative unit with three doses of diphtheria-tetanus-pertussis-containing vaccines 3.2 By 2020, reach 90% national coverage and 80% in every district or equivalent administrative unit for all vaccines in national programmes, unless otherwise recommended
4. Develop and introduce new and improved vaccines and technologies	4.1 Licensure and launch of vaccine or vaccines against one or more major currently non-vaccine preventable diseases 4.2 Licensure and launch of at least one platform delivery technology 4.3 Number of low-income and middle-income countries that have introduced one or more new or under-utilized vaccines
5. Exceed the Millennium Development Goal 4 target for reducing child mortality and Integration indicators	5.1 Reduce under-five mortality rate 5.2 Integration of health-care interventions and immunization activities

Strategic objective

Goals / Strategic Objectives	Indicators
1. Ensuring country ownership of immunization	1.1 Increasing domestic expenditures for immunization per person targeted 1.2 Presence of an independent technical advisory group that meets the defined criteria
2. Demand for immunization	2.1 Percentage of countries that have assessed the level of hesitancy in vaccination at a national or subnational level 2.2 Reasons for vaccine hesitancy
3. The benefits of immunization are equitably extended to all people	3.1 Percentage of districts with 80% or greater coverage with three doses of diphtheria-tetanus-pertussis-containing vaccine Note: This indicator is included in the narrative of the overall coverage indicator report (under G3.1) 3.2 Reduction in coverage gaps between wealth quintiles and other appropriate equity indicator(s)
4. Strong immunization systems are an integral part of a well-functioning health system	4.1 Dropout rates between first dose (DTP1) and third dose (DPT3) of diphtheria–tetanus–pertussis-containing vaccines Note: this indicator is included in the narrative of the overall coverage indicator report (under G3.1) 4.2 Sustained coverage of diphtheria-tetanus-pertussis-containing vaccines 90% or greater for 3 or more years Note: This indicator is included in the narrative of the overall coverage indicator report (under G3.1) 4.3 Immunization coverage data assessed as high quality by WHO and UNICEF 4.4 Number of Countries with case-based surveillance for vaccine-preventable diseases: invasive bacterial vaccine-preventable diseases and rotavirus
5. Stock-out and access to sustained supply of vaccines of assured quality	5.1 Percentage of doses of vaccine used worldwide that are of assured quality 5.2 Number of countries reporting a national-level stock-out of at least one vaccine for at least 1 month
6. Country, regional and global research and development innovations maximize the benefits of immunization	6.1 Progress towards development of human immunodeficiency virus (HIV), TB and malaria vaccines 6.2 Progress towards a universal influenza vaccine (protecting against drift and shift variants) 6.3 Progress towards institutional and technical capacity to carry out vaccine clinical trials 6.4 Number of vaccines that have either been re-licensed or licensed for use in a controlled-temperature chain at temperatures above the traditional 2–8°C range 6.5 Number of vaccine delivery technologies (devices and equipment) that have received WHO pre-qualification against the 2010 baseline

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acronyms & abbreviations

AEFI	Adverse Events Following Immunization
AES	Acute Encephalitis Syndrome
AFP	Acute Flaccid Paralysis
Anti-HB	Hepatitis B Core Antibody
BIAS	Indonesia School-based Immunization Programme
CCS	Containment Certification Scheme
cMYPs	Comprehensive Multiyear Plans
CRS	Congenital Rubella Syndrome
cVDPV	Circulating Vaccine-Derived Poliovirus
DT	Diphtheria and Tetanus Toxoids, Pediatric Formulation
DTP	Diphtheria-Tetanus-Pertussis Vaccine
DTP3	Third Dose of Diphtheria-Tetanus-Pertussis Vaccine
EPI	Expanded Programme on Immunization
EVM	Effective Vaccine Management
FGL	Department of Family Health, Gender and Life Course
fIPV	Fractional Dose of Inactived Poliovirus Vaccine
GAPIII	WHO Global Action Plan to Minimize Poliovirus Facility-Associated Risk After Type-Specific Eradication of Wild Polioviruses and Sequential Cessation of Oral Polio Vaccine Use
Gavi	Gavi, the Vaccine Alliance
Gavi-eligible	Eligible for support from Gavi, the Vaccine Alliance
GCP	Good Clinical Practice
GDP	Good Distribution Practice
GHSSVH	Global Health Sector Strategy on Viral Hepatitis
GLO	Global Learning Opportunities (WHO)
GPEI	Global Polio Eradication Initiative
GRISP	Global Routine Immunization Strategies and Practices
GVAP	Global Vaccine Action Plan
HBeAg	Hepatitis B e Antigen

HBsAg	Hepatitis B surface Antigen
HBV	Hepatitis B virus
HepB	Hepatitis B vaccine
HepB1	First dose of Hepatitis B vaccine
HepB3	Third dose of Hepatitis B vaccine
HepB-BD	Hepatitis B vaccine Birth dose
Hib	*Haemophilus Influenzae* type B Vaccine
HIV	Human Immunodeficiency Virus
HPV	Human Papillomavirus
HSCC	Health Sector Coordinating Committee
ICC	Interagency Coordinating Committee
IVD	Immunization and Vaccine Development Unit
IPV	Inactivated Poliovirus Vaccine
ITAG	Immunization Technical Advisory Group
ITD	Intratypic Differentiation (of poliovirus)
JE	Japanese Encephalitis
JRF	Joint Reporting Form
LB	Live Births
LIC	Low-Income Countries
LJEV	LVE JE Vaccine
LMIC	Lower-Middle-Income Countries
MBDJEV	Mouse-Brain-Derived Inactivated JE Vaccine
MCV	Measles-Containing Vaccine
MCV1	First dose of Measles-Containing Vaccine
MCV2	Second dose of Measles-Containing Vaccine
MIC	Middle Income Country
MIS	Management Information System
MLM	Mid-Level Managers
MNCH	Maternal and Neonatal Child Health
MNT	Maternal and Neonatal Tetanus
MR	Measles Rubella Vaccine
MRCV	Measles Rubella Containing Vaccine

NCCPE	National Certification Committee for Polio Eradication
NCL	National Control Laboratory
NGO	Non-Governmental Organization
NIP	National Immunization Programme
NITAG	National Immunization Technical Advisory Group
NRA	National Regulatory Authority
NRHM	National Rural Health Mission (India)
NT	Neonatal Tetanus
NTD	Neglected Tropical Diseases
NVC	National Verification Committee (for measles elimination)
OPV	Oral Poliovirus Vaccine
bOPV	Bivalent OPV
tOPV	Trivalent OPV
PAHO	Pan American Health Organization
PCV	Pneumococcal Conjugate Vaccine
PEF	Poliovirus Essential Facility
Polio	Poliomyelitis
PQ	Prequalified (by the World Health Organization)
PWID	People WHO Inject Drugs
R&D	Research and Development
RCCPE	Regional Certification Commission for Polio Eradication
RCV	Rubella-Containing Vaccine
REC	Reaching Every Child
RED	Reaching Every District
RVC	Regional Verification Commission (for measles elimination)
SAGE	Strategic Advisory Group of Experts on Immunization
SBAs	Skilled Birth Attendance
SEA	South-East Asia
SEARVAP	South-East Asia Regional Vaccine Action Plan
SIA	Supplementary Immunization Activity
Td	Tetanus and Diphtheria Toxoids, Adult / Adolescent Formulation
TTCV	Tetanus Toxoid Containing Vaccine

TT2+	Two or more Doses of TTCV in Pregnant Women
UN	United Nations
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
V3P	Vaccine Product Price Procurement
VDPV	Vaccine-Derived Polio Virus
VPD	Vaccine-Preventable Disease
WCBA	Women of Childbearing Dge
WHO	World Health Organization
WHA	World Health Assembly
WPV	Wild Poliovirus
WUENIC	World Health Organization and United Nations Children's Fund estimate of national immunization coverage

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South-East Asia regional vaccine action plan 2016-2020 (SEARVAP)

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