LAO PDR
NATIONAL IMMUNIZATION PROGRAMME

UPDATED COMPREHENSIVE MULTI-YEAR PLAN 2019-2023

December 2018

Executive Summary

Country Context

Background indicators

The Lao People's Democratic Republic (Lao PDR) is a land-locked, ethnically diverse and mountainous country with a highly dispersed population of 6.9 million (2018) covering an area of about 236,880 sq. km. Some 80% of the land area of Lao PDR is hilly or mountainous including remote area which are difficult to access. Administratively, the country is divided into 17 provinces and Vientiane Capital, with 148 districts and around 8,500 administrative villages or urban neighborhoods.

Lao PDR has made significant progress in decreasing both its infant (49/1000 live births in 2017) and under-5 mortality (63/1000 live births in 2017) in the past years. However, there is a disparity in the under-5 mortality rate across provinces, wealth quintiles, and education levels. Life expectancy at births is 67 years. Lao PDR had a GNI/capita of 2,270 USD in 2017 and is ranking at 139 out of 189 countries in the UNDP Human Development Index.

The government of Lao PDR has undertaken substantial reforms of the health system and is allocating increased public funds to priority public health interventions, including immunization, thus demonstrating its commitment to continued efforts to achieve the Sustainable Development Goals.

Health system structure

The health-care delivery system of Lao PDR is primarily a government-owned, public system that operates at three levels with health centers, district and provincial hospitals. Under the Ministry of Health (MoH) there are five central hospitals, three regional hospitals, 17 provincial hospitals, 135 district hospitals, around 1100 health centers and approximately 5,000 village drug dispensaries. The total number of health personnel in Lao PDR is around 20,000. With only 43 percent of the health workforce having a mid-level or higher education, the actual density of health professionals (physicians, nurses, midwives) is 13 per 10,000 population. Adequate utilization of the health services still remains a major challenge due to a number of reasons including access, quality of services, staff management capacity, uneven distribution of health staff and language barriers in areas with predominantly ethnic populations.

Health Sector Reform

In 2013, the National Assembly approved the National Health Sector Reform (HSR) Strategy for the period 2013-2025 aiming to achieve universal health coverage by 2025. The HSR Framework outlines five priorities including standardized community services including immunization. During Phase 1 (2013-2015), progress was made in maternal and child health outcomes, while phase 2 (2016-2020) focuses on ensuring quality essential services and financial protection through implementation of priority programs of the 8th Health Sector Development Plan. The strategies and activities put in place as part of the HSR are expected to significantly improve access to basic health care services.

Health financing

Lao PDR is among the fastest growing economies in the East Asia and Pacific region and the World's 13th fastest growing economy. Lao PDR's reliance on external assistance is still one of the highest in Asia. Ensuring a sustainable debt burden will require gradual fiscal consolidation with a wider tax base and improved tax administration as well as improved efficiency of public spending and the reduction of off-budget projects, e.g. in the health sector. By 2020, the country aims to graduate from Least Developed Country status. Given the transition to lower middle-income status, there has been a gradual decline in the proportion of overseas development assistance (ODA).

Health financing indicators

Lao PDR is characterized by low but increasing levels of government spending, albeit from a very low and erratic base. While Lao PDR's share of government budget on health of total government budget has increased, it still has one of the lowest government spendings on health in the region. Public financing for health has increased substantially since 2012, from US$63 million to US$197 million, equaling approximately 1.7% of GDP[1]. The National Assembly endorsed a target of government general health expenditures at the level of 9% of the government's budget, above the present spending of 7.2% (in 2017). Out-of-pocket (OOP) health expenditures are still one of the main sources of financing the health system, representing almost 43% of total health expenditures in 2017. The Government is committed to implementing Universal Health Coverage, with OOP to be replaced by a tax-based national health insurance scheme that was rolled out since 2016. This scheme is currently covering about 74% of the population and aims at covering the whole country during the period of this plan.

Immunization financing

The tax-based National Health Insurance scheme was launched at the end of 2016, including all schemes targeting the informal sector. The services funded by national health insurance include some maternal and child health and family planning services. As the scheme was set up to primarily reduce OOP expenditures, it does not (yet) include immunization services or other vertical program services such as HIV/AIDS and tuberculosis, which continue to be funded through central government mechanisms. At a later stage, however, adjustments to the services covered and payment mechanisms are expected with a later inclusion of an immunization services package.

Gavi, the Vaccine Alliance, has been supporting the Lao PDR since 2002 under several types of support including cash support, support for eight vaccine introductions (including anticipated HPV and rotavirus vaccines in 2019), immunization services support and health system strengthening (HSS) grants, among others. The HSS grant implementation is targeted towards a broader MNCH intervention base with immunization service delivery intricately aligned. The Gavi transition team, in 2016, made various recommendations including the need to build resilient program management capacity in the MoH with closer links to the Department of Finance (DoF) and the introduction of improved financial management reporting and accounting systems.

[1] WHO and World Bank Fact Sheets, 2017

The National Immunization Program

Data summary

The National Immunization Program (NIP) is considered one of the most successful public health programs in the country. According to administrative reports, immunization coverage improved remarkably since 2005, with DTP3 coverage increasing from 49% in 2005 to 89% in 2015 and with the percent of districts achieving more than 80% DTP3 coverage being more than 79%. MCV1 coverage also rose from 50% in 2005 to 88% in 2015. However, in 2016, coverage showed a decline for the majority of antigens. Particularly, between 2015 and 2016, the coverage for MCV1 and RCV1 declined by 12% (from 88% to 76%), and for BCG, DPT1, DPT3, OPV3, HepB3 and Hib3 by up to 8%. In 2017, however, an upswing in coverage for MCV1 (82%) and Penta3 (85%) was again seen as well as in the proportion of districts with 80% DTP3 coverage (63%), but levels of 2015 have not again been reached. In May 2018, a NIP review was performed and its main findings are included in the following sections.

Governance and management

The NIP is a structural unit of the Department of Hygiene and Prevention of the Ministry of Health. It works jointly with the relevant departments of the MoH and the provincial and district health offices (PHO, DHO). The NIP is well-established with high political commitment by central and provincial governments and dedicated immunization staff at all levels. An Inter-agency Coordination Committee (ICC) exists since 1992. In addition, there are the National Certification Committee for polio (NCC), the National Verification Committee for measles/rubella (NVC) and the National AEFI Causality Committee.

Micro-planning is an important activity at the service delivery level. Although microplans are available in many health facilities, their adequacy and proper implementation appears sub-optimal. Supportive supervision across MNCH services is a critical factor for ensuring the delivery of quality immunization services and standard supervision tools and processes have been developed to improve accountability at all levels. The NIP is also implementing a tailored training curriculum based on modules of the WHO Immunization in Practice guidelines.

NITAG

The introduction of new vaccines into the national immunization schedule is based on decisions made by the National Immunization Technical Advisory Group (NITAG), created in 2013 and reconstituted in 2017. It comprises expertise from different departments of the Ministry of Health and is chaired and managed by independent public health experts. The group is charged with guiding health authorities and the NIP in the definition and implementation of national immunization policies and strategies.

National Immunization Law

A Law on Immunization was submitted to the Ministry of Justice in September 2017 as a comprehensive document encompassing all required aspects of immunization. This law provides the legal underpinnings for the institutionalization of major NIP functions as well as for sustained domestic financial support for the immunization program at all levels.

Human resources

The number of health workers has increased in recent years at national and subnational level and efforts are being made to improve planning through use of specific productivity tools. Equitable geographical distribution of the health staff is one of the major challenges faced by the NIP. A systematic supervision framework with standardized supervision forms and checklists has been developed for districts and provinces and an essential service package clarifying which services should be provided at which level supports HR planning processes. Additional training and capacity building activities will likely contribute to improvement of immunization services including vaccine and logistics management and microplanning and mitigate effects of staff turnover.

Service delivery

Immunization service delivery in Lao PDR is part of an integrated service delivery package wherein both Immunization and Maternal, Neonatal and Child Health (MNCH) services are provided to the community in a single setting. These services are provided through a combination of fixed sites and outreach conducted by health centers and MCH clinics of major hospitals. More than 60% of children immunized are reached through outreach services, which still suffer from insufficient program support. At the same time, limited demand for health services is found in the non-Lao ethnic groups, in particular among the Hmong population. In spite of these shortcomings, progress has been made and fixed site delivery functions well across the country with regular (usually 5 days/week) provision of routine immunization. Outreach is performed at least 4 times/year, albeit not always as planned. A World Bank and UNICEF-supported program covering 50 priority districts in 14 provinces supports integrated outreach services by utilizing a results-based framework with disbursement-linked indicators. At the same time, static health services are being enhanced with the aim of substantially reducing the overreliance on outreach services, aiming at 80% immunization service delivery via static clinics by 2025.

Equity

An estimated 12,000 children die in Lao PDR every year before reaching their fifth birthday. These deaths occur among poor and disadvantaged populations and are due to few preventable and treatable conditions. New social indicator survey data on child mortality point to continued discrepancies by socio-economic characteristics such as by wealth quintile, mother's education and rural and urban area. Immunization program performance also varies across provinces and districts, with lower coverage mainly seen in minority groups, in particular the non-Lao ethnic groups comprising about 25 to 30% of the population. There is also some difficulty in immunization delivery in certain urban areas, with a substantial migration to and from Thailand and fluctuating denominators. Immunization inequalities also point to supply side bottlenecks. Additional support is planned for increasing the quality of outreach services (see above) and for integration with other services as part of the broader health sector reform (HSR) strategy.

Epidemic-prone disease control

Lao PDR sustained its polio-free status since 2000. In October 2015, however, a cVDPV1 case was confirmed. In response, the NIP conducted supplementary polio vaccination activities, along with other vaccination campaigns to close immunity gaps. The cVDPV outbreak was declared ended in January 2017.

The reported routine measles vaccination coverage at national level increased from 40% in 2007 to 89% in 2015, but dropped to 82% by 2017. Nation-wide measles SIAs were conducted in 2007, 2011 and 2014. Lao PDR introduced a routine measles second dose into the national immunization schedule in late 2017. The NIP continues to conduct nationwide MR SIAs to achieve and sustain interruption of measles and rubella transmission. The next rounds are planned for 2019 and 2022.

Lao PDR has achieved MNT elimination status in 2014 by vaccinating pregnant women and women of child-bearing age with tetanus toxoid and tetanus adult diphtheria (TT/Td) vaccine administered in accordance with the 5-dose schedule recommended by WHO.

According to administrative data, in 2017, around 60% of newborns received a hepatitis B birth dose within 7 days of birth, while 85% of children were vaccinated with three doses of hepatitis B vaccine as part of the pentavalent vaccine. The within-24 hours dose of hepatitis B still remains a concern.

After initial widespread Japanese Encephalitis vaccination campaigns targeting children from 12 months through 14 years of age, transition into routine immunization was hampered by serious supply constraints in 2016 and 2017.

New vaccine introductions

In 2013, Lao PDR conducted an HPV vaccine demonstration project in two provinces using the 3-dose quadrivalent vaccine Gardasil™, targeting all girls enrolled in grade 5 in school and 10 year-old girls not enrolled in school. The project was continued in 2014-2016, using a 2-dose schedule. The surveys performed showed that three-dose HPV vaccination coverage was between 94% and 97% in both provinces. Following a 2017 NITAG decision, the NIP will include HPV and rotavirus vaccines in the national immunization schedule in 2019. Rotavirus vaccine will be given to infants at the same time as the first and second dose of Pentavalent vaccine. The possibility of introducing a typhoid conjugate vaccine with Gavi support is being reviewed and the NIP is in the process of collating the necessary background data to allow for a NITAG discussion and evidence-based decision by 2019.

Vaccine management

The Food and Drug Department in the Ministry of Health in Lao PDR is responsible for the regulation of vaccines. All vaccines used in the NIP are WHO-prequalified and procured through UNICEF. Vaccine and cold chain logistics are managed by the NIP in collaboration with the Medical Procurement Supply Centre.

Several of the recommendations of the 2014 Effective Vaccine Management (EVM) assessment related to challenges with stock data recording and collection at national and sub-national levels. At NIP level, records must be brought and kept up to date and vaccine forecasts reviewed every 6 months and adjusted as necessary to minimize risk of stock-outs or wastage. A National Immunization Logistics Working Group was established with technical and management capacity to steer the implementation of the EVM improvement plan. A vaccine supplies stock management system is in place at the national level, and vaccine management tools are updated to include HPV and RV. Lao PDR has sufficient capacity for inclusion of present and future vaccines in the NIP schedule. In view of the need for further improvement and upgrade of the cold chain, the country will increase cold chain capacity through the Gavi Cold Chain Equipment Optimization Platform.

Information and data issues

The strengthening of the Health Information System and the improvement of quality and use of data is one of five pillars of the Lao HSR. In December 2017, a new web-based, open source District Health Information System 2 (DHIS2), was established and operationalized in all provinces. DHIS2 is to be used as the sole platform for collection of agreed NIP indicators as of 2019. In 2016 the NIP drafted a data quality improvement plan (DQIP) covering the timeframe 2016-2020 and including strengthening immunization coverage monitoring and the quality of data of the supply management system.

VPD surveillance and pharmacovigilance

An Early Warning and Response Network (EWARN), as an integrated disease surveillance system, was established in 2009 and includes systematic reporting of 17 priority diseases including VPDs. In addition, sentinel surveillance for Japanese encephalitis and rotavirus gastroenteritis has been established at selected hospitals. The overall quality of VPD surveillance has been variable. Lao PDR has introduced an Immunization and Surveillance Data Specialists project supported by WHO and US CDC with focus on capacity building for health and immunization information systems with frequent supportive supervision and mentoring at sub-national level. The MoH is working on establishing processes for the impact assessment of HPV vaccine use by means of a newly initiated HPV surveillance approach.

Legal provisions, regulations and guidelines required to define the regulatory framework of pharmacovigilance are in place and senior NIP staff were trained in pharmacovigilance. The National AEFI Expert Committee was re-established in 2017 with a strong mandate to improve the AEFI reporting system and performance. In spite of these advances, AEFI surveillance is still not robust. The NIP is operationalizing a customized AEFI database using Vaccine Adverse Events Information Management System software.

Demand generation, communications, advocacy

The recognition of the NIP amongst policy planners and decision makers as one of the successful public health programs can be ascertained from the involvement of the office of President and of the Prime Minister in advocacy events of various immunization programs. Still, disparities in immunization performance at the subnational level highlight the need for additional engagement. The NIP works to overcome challenges with insufficient demand of vaccination services in rural communities, especially

those of ethnic minorities. An equity and bottleneck analysis to identify key barriers leading to vaccine hesitancy resulted in the recognition of several factors thwarting full immunization coverage. To address these factors, the NIP works to update the communication strategy and materials for mobilizing underserved communities, strengthen communication demand for vaccination services by engaging with leaders, local authorities and local civil society organizations, implements communication and awareness campaigns and trains service providers in communication, social mobilization and awareness raising.

cMYP 2019-2023

The updated cMYP for Immunization of Lao PDR 2019-2023 is based on the overall concept of improving immunization service delivery and coverage with an underlying agenda of achieving long-term sustainability of immunization services with increased government ownership. The strategic objectives of cMYP Lao PDR 2019-2023 are aligned with the objectives of the Regional Framework for Implementation of the Global Vaccine Action Plan in the WHO Western Pacific Region and the existing country HSR.

The cMYP is part of the broader RMNCH Strategy of Lao PDR 2016-2025, which includes a set of key activities in the areas of policies, strategies and guidance; management, monitoring and supervision; training; service delivery; and communication and demand generation. Strategic Objective 6 of the RMNCH Strategy refers to immunization with the objective of protecting all children under 5 years from vaccine preventable diseases and the specific objective of 95% of one-year old children fully immunized and 90% of pregnant women vaccinated for TT2 by 2025.

In line with the RMNCH strategy, the primary targets to be achieved in the immunization area during the cMYP period 2019-2023 are the following: 1) 95% coverage of all antigens in the NIP, with 90% of children fully immunized. 2) 80% fixed site delivery of immunization, with outreach delivery reduced to 20%. 3) Vaccine cold chain functioning allowing uninterrupted supply at all levels. 4) A self-sustained fully domestically financed NIP.

The plan of activities for the period 2019 – 2023 covers the following main areas (see table 11 and annex for detailed activities): Program governance and management; Human resources; NIP service delivery for routine and SIAs; New and underutilized vaccine implementation; Vaccine management, cold chain and logistics; Information, data recording and reporting; Surveillance, outbreak response and AEFI monitoring; Demand generation, communications and advocacy; and operational research.

Routine immunization activities as well as those related to epidemic-prone disease control (e.g. Polio, MR, JE, MNTE) are listed conjointly under the relevant categories.

cMYP financing

The immunization program in Lao PDR is still heavily dependent on external funding for the operational costs to deliver vaccines, while the government contribution towards procurement of vaccines has been growing steadily. External funding is still substantial, but shrinking, and includes funds from Gavi,

UNICEF, WHO, US CDC, the World Bank Group, and others. Lao PDR is in the Gavi accelerated transition phase and the last year of Gavi support is predicted to be 2021. With HPV and Rotavirus vaccines introduced in 2019, Gavi support for these vaccines will extend to 2022. The Government's ability to replace Gavi support after 2022 is open to many economic variables. There is, however, a firm commitment as outlined in the Gavi transition plan and endorsed by the Minister of Health.
Government stewardship is needed to lead the program transition plans and coordination across stakeholders in view of the reduction of external funding. A possible reliance on OOP expenditure for financing routine immunization and other priority public health services during the transition and post-transition periods will need to be reduced.

cMYP costing summary

Overall immunization expenditures in 2017 according to the cMYP costing tool calculations reached almost US$ 22M. Some 9% of the total health expenditures (or 16% of the government health expenditure) was spent on routine immunization in 2017. Shared health system costs (US$ 2.8 million) accounted for 13% of the immunization expenditures in 2017. The major part of these costs was incurred for routine immunization specific activities (78%) and SIAs (9% of total expenditures for immunization in 2017). The cost of a fully (DTP3) immunized child reached 113 US$ in the baseline year, a relatively high cost driven by the combined OPV/MR SIAs conducted in this year.

A total of 3.7 million US$ (or 60% of total expenditures on vaccines and injection supplies) were spent on traditional vaccines, approximately 0.9 million US$ (14% of these expenditures) was spent on underused vaccines and nearly 1.4 million US$ (or 24% of these expenditures) on new vaccines in 2017. The total expenditures on vaccines and injection supplies amounting to 6.1 million US$ constituted 32% of total program costs in this year. Other routine recurrent costs amounted to 3.7 million US$ with program management seen as the main cost driver accounting for 15% (or 2.9 million US$) of total program costs, followed by short-term trainings accounting for 4% of these costs. 2. % (or 0.5 million US$) of total program costs were spent on building overheads and 2.5% (0.47 million US$) on cold-chain maintenance. IEC/Social Mobilization consumed only 2% (or 368,080 US$) of total program costs.

The Government of Lao PDR was the major source of financing of the NIP in the baseline year. The government funding of 9.4 million US$ accounted for 49% of all funds if shared health system costs are excluded and 57% (12.8 million US$) if shared health system costs are included. Gavi was the second major source of funding accounting for a combined 29% share of financing if shared health system costs are accounted for.

With shared health system costs excluded, the annual resource requirements for the NIP vary between US$14 and US$23 million over the course of the cMYP period (2019-2023). The total financing (secured and probable) for 2019-2023 is estimated at 72.8 million US$ (including shared health system costs) or 57.2 million US$ (excluding shared health system costs). The secured funding is sufficient to cover about two thirds (67%) of the total resource requirements in 2019-2023 (excluding shared health system costs). The funding gap taking into account only secured financing ranges between 18% and 45% across

the cMYP period with an overall funding gap of almost 34 million US$. If probable funds are secured, the available financing will be sufficient to cover 71% of the total resource requirements for 2019-2023 and the funding gap range will be between 18% and 39% during the projection years with a total funding gap of about 30 million US$.

cMYP sustainability strategies

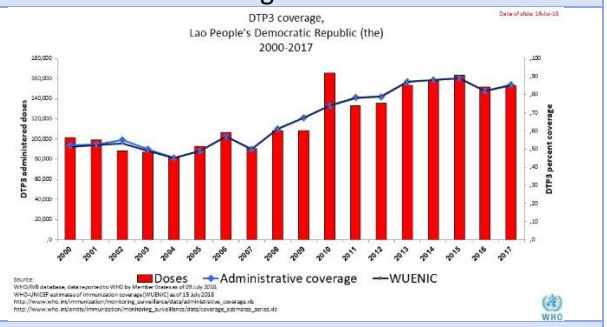
Strategies to ensure financial and programmatic sustainability of the NIP during the cMYP period 2019—2023 period could include some of the following activities: 1) Increasing the reliability of financing from domestic sources. This includes advocacy with the MoH for the timely release of funds for critical components of NIP such as vaccine procurement, cold-chain rehabilitation, disease surveillance and program management. 2) Securing probable funds, through additional advocacy and fundraising activities related to the implementation of the national MR follow-up campaigns. 3) Revising the present outreach service delivery strategy with a more rapid increase of static clinics to substantially reduce transport and staff costs for ongoing outreach services. 4) Optimizing immunization program activities with a further integration with other health service delivery components to allow sharing of costs of program activities. 5) Reaching consensus with key stakeholders on immunization coverage and wastage targets in order to optimize resource requirements for procurement of vaccines and immunization supplies, and 6) Completing the Health Financing Strategy (HFS) 2021-2025, by including the NIP with costing contributions building on this cMYP.

Lao PDR Immunization Situation analysis summary 2017

Immunization achievements 2016-2017

- **Successful control of cVDPV outbreak in 2016**
- **Successful mitigation of other VPD outbreaks (diphtheria, pertussis, measles)**
- **Significant reduction of measles cases**
- **Penta3 coverage increase after slight drop (in 2016)**
- **Successfully applied for Gavi support for the introduction of HPV and rotavirus vaccines (as of 2019)**
- **Immunization Law endorsed by the Parliament**

Immunization coverage



Immunization system

- **NITAG re-established and functioning Full integration of immunization data into DHIS2 as of 2019**
- **Additional cold chain equipment installed**
- **Gavi CCEOP application submitted**
- **More than 60% of children immunization through outreach services**
- **Emerging vaccine acceptance issues in ethnic populations**

Health system constraints

- Limited access to ethnic and remote populations
- Transition from Gavi support within the next 5 years
- Gavi Transition Plan approved by the MoH outlining path to full self-financing the NIP
- Human resources maldistributed and often with limited technical capacity
-

VPD incidence

Indicators	2017
AFP (Polio)	0
Measles	3
Rubella	10
Neonatal Tetanus	17
Pertussis	111
Diphtheria	10

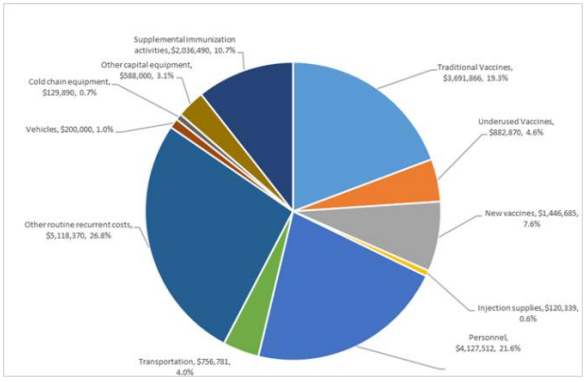
Disease control

- VPD surveillance with variable quality
- NT elimination maintained
- Rotavirus surveillance to be expanded to additional provincial sentinel hospitals
- Intussusception surveillance initiated as part of a multi-country system

Baseline costing profile

Baseline Indicators	2017
Total immunization specific expenditure	$19,098,802
Supplemental immunization/campaigns	$2,036,490
Routine immunization only	$17,062,312
RI costs per capita	$2.55
RI costs per DTP3 child	$113
% vaccines and supplies	36.0%
% government funding	52.4%
% total health expenditure	8.5%
% government health expenditure	16.41%
% GDP	0.1%
% shared health systems cost	12.6%
Total/incl. shared health system costs	**$21,857,680**

Baseline costing profile (2017)



Lao PDR Immunization Plan Summary 2019 - 2023

National immunization priorities

- **Maintain polio free status**
- **Eliminate measles and rubella**
- **Maintain elimination status of MNT**
- **Improve coverage of routine vaccines with special emphasis to equity (geographic, ethnic)**
- **Strengthen community demand for immunization**
- **Strengthen and maintain cold chain and logistics**
- **Introduce new vaccines based on evidence**
- **Accelerate control of Japanese Encephalitis**
- **Accelerate Hepatitis B control**

Immunization priority objectives 2019-2023

- 95% coverage of all antigens in the NIP
- 90% of children fully immunized
- 80% fixed site delivery of immunization
- Outreach reduced to 20%
- Vaccine cold chain functioning well with uninterrupted supply at all levels
- NIP self-sustained and fully domestically financed

NIP Monitoring

Indicators	2017	2023 target
DTP3 (Penta3) coverage	85%	95%
% districts with DTP3 > 80%	63%	90%
OPV3 coverage	85%	95%
MCV1 coverage	82%	95%
Non Polio APF rate	5 /100,000	
Immunization law	Passed Parliament	Law enacted

Priority NIP strategies

- Improve governance and program management
- Enhance human resource capacity
- Improve NIP service delivery for routine and SIA
- Introduce HPV and rotavirus vaccines
- Strengthen vaccine management, cold chain and logistics
- Improve information, data issues and reporting
- Strengthen VPD surveillance and outbreak response and AEFI monitoring
- Enhance demand generation, communications and advocacy
- Perform operational research

Partnership and sustainability strategy

- **ICC functioning well and overseeing all immunization activities**
- **Good collaboration with Gavi and other partners on facilitating transitions**
- **Immunization law will secure sustained domestic financing of NIP**

Health and development impacts

- Improve child survival through contribution to ensuring health lives (SDG3)
- Reduce disability associated with VPDs
- Contribute to poverty reduction (SDG1) and budget savings through reduction of preventable hospitalization and OOP expenses due to VPDs

Costing and financing projections 2019-2023 (US$)

	2019	2020	2021	2022	2023
Total resources required (excluding shared health system costs)	US$ 26,362,847	US$ 20,175,517	US$ 18,021,637	US$ 18,203,150	US$ 17,488,198
Cost per capita (RI only)	US$ 3.49	US$ 2.69	US$ 2.54	US$ 2.33	US$ 2.39
Total secure financing	US$ 18,117,109	US$ 12,608,986	US$ 10,566,137	US$ 5,746,383	US$ 4,226,922
Funding gap	US$ 8,245,739	US$ 7,566,530	US$ 7,455,501	US$ 12,456,767	US$ 13,261,276
Total probable financing	US$ 1,045,836	US$ 1,826,968	US$ 1,556,128	US$ 6,799,705	US$ 6,270,113
Funding gap	US$ 7,199,902	US$ 5,739,563	US$ 5,899,373	US$ 5,657,062	US$ 6,991,163

List of Abbreviations

AEFI	Adverse Event Following Immunization
CHAI	Clinton Health Access Initiative
cMYP	Comprehensive Multi-Year Plan for Immunization
CRS	Congenital Rubella Syndrome
cVDPV	Circulating Vaccine Derived Polio Virus
DCDC	Department of Communicable Disease Control
DHC	Department of Health Care
DP	Development Partners
DPC	Department of Planning and Coordination
DHHP	Department of Hygiene and Health Promotion
EPI	Expanded Program on Immunization
EVM	Effective Vaccine Management
GAVI	Global Alliance for Vaccinates and Immunization
GoL	Government of Lao PDR
HDI	Human Development Index
HR	Human Resources
HSR	Health Sector Reform
IEC	Information Education Communication
IPV	Inactivated Polio vaccine
ISS	Immunization Service Support
JICA	Japan International Cooperation Agency
JRF	Joint Reporting Form
KOFIH	Korea Foundation for International Healthcare
Lao PDR	Lao People's Democratic Republic
Lao TPHI	Lao Tropical and Public Health Institute
LRHS	Lao Reproductive Health Survey
LSIS	Lao Social Indicator Survey
LWU	Lao Women's Union
MCHC	Maternal and Child Health Center
MDG	Millennium Development Goals
MNCH	Maternal Neonatal and Child Health
MNTE	Maternal and Neonatal Tetanus Elimination
MOH	Ministry of Health
MOE	Ministry of Education

MOF	Ministry of Finance
MoPI	Ministry of National Planning and Investment
MPSC	Medical Product and Supply Center
NCLE	National Center for Laboratory and Epidemiology
NCMC	National Commission for Mothers and Children
NIP	National Immunization Program
NLEG	Non-Lao Ethnic Groups
REV	Reaching Each Village
SIA	Supplemental Immunization Activity
TPHI	Tropical and Public Health Institute
TWG	Technical Working Group
UHS	University of Health Sciences
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
VPD	Vaccine Preventable Disease
WB	World Bank
WHO	World Health Organization

Background and Country Context

The Lao People's Democratic Republic (Lao PDR) is a land-locked, ethnically diverse and mountainous country bordering China, Myanmar, Thailand, Cambodia and Vietnam. The geographic conditions restrict both the quantity and quality of agricultural land use and pose difficulties in the development of infrastructure, transport and communication links. This is further compounded by a highly dispersed population of 6.9 million (2018) covering an area of about 236,880 sq. km. Some 80 % of the land area of Lao PDR is hilly or mountainous including areas which are remote and difficult to access. Lowland areas accommodate about half the country's population (56%).

Administratively, the country is divided into 17 provinces and Vientiane Capital, with 148 districts and around 8,500 administrative villages or urban neighborhoods. Lao PDR is ranking at 139 out of 189 countries in the UNDP Human Development Index (HDI), with an HDI of 0.601, according to the 2018 UNDP Statistical Update.

TABLE 1: SELECTED DEMOGRAPHIC INDICATORS OF LAO PDR

Indicator		Source	Year
Total population (2018)	6.858 Million	World Development Indicators database	2018
Urban Population	34.4%	UNDP country profile	2017
Average annual population growth rate (2005- 2015)	1.45%	Lao Population and Housing Census	2015
Life expectancy at birth (years)	67.0	World Development Indicators database	2017
Total fertility rate	2.7	World Development Indicators database	2017
Percent of births attended by skilled attendants	41.5%	Lao MICS-DHS	2012
Human Development Index	0.601	UNDP county profile	2018

TABLE 2: SELECTED SOCIOECONOMIC INDICATORS OF LAO PDR

Indicator		Source	Year
Gross National Income per Capita	2,270 USD	World Development Indicators database	2017
Population below national poverty line	23.2%	WHO Health Information Intelligence Platform	2013
Households with access to safe water	47%	HH survey report, ADB	2013

Literacy rate among women	72.8%	UNESCO Institute for Statistics	2017
Literacy rate among men	87.1%	UNESCO Institute for Statistics	2017
Primary school enrolment ratio – both sexes	97.4%	UN in Lao PDR, Education Fact Sheet	2017
Population using improved drinking water source	76%	WHO Health Information Intelligence Platform	2015
Population using improved sanitation facilities	71%		2015

TABLE 3: INFANT, MATERNAL AND CHILD HEALTH INDICATORS OF LAO PDR 2017

Indicators			Source	Year
Crude Birth Rate	Per 1000 population	28	WHO Global Observatory on e-Health	2017
Infant Mortality Rate	per 1000 live births	49		
Maternal Mortality Ratio	per 100,000 live births	197	World Development Indicators database	2015
Under 5 Mortality Rate	per 1000 live births	63	UN Inter-agency group for Child Mortality Estimation	2017
Neonatal Mortality Rate	per 1000 live births	28	WHO Global Observatory on e-Health	2017
Stunting moderate and severe	Prevalence in children under 5 years of age	40%	Country Profile on Nutrition and Child Stunting Trends	2017

Lao PDR has made significant progress in decreasing both its infant and under-5 mortality rate in the past years. The under-five mortality rate decreased from 170/1000 live births in 1995[2] to 63/1000 in 2017[3]. However, this rate is still high compared to other South-East Asian countries. There is significant disparity in the under-5 mortality rate across provinces, wealth quintiles, and education levels. Results from the Lao Social Indicator Survey 2018 indicate that progress made in reducing the under-5 mortality rate in the lower education, lower income and geographically remote populations has been slower compared to other population sub-groups.

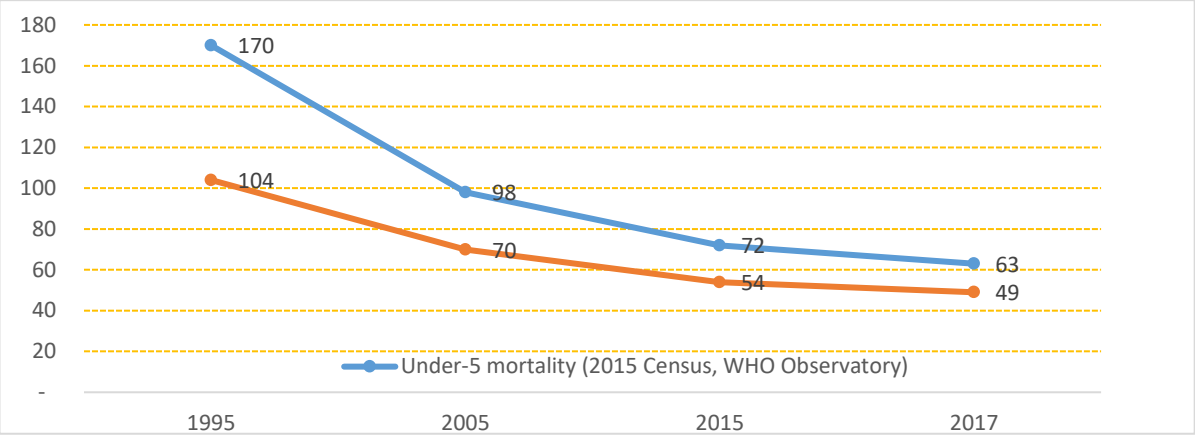
According to the UNDP country profile, the infant mortality rate decreased from 104/1000 live births in 2005 to 49 in 2018. At present, the proportion of births attended by skilled health personnel is 42%.

The decline in the infant and under-5 mortality rates in Lao PDR over the past years are shown below:

[2] 1995 census data

[3] UN Inter-agency group for Child Mortality Estimation, 2017

FIGURE 1: TRENDS IN INFANT AND UNDER-5 MORTALITY RATES, LAO PDR



Source: Lao Population and Housing Census 2015 and WHO Global Observatory

The government of Lao PDR has undertaken substantial reforms of the health system and is allocating increased public funds to priority public health interventions, including immunization, thus demonstrating its commitment to continued efforts to achieve the Sustainable Development Goals (SDGs).

Health Systems Structure

The health-care delivery system of Lao PDR is primarily a government-owned, public system that operates at three levels with health centers, district and provincial hospitals. The Lao PDR's public health structure is divided into i) health care; ii) prevention, promotion, and disease control; and iii) health management and administration.

The public health system is administratively organized as follows:[4]

- *Central level:* Ministry of Health Steering Committee and individual departments and units: Cabinet, Department of Hygiene and Prevention, Department of Finance, Department of Planning and Corporation, Department of Inspection, Department of Organization and Personnel, Department of Education and Research, Department of Health Care, Food and Drug Department, Department of Communicable Disease Control, National Health Insurance Bureau, and University of Health Science.
- *Provincial level:* Provincial Health Offices, regional hospitals, provincial hospitals and nursing schools.
- *District level:* District Health Offices, district hospitals, and health centers.

Under the Ministry of Health there are five central hospitals, three regional hospitals, 17 provincial hospitals, 135 district hospitals, around 1100 health centers and approximately 5,000 village drug dispensaries. There are approximately 5,000 hospital beds in the country. Each health center covers about 7,000 people on average, however, many health centers serve fewer than 1,000 population. Although there are no private hospitals in Lao PDR, the private outpatient health sector is expanding, mainly in the urban areas.

[4] MoH 2018

The total number of health personnel in Lao PDR is around 20,000, with 16% of health workers located at the central level, 34% at the provincial level, including the national capital province and 49% at the district and community level. Since 2014 great efforts have been made to improve primary health service delivery, especially for MNCH by increasing the number of staff working at the health center level, especially community midwives.

At present, there are approximately 200 medical specialists with post-graduate degrees, 1,800 medical doctors, 3,800 medical assistants and 5,600 nurses. On average, in 2017, there were 3.2 trained health personnel (excluding village health workers, traditional birth attendants and traditional practitioners) for 1,000 people. There is on average one doctor for every 2,800 people, and one nurse for every 970 people.

With only 43 percent of the health workforce having a mid-level or higher education, the actual density of health professionals (physicians, nurses, midwives) is 13 per 10,000 population. These numbers, however, do not account for staff working on a contractual basis for the provincial authorities or working as volunteers in anticipation of obtaining formal employment. In addition, there are a significant number of VHWs (village health volunteers, members of village health committees, traditional birth attendants, and traditional healers).[5]

Adequate utilization of the health care services still remains a major challenge due to a number of reasons: A large part of the population lives in rural, remote, and mountainous areas with lack of adequate access to basic health care services. Delivery of quality health care services varies considerably between provinces and districts. There is often inadequate communication between the community and the health system due to language barriers and sometimes weak ownership of the health programs by the communities. Health staff are unevenly distributed between rural and urban areas. Finally, staff management capacity, especially in the areas of planning, implementation, supervision and evaluation still needs improvement.

Health Sector Reform

In 2013, the National Assembly approved the National Health Sector Reform (HSR) Strategy for the period 2013-2025 aiming to achieve universal health coverage by 2025. This Health Sector Reform is led by the Government of Lao PDR and supported by pooled funding from development partners including WHO, JICA and UNICEF. The reform strategy aims to introduce a sector-wide systematic approach to achieving affordable, reliable and accessible health services to all.

The HSR Framework is the guiding document for the implementation of the strategy with five priorities and standardized community services including immunization. It provides a legal and action framework for the implementation at all levels. Work under the HSR is coordinated by the Department of Planning and Cooperation of the MOH.

The HSR strategic planning framework consists of three implementation phases.

[5] Lao PDR Health Financing System Assessment 2017

TABLE 4: OBJECTIVES OF THE HEALTH SECTOR REFORM STRATEGY

	2013-15 Objectives Milestones/Indicators	2016-2020 Objectives Milestones/Indicators	2021-25 Objectives Milestones/Indicators
Service delivery	• Basic integrated health service package covers most of interventions regarding MDGs developed and applied in the whole country. • 30% of health facilities adopting a set of quality assurance measures in the country.	• New national health plan is developed and reflects and supports the health system reform. • Upgraded health service package including major NCDs intervention being implemented in the whole country • 60% of health facilities adopting quality assurance measures in the country.	• Comprehensive service package to fit the health needs of all populations is developed and implemented. • Standardized service provision and quality assurance are conducted cross the country.
Health financing	• The government health expenditure from domestic sources reaches 9% of the total government expenditure and 2 - 2.5% of GDP. • Free facility-based delivery and free health services for under-five children. • 50% of the population covered by social health protection schemes, in which 70% of the poor are covered. • Out of pocket payments are reduced to <40% of total health expenditure.	• The government health expenditure from domestic sources reaches at least 3% of GDP. • 80% of the population is covered by social health protection schemes, in which all the poor are covered. • Out of pocket payments are reduced to 40% of total health expenditure.	• The government health expenditure from domestic sources is 3 - 4% of GDP. • 95% of the population is covered by social health protection schemes. • Out-of-pocket payments are reduced to 40% of total health expenditure.
Human resources for health	• Increased quota implemented to employ trained health workers for health centers and district hospitals. • Each health center has at least one mid-level midwife. • Final exit exam for health professional training introduced by 2015.	• All health centers have a proper health workforce according to the National Health Service coverage plan. • The proper amount of qualified health professionals is produced in the country (No. of graduates and % graduates passing exams).	• Most health facilities have a proper health workforce according to the National Health Service coverage plan. • Incentives and performance-based payment mechanisms are applied across the country.
Health information system	• Overall M&E framework and indicators are identified with proper data collection arrangement by 2013. • Baseline of HSR is developed, and MDGs indicators collected and reported properly. • A compulsory birth registration is introduced. • Over 80% of public health facilities are able to provide statistical reports timely and accurately.	• 90% of health facilities (public and private) can provide timely statistical reporting with appropriate quality. • Information is properly used at provincial and district levels. • An ICT system is developed for all public health facilities to support patient empowerment and improve service provision.	• Most health facilities apply a standardized electronic information system and exchange data with different sectors. • ICT systems are applied for empowering patients and better service provision.

Health Sector Reform impact on immunization service delivery

During Phase 1 (2013-2015), progress was made in maternal and child health outcomes, but large inequities still exist across provinces and subgroups. Phase 2 (2016-2020) focuses on ensuring quality essential services and financial protection through implementation of priority programs of the 8th Health Sector Development Plan.

The HSR strategy is critical to the improvement of immunization service delivery, given its intent to strengthen basic primary health care services with a focus on MCH services at the village and in the community and neighborhood, as well as at health center and district hospital levels. Immunization is part of an integrated service delivery package provided to the community in a single setting and including maternal and child health, immunization, antenatal care, perinatal care, growth monitoring, and family planning. With all of these services provided by the same health staff, workforce distribution and financial management have a significant bearing on the quality of immunization service delivery. The strategies and activities put in place as part of the health sector reform are expected to significantly improve access to basic health care services.

Health Financing

Macroeconomic context

Lao PDR figures as a lower-middle income country according to the WB classification with a GNI per capita of US$2,270 in 2017[6]. Important gains in poverty reduction over the past decade were achieved and preserved with poverty rates declining from 34% in 2003 to 23% in 2013[7].

Lao PDR is among the fastest growing economies in the East Asia and Pacific region and the World's 13th fastest growing economy with an average annual rate of 7% over the past years and similar projections into 2020. Growth is largely driven by natural resources while low productivity in agriculture and weak performance in manufacturing still limits income-generating opportunities for most Lao people. The fiscal deficit widened significantly in recent years and brought public debt to almost 70% of GDP[8]. The high debt level makes additional World Bank loans impossible until 2020, with concessional World Bank loans likely to be available thereafter. Revenues, as ratio to GDP, have declined to 18% in 2017 due to lower commodity and oil prices.

Lao PDR's reliance on external assistance is still one of the highest in Asia. Ensuring a sustainable debt burden requires gradual fiscal consolidation with a wider tax base and improved tax administration [9] as well as improved efficiency of public spending and the reduction of off-budget projects, of which there are many in the health sector. Overall, however, the capacity of the government to raise tax revenue is low with taxes contributing less than 13% to the GDP.

[6] World Development Indicators database 2018
[7] World Development Indicators database 2018
[8] World Bank Country Profile Lao PDR 2018
[9] World Bank (2017). Lao Economic Monitor: Challenges in promoting more inclusive growth and shared prosperity.

By 2020, the country aims to graduate from Least Developed Country status. Given the transition to lower middle-income status, there has been a gradual decline in the proportion of overseas development assistance (ODA). Since its peak in 1998 at 22% of GDP, net ODA (of around 400 million USD) is valued at less than 2.5% of GDP in 2017, with economic growth rendering Lao PDR ineligible for many types of external assistance.

To maintain macroeconomic growth and financial stability, fiscal space needs to be expanded by increasing government revenues while maintaining fiscal sustainability. Credit growth will need to be brought down to a healthier level with protection of international reserves. Priority investments in high impact health and education infrastructure and programs could be key boosters for sustainable growth of the Lao PDR economy and for the reduction of inequality and the attainment of the SDG targets.

Government spending on health

Lao PDR is characterized by low but increasing levels of government spending, albeit from a very low and erratic base. Spending for health has been among the lowest in the region. While Lao PDR's share of government budget on health of total government budget has increased, it still has one of the lowest government spendings on health in the region. External health expenditures as a share of total health expenditures have declined from 25% to 22% from 2011 to 2017, while social health protection expenditures as a share of total health expenditures stand at 5.4% in 2017.

Public financing for health has increased substantially since 2012, from US$63 million to US$197 million, equaling approximately 1.3% of GDP or 5.9% of total government expenditures[10]. The National Assembly endorsed a target of government general health expenditures at the level of 9% of the government's budget, above the present spending. Efforts are being made to significantly increase the government health budget and to mobilize domestic resources, including at subnational levels.

At the same time, much of the support to Lao's health sector from financial development partners will further decrease between 2019 and 2023. This includes transitioning from Gavi, the Global Fund for AIDS, TB and Malaria, Luxemburg Development Assistance, USAID and others.

Out-of-pocket (OOP) health expenditures are still one of the main sources of financing the health system, representing almost 43% of total health expenditures in 2017. In recent years, the Lao health system has attempted to scale back its reliance on OOP payments. The Government is committed to implementing Universal Health Coverage, with OOP to be replaced by a tax-based national health insurance scheme that was rolled out since 2016. This scheme is currently covering about 74% of the population[11] and aiming at covering the whole country during the period of this plan. It targets selected populations, such as the poor via health equity funds.

The government is committed to attaining Universal Health Coverage (UHC) by 2025, supported by the Asian Development Bank and the World Bank. The government put down US$21M for UHC in 2017, with pledges to increase this amount to US$30M in 2020. Even with this allocation, however, government expenditure on health will remain below the target of 9% of overall government spending. The general government health expenditure (GGHE) as a share of total government expenditure was 7.2% in 2017, down from 7.6% in 2016 and below the national target.[12] External health expenditures as a share of total

[10] WHO and World Bank Fact Sheets, 2017
[11] NHIB annual report 2017
[12] National Health Account Report, MoH Department of Finance, 2017

health expenditures have declined from 25.5% to 21.7% from 2011 to 2017, while social health protection expenditures as a share of total health expenditures stands at 5.4% in 2017.

Further prioritization of health in the government budget will be necessary. It will be essential to create the appropriate fiscal space for health, including immunization. Opportunities for more integrated approaches to health services in UHC context may emerge as Lao PDR explores possible funding through the essential health services package and national health insurance and other tax-based mechanisms. The World Bank's ongoing plans to strengthen MNCH and PHC outreach services also provide an opportunity to fund parts of the operational costs of immunization services.

Financial planning and management

The overall healthcare budget is planned at the ministerial level and funds are disbursed from the central level to district authorities via the provincial level. A number of constraints are experienced, including low operational budgets at the lower levels with delayed receipt of funds disbursements. Management of immunization and MCH programs is at times challenged by the variety of different funding flows. There are inefficient administrative mechanisms for the control of healthcare budgets by the sub-national authorities with weak capacity in financial management and with budget execution not regularly monitored.

The MoH and the NIP in particular have seen a significant increase in the allocated budget during the last years with a near doubling of the NIP budget since 2013. Funds channeled from external sources to the the MoH, however, are often not on the MoF budget, making the latter oblivious to e.g. co-financing requirements.

TABLE 5: HEALTH FINANCING INDICATORS, 2000-2017

Indicators	2000	2005	2010	2014	2015	2016	2017
Total Health Expenditure (THE) per Capita in US$	US$10.5	US$20.4	US$30.0	US$50	US$ 59	US$59	US$ 69
Total Health Expenditure (THE) % Gross Domestic Product (GDP)	3.4%	4.3%	2.7%	2.9%	3.0%	2.4%	2.8%
Annual real growth rate in Total Health Expenditure in previous 5 years	-4.3%	1.7%	-21.0%	0.3%	0.8%	1.2%	2.1%
GDP growth (annual %)	5.8%	7.1%	8.5%	7.6%	7.2%	7.0%	6.7%
General Government Health Expenditure (GGHE) as % of Total Health Expenditure	33.1%	17.0%	46.5%	49.5%	55.2	51.8%	65.8%
General Government Health Expenditure (GGHE) as % of Gross Domestic Product (GDP)	1.1%	0.7%	1.0%	1.4%	1.7%	1.3%	1.7%
General Government Health Expenditure (GGHE) as % of General Government Expenditure (GGE) incl. external funding and technical revenue	5.2%	4.1%	5.2%	5.3%	7.4%	7.6%	7.2%

Social Health Protections as % of General Government Health Expenditure (GGHE)	1.3%	6.9%	5.5%	3.3%	2.9	4.4%	5.4%
Private Health Expenditure (PvtHE) as % of Total Health Expenditure (THE)	66.9%	83.0%	53.5%	50.5%	44.8%	48.2%	44.8%
Out of Pocket Expenditure (OOPS) as % of Total Health Expenditure (THE)	61.4%	62.4%	41.8%	48.0%	42.3%	45.1%	42.9%
Out of Pocket Expenditure (OOPS) as % of Private Health Expenditure (PvtHE)	91.8%	75.2%	78.2%	78.8%	81.2%	93.5%	95.6%
External Resources on Health as % of Total Health Expenditure (THE) including donor and NGO funding	30.0%	16.7%	28.7%	18.2%	21.3%	20.8%	21.7%

Source: WHO and World Bank Fact Sheets, in Managing Transition: Health Financing System Assessment in Lao PDR, Dec 2017 and NHA Report 2011-17 / NHA Report 2014-17.

Immunization financing in the context of National Health Insurance

Since 2013, there have been large efforts to start harmonizing and merging the social health protection schemes, such as Free MNCH, Health Equity Funds and Community-Based Health Insurance. The tax-based National Health Insurance scheme was launched at the end of 2016, under the management of the MoH National Health Insurance Bureau, including all schemes targeting the informal sector. Discussions are ongoing on handing over the management of the health benefits of the formal sector schemes (State Authority Social Security and Social Security Organization to the National Health Insurance Bureau.

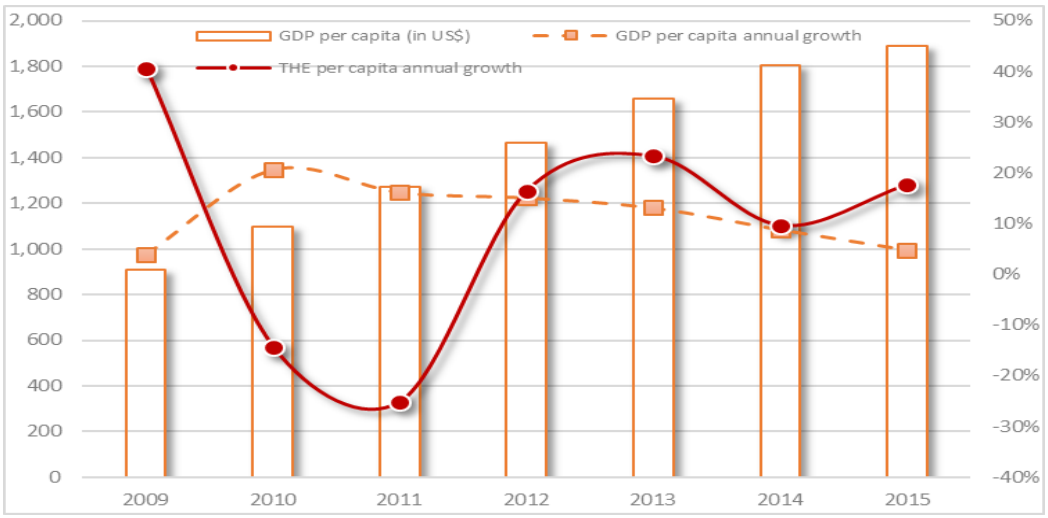
An essential health services package has been endorsed including 121 services across major disease programs and all facility levels as well as community outreach. This package will be partly funded through national health insurance payments for medicines and consumables for services provided at fixed sites. Other cost categories such as equipment, salaries and investment as well as outreach services are still covered through the MOH supply side budget. This may encourage mothers and children to continue visiting the fixed sites for their various services. However, financing streams will need to be coordinated to support more integrated outreach services, particularly for those in remote or hard-to-reach areas.

The services funded by national health insurance include some maternal and child health and family planning services. As the health insurance scheme was set up to primarily reduce OOP expenditures, it does not (yet) include immunization services or other vertical program services such as HIV/AIDS and tuberculosis, which continue to be funded through central government mechanisms. At a later stage, however, adjustments to the services covered and payment mechanisms are expected to be made with a later inclusion of a package of immunization services.

There has been greater collaboration across departments within the Ministry of Health, other Ministries, and development partners in supporting the health sector reform and moving towards more integrated domestic financing for priority public health programs. Through performance-based financing, such as the World Bank disbursement-linked indicators, integration of services across programs is attempted,

including between NIP and MCH. In addition, more evidence has been generated by the government and various partners to better inform decision-making, including in the areas of budgeting, costing of services, health expenditure tracking, financial protection, and service delivery assessment.

FIGURE 2: MACROECONOMIC TRENDS AND FINANCING DYNAMICS



Source: WHO Global Health Expenditure Database 2016

Gavi support

Gavi, the Vaccine Alliance, has been supporting the Lao PDR since 2002 under several types of support including cash support, support for eight new vaccine introductions (including HPV and rotavirus vaccines in 2019), immunization services support and health system strengthening (HSS) grants, among others. The currently implemented Gavi HSS grant 2016-2020 is based on the "Strategy and Planning Framework for the Integrated Package of Maternal Neonatal and Child Health Services" (MNCH Strategy). The HSS grant implementation is targeted towards a broader MNCH intervention base with immunization service delivery, and MNCH / antenatal care intricately aligned. Support is provided to improving primarily static, but also outreach service delivery for immunization in identified provinces and districts, while additional support relates to the overall improvement of the immunization system, including improvements in financial management with objective-based technical reporting in line with the Health Sector Reform. A reallocation of a significant portion of the Gavi HSS budget was undertaken in late 2018.

The Gavi transition team, in 2016, made various recommendations including the need to build resilient program management capacity in the MoH with closer links to the Department of Finance (DoF) in the MoH and the introduction of improved financial management reporting and accounting systems. While the Department of Planning and Cooperation (DPC) of the MoH is presently handling MoH donor finances, there is need for ensuring future funding flows through the Ministry of Finance with proper feedback reporting to donors and funders.

Lao PDR National Immunization Program

History of the National Immunization Program

In 1979, the National Immunization Program (NIP) was launched with the introduction of six vaccines (BCG, Diphtheria, Tetanus, Pertussis, Polio and Measles). In 1993 implementation of immunization was accelerated through a government decree, which led to the successful certification of Lao PDR as 'polio free' in 2000 (with the last polio case detected in 1996). In 2015, however, an outbreak of circulating vaccine derived poliovirus Type 1 (cVDPV1) affected 3 provinces and 7 districts. Genotyping data of the VDPV indicated that the virus had been in circulation for nearly 3 years. Intensive vaccination campaigns, starting in October 2015 and continuing through to January 2017 were conducted in response, with a total of 8 national immunization days (NIDs) and 2 sub-national immunization days (SNIDs).

Gavi has assisted Lao PDR with support for immunization services, injection safety and for the introduction of several vaccines such as tetravalent (DTP-HepB) vaccine in 2004, followed by Hepatitis B monovalent vaccine in 2006, DTP-HepB-Hib vaccine in 2009, MR vaccine in 2011, and pneumococcal conjugate vaccine (PCV-13) in 2013. With the roll-out of DTP-HepB vaccines, improved injection safety measures (utilization of auto-disable syringes and safe disposal practices) were also introduced.

In October 2015, the NIP introduced the inactivated polio vaccine (IPV) within the framework of the Global Polio Eradication Endgame Strategy. The NIP also implemented the national plan for switching from trivalent oral polio vaccine (tOPV) to bivalent oral polio vaccine (bOPV) in April 2016.

Japanese Encephalitis (JE) vaccines were introduced in the whole country in 2015 with a wide-age campaign in the central and southern regions. A similar wide-age JE campaign had been conducted in 2013 in the Northern Region of the country. In 2016 and 2017, however, due to supply constraints, JE vaccination was almost completely interrupted.

In 2014, a Measles Rubella (MR) campaign in under 10-year old children was implemented. In October 2017, the NIP introduced the measles vaccine second dose. To address low vaccination rates in identified high risk and hard-to-reach areas, regular routine immunization and periodic intensified routine immunization (PIRI) approaches were implemented. National MR supplementary immunization activities (SIAs) are planned for the years 2019, 2022, and 2025.

Human Papilloma Virus (HPV) vaccine demonstration projects in Vientiane Capital and Vientiane province were initiated in 2013. In the third quarter of 2019, with the beginning of the academic school year, HPV vaccine will be introduced targeting all primary school grade 5 girls. Introduction will be accompanied by a multi-age cohort vaccination of all 10-14 year-old girls in secondary schools in 2019 as well as vaccination of all 10-14 year-old out-of-school girls.

At the same time, in 2019, rotavirus vaccine in a two-dose schedule will be introduced as part of the routine infant immunization schedule and administered together with the first and second Pentavalent vaccine doses.

A Post-Introduction Evaluation (PIE) was conducted for Pentavalent vaccine in 2011 and for the HPV demonstration project in 2014.

The more complex vaccination schedule has brought about programmatic challenges and additional logistics issues, including services provided to more diversified and older target populations, and the

evolution of potential vaccine acceptance issues in specific population groups. The latter mainly arose from the fact that multiple injections need to be administered during the same immunization visit in situations when outreach visits were only performed once per quarter (4 times/year). In such situations, not all health workers provided JE and PCV vaccines at all times due to concerns about acceptance of multiple injections. In response, the NIP is developing simple, easy to use job-aids and is performing expanded health worker re-training covering the entire vaccination schedule.

NIP data summary

The national immunization program is considered one of the most successful public health programs in the country. According to administrative reports, immunization coverage improved remarkably since 2005, with DTP3 coverage increasing from 49% in 2005 to 89% in 2015 with the percent of districts achieving more than 80% DTP3 coverage being more than 79%. MCV1 coverage also rose from 50% in 2005 to 88% in 2015. However, in 2016, coverage showed a decline for the majority of antigens. Particularly, between 2015 and 2016, the coverage for MCV1 and RCV1 declined by 12% (from 88% to 76%), and for BCG, DPT1, DPT3, OPV3, HepB3 and Hib3 by up to 8%. In 2017, however, an upswing in coverage for MCV1 (82%) and Penta3 (85%) was seen as well as in the proportion of districts with 80% DTP3 coverage (63%), but coverage levels of 2015 have not yet again been reached.

Table 6: NIP data summary

	2013	2014	2015	2016	2017
Demographic and Health Data *(Source: Estimated data from 2004 and 2015 census and WHO Global Observatory)*					
Total population	6,494,557	6,576,397	6,883,967	6,758,353	6,858,160
Estimated birth cohort	164,925	163,455	162,586	161,676	160,698
Under five mortality rate (per 1000 live births)	70.9	68.5	66.1	63.9	63.0
Immunization Coverage *(Source: NIP and coverage survey 2015)*					
Administrative coverage Penta3	87 %	88 %	89 %	82 %	85 %
Administrative coverage MCV1	82 %	87 %	88 %	76 %	82 %
Drop-out rate (Penta1-Penta3)	3 %	6 %	4 %	3 %	4 %
Coverage survey Penta3 and MCV1	-	81.4 %	-	-	-
Vaccine Preventable Diseases Cases *(Source: NCLE and WHO Joint Reporting Form)*					
Number of diphtheria (+ve vs. total suspected)	6 / 31	0 / 1	70 / 579	3 / 14	0 / 10
Number of pertussis (+ve vs. total suspected)	10 / 60	0 / 24	0 / 117	9 / 613	1 / 164
Number of suspected measles/rubella cases reported	573	547	631	512	495
VPD Surveillance Standards *(Source: NCLE)*					
Non-Polio AFP rate (AFP cases/100,000 for <15 years)	2	1.2	2.6	6.3	5
Percent (%) of AFP cases with adequate stool specimens	65 %	63 %	63 %	74 %	76 %
Percent (%) of suspect measles with adequate	49 %	74 %	79 %	49 %	86 %

laboratory specimens					
Number of laboratory-confirmed measles cases	23	77	13	2	2
Immunization Equity *(Source: NIP)*					
Percent (%) of districts with DPT3 > 80%	72 %	79 %	78 %	59 %	63 %
Percent (%) of districts with MCV1 coverage >=95%	17 %	19 %	32 %	9 %	20 %
Immunization Financing *(Source: Joint Reporting Form and WHO Immunization Financing Indicator Database)*					
Routine immunization (RI) total expenditure (USD)	4,000,000	9,244,561	18,254,640	24,754,374	10,844,151
RI government expenditure (USD)	250,000	4,473,785	6,747,667	10,321,484	3,505,159
% of RI funded by government	6 %	48 %	37 %	42 %	32%

NIP Review May 2018

In May 2018, an immunization program review was performed with the aim of determining the current status of the immunization program, to quantify achievements in vaccine preventable disease control, to explore ways of improving coverage and service delivery, and to address the challenges faced in meeting national, regional and global immunization goals and targets.

The review included all system immunization program components including financing and program management, human resources, vaccine supply, quality and logistics, service delivery and new vaccine introduction, immunization coverage and AEFI monitoring, disease surveillance and outbreak response and advocacy, communication and demand generation. It was conducted with the assistance of partners including WHO, UNICEF, US CDC, PATH, CHAI, Gavi, and the World Bank Group and covered all administrative levels of the immunization program: national, provincial, district and immunization units in health facilities.

Seven provinces were selected for the review based on criteria including socio-economic status, immunization performance and history of VPD outbreaks. In each province, the Provincial Health Office and vaccine store were visited as well as two District Health Offices (one urban; one rural); district vaccine stores; maternity wards (urban) of the provincial and district hospitals; and four health centers (two urban, two rural). At the national level, several departments and units of the MOH, MOF, Ministry of Education (MoE), the Maternal and Child Health Center (MCHC) and NIP were visited and interviews conducted with key partners and relevant stakeholders.

The review teams used a variety of methods to inform their findings, using standardized questionnaires to collect, assess and review information and data at each level.

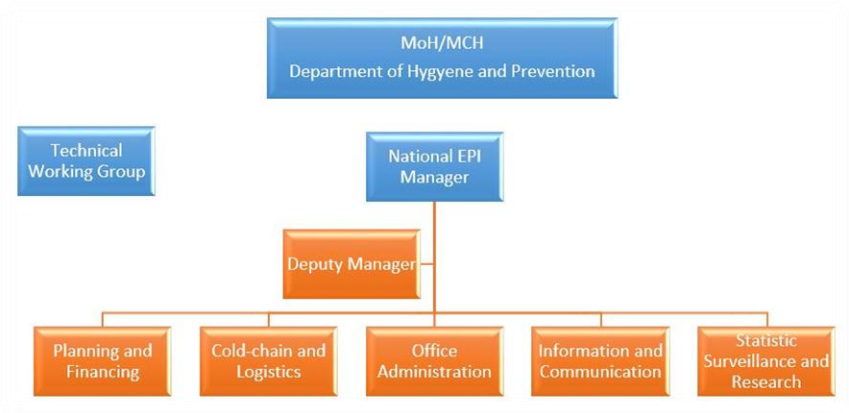
Main findings from this NIP review are included in the following sections.

NIP Governance and Management

The National Immunization Program (NIP) is a structural unit of the Department of Hygiene and Prevention of the Ministry of Health. The NIP is directly supervised by the Director of the Mother and Child Health Center (MCHC) and performs all operations under the management of the Director Hygiene

and Prevention and the Director of the Cabinet of the Ministry of Health. There are five different units (sections) of the NIP: Planning and financing, cold-chain and logistics, information and communication, statistics and office administration. Each unit is staffed with around 3-5 persons.

FIGURE 3: MANAGEMENT OF THE NATIONAL IMMUNIZATION PROGRAM



The Planning and Financing unit is the main unit to ensure the governance, implementation and coordination of immunization activities at the national level. The NIP works jointly with the relevant departments of the MoH and the provincial and district health authorities (PHO, DHO). The NIP is structurally and operationally affiliated with divisions and units at the central level in the MoH, such as Finance, Planning and Coordination (FPC), National Centre for Laboratory and Epidemiology (NCLE), as well as at the subnational level. It has established links with the Ministry of National Planning and Investment (MoPI), MoF and MoE.

The 2018 EPI review found that the NIP is well-established and has reached several of its goals including the introduction of a large number of new vaccines. A strength of the program is the high political commitment by central and provincial governments and the dedication of the immunization-related staff at all levels, especially in view of challenges often faced by health workers.

The earlier multi-year plan for immunization (cMYP) covers the period 2016-2020 and is aligned with the health sector reform and other relevant government policies. Annual immunization workplans (action plans) are developed, listing program activities and priorities in line with the cMYP. Following the EPI Review, the existing cMYP was revised, updated and extended to cover the period 2019-2023.

The immunization program planning process takes into account the Gavi transition plan elaborated in 2017 for the period including 2021. With the impending implementation of HPV and rotavirus vaccines and a possible future Typhoid conjugate vaccine introduction, timelines for Gavi support could well be extended. This being said, understanding of the transition plan and its process is still sub-optimal at subnational levels. There is also a need for placing the immunization transition plan in a broader health sector context together with several other transition plans, e.g. for HIV, Malaria, and TB programmes.

With regards to immunization policy and guidance, Lao PDR has issued a set of regulatory documents, guidelines and manuals on immunization. Besides the cMYP, a number of national plans impact immunization outcomes, including the Health Reform Strategy 2013-2025, the National Health Sector

Development Plan, the Maternal, Neonatal, and Child Health Strategy 2013-2025, the national strategy for integrated services RMNCH 2016-2025, the Integrated Health Communication Strategy, the EVM Improvement Plan, the Data Quality Improvement Plan and the National Regulatory Agency Institutional Development Plan.

An issue observed during the EPI review was the limited availability, understanding and use of policy documents and standard guidelines at sub-national and service delivery levels. There is insufficient translation into action of existing information (e.g. assessments/reviews) to inform priorities and approaches to improve the immunization program.

An Inter-agency Coordination Committee (ICC) exists since 1992, dedicated to coordinating support to the NIP. Other specific committees have been established to provide technical oversight for immunization, i.e. the re-established National Immunization Technical Advisory Group (NITAG). In addition, there are the National Certification Committee for polio (NCC), the National Verification Committee for measles/rubella (NVC) and the National AEFI Causality Committee. While these committees have defined roles and responsibilities, the TOR of the ICC are partially outdated and will be updated.

A Health Sector Working Group mechanism is established at the national level to provide oversight and coordination of support to the NIP across different partner organizations through information sharing, consultation and networking. The integration of immunization services with other mother and child health activities is ongoing in several provinces, with activities combined mainly at the peripheral level, but not yet well integrated at district or provincial levels.

The provincial immunization units' tasks include consolidation of budgets and activity plans developed by district program staff, and disbursement of funds received from the NIP. The unit is responsible for the overall management of vaccines and logistics in the province, as well as for monitoring and supervision of immunization program implementation at the district level.

Micro-planning is an important activity at the service delivery level. Although microplans are available in many health facilities, their adequacy to the field situation and their proper implementation appears sub-optimal. Micro-plans are not sufficiently used as monitoring tools to assess the extent to which immunization sessions have been conducted. The absence of a bottom-up consolidated planning process from health facilities to district and further to province health offices represents a challenge in ensuring the proper definition and implementation of immunization activities. Guidance is required on the process and use of evidence for planning, including the consolidation by district and province health offices.

Disparities in immunization performance at subnational level with DTP3 coverage in 37% of districts still below 80% in 2017 indicate the need for improved program management at all levels. The dearth of well-trained human resources to carry out NIP activities continues to be a challenge. To build the capacity of EPI Managers at the provincial and district level, WHO is supporting the NIP in implementing a tailored training curriculum. This curriculum is based on modules of the Immunization in Practice (IIP) guideline. From September 2018, two cohorts of EPI managers have attended a two-week intensive EPI

training program in Khon Kaen, Thailand. This training will be replicated in a phased approach at the subnational level in Lao PDR.

Since 2006, a National Commission for Mother and Child Health with provincial and district MCH Commissions is in place, comprising ministerial staff, Deputy Governors, senior health officers from the MoH, central hospitals, pediatricians and academicians. This commission provides support to immunization at sub-national levels through supervision and monitoring and the identification of local issues to be improved.

Supportive supervision across MNCH services is a critical factor for ensuring the delivery of quality immunization services. However, there quality of supervision is often sub-optimal with inadequate supervisory tools and processes, and incomplete implementation of supervisory visits. The NIP has therefore developed a standardized supervision tool to improve accountability at all levels. Plans for further training on supportive supervision for provincial and district NIP managers are in place through 2020, including a revision of the supervision tool and training for new EPI staff. Additionally, annual review meetings at central, provincial and district levels and EPI training programs are held including practical training for new district and health center staff.

National Immunization Technical Advisory Group (NITAG)

The introduction of new vaccines into the national immunization schedule is based on decisions made by the NITAG. The NITAG was created by the Ministerial Decree Ref. No. 907/MOH. Cab on 13 May 2013 and reconstituted in 2017. It comprises expertise from different departments of the Ministry of Health and is chaired and managed by independent experts in public health, epidemiology, infectious disease, vaccinology, health economics, and other disciplines. The NIP hosts the NITAG Secretariat, providing technical and administrative support, but none of the NIP staff are members of the NITAG.

The group is charged with guiding health authorities and the NIP on the definition and implementation of national immunization policies and strategies. The NITAG reviews in-country evidence of disease burden and assesses the feasibility of use of vaccines in line with the requirements set out by WHO, with emphasis placed on the contextualization of the international norms and standards to the country settings and on arriving at policy decisions best suited for the program. Development partners including WHO and UNICEF provide the technical assistance for assimilating global evidence and capacity building of designated NITAG members.

The NITAG has developed revised standard operating procedures, guidance on conflict of interest management and draft work plans. In July 2017, the NITAG recommended to NIP that they proceed with the introduction of HPV immunization with the quadrivalent vaccine (Gardasil™) and on including rotavirus vaccination with monovalent vaccine (Rotarix™) in the infant immunization schedule together with Penta1 and Penta2.

Interagency Coordinating Committee (ICC)

The Interagency Coordinating Committee (ICC) plays a decisive role in providing and coordinating support and overseeing the commitment to the NIP of different stakeholders (MoF, MoP, MoE) and partners. The ICC was established in 1992 to facilitate support and coordination of the NIP activities and

the resolution of programmatic and operational challenges. It brings together representatives of government departments responsible for implementing immunization and related public health activities and those who provide funding and technical assistance. The ICC discusses issues related to immunization coverage and disease surveillance, monitoring and supervision, vaccine use and supplies, data management, cold chain and program planning, human resources and education, financial planning and management, provincial issues and community partnerships.

Legislation for immunization

A Law on Immunization was submitted to the Ministry of Justice in September 2017 as a comprehensive document encompassing all required aspects of immunization. This law provides the legal underpinnings for the institutionalization of major NIP functions as well as for sustained domestic financial support for the immunization program at all levels. It also provides guidance on the necessary collaboration between ministries for enhancing immunization services.

Similar legislation was drafted with Laws on Disease Prevention and Health Promotion, on Management of Domestic Investment and on Promotion and Management of Foreign Investments. The National Immunization Law was endorsed by the National Assembly in 2018. This will enact immunization policies into law and clearly describe the implementation and relationships of the NIP with other sectors. The main advantage of having the National Immunization Law is the legal aspect for implementing the immunization program at all levels. The law has been finalized and approved by National Assembly on June 2018 and promulgated under the decree of President of Lao PDR, No. 211/PO dated 9 August 2018.

NIP Review recommendations on governance and management

- The MOH DPC should coordinate relevant health programmes to prioritize the development and monitoring of an integrated costed bottom-up microplan across NIP, MCH, Nutrition (including costs for integrated outreach, supervision, health communication, etc.).
- The NIP should define a standard list of immunization policy documents and guidelines, and ensure their availability, understanding and implementation at subnational level and service delivery sites.
- The MOH and key supporting partners should work to build awareness and harness action about the transition plans among key stakeholders, including Parliamentarians and Provincial Governors.
- The ICC should consider the revision of its terms of reference, aligned with other coordinating mechanisms within the health sector.
- The MCHC should evaluate and revise necessary supervision tools and processes to ensure high quality integrated supportive supervision (for NIP, MCH and nutrition).

Human Resources

The number of health workers has increased in recent years at national and subnational level and efforts are being made to improve planning through use of specific productivity tools. Most health facilities now have three to five staff including a person in charge of immunization, but not necessarily with appropriate immunization backgrounds or skills. NIP/MCHC staff, especially at lower level and health

facilities are highly motivated and are implementing activities even with limited funding. Most health facilities do not have specified job descriptions, but merely organigrams showing major responsibilities of staff, without clear descriptions of tasks and responsibilities.

Health worker training opportunities are limited. Additional training and capacity building opportunities are required focusing on areas such as immunization and vaccine-specific information, vaccine and logistics management, and microplanning.

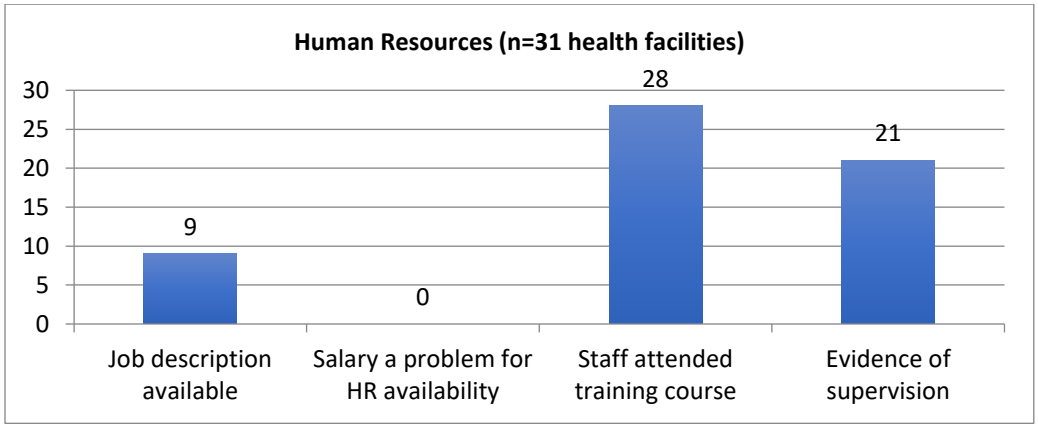
There is a lack of systematic and supportive supervision. In response, a systematic supervision framework with standardized supervision forms and checklists has been developed for districts and provinces, but is not regularly used, partly due to its complexity. A further revised simplified checklist will need to be developed as an integral part of improved human resources management.

In priority districts, health workers are often of different ethnic and cultural backgrounds when working with populations of ethnic communities. Lack of knowledge of ethnic languages and customs may severely limit their communications.

Better planning is needed to ensure the appropriate distribution and utilization of health workers, the matching of health workers' skills with the needs of health facilities and the re-allocation of staff. As part of the HSR, the Health Professionals Council has initiated a registration process for health workers and works towards assessing, certifying and updating skills of health professionals. This formal recognition and registration process is to match health workers' backgrounds to the needs of health facilities. An essential service package clarifying which services should be provided at which level supports these planning processes. It will also assist in developing improved job descriptions for health facilities. Better planning will also need to ensure retention of staff in remote areas, e.g. through financial incentives and similar approaches.

The curriculum of nurses and medical assistants often includes only basic information on immunization. Inclusion of specific immunization and surveillance modules into pre-service curricula is needed. While training opportunities have increased, ensuring that all staff are provided equal opportunities to participate in training and capacity building activities will likely contribute to improvement of immunization services and mitigate effects of staff turnover.

FIGURE 4: NIP REVIEW FINDINGS: HUMAN RESOURCES



NIP Review recommendations on human resources

- The MoH Department of Health Personnel (DHP) to continue implementation and alignment of workforce planning within the Health Sector Reform.
- The MoH DHP and DPC to align HR planning to support efficient implementation of the essential service packages.
- The MoH DHP and DPC to strengthen the development and utilization of terms of reference / job descriptions at the implementation level.
- The MoH DHP to improve and systematize in-service training including on-the-job training and rotation.
- The MoH DHP and DPC to strengthen provincial health workforce planning ensuring that NIP needs are reflected.

Immunization Service Delivery

The immunization service delivery in Lao PDR is part of the integrated service delivery package wherein both immunization and Maternal, Neonatal and Child Health (MNCH) including nutrition services are provided to the community in a single setting. Services are provided through a combination of fixed sites and outreach services conducted by health centers and MCH clinics of major hospitals. More than 60% of children immunized are reached through outreach services.

There is difficult access in forest and hill areas with scattered populations, leading to substantial access and coverage inequities, specifically in ethnic minority populations. Fixed site immunization sessions are to be provided on all working days or target populations in close vicinity (5 km) to the health facilities. Fixed site villages in a health facility catchment area are those villages surrounding the health center, district hospitals or provincial hospitals which are located within or beyond 10 km from the health facility but require only up to 30 mins to reach the health facility by any means of transport. Outreach villages are those villages which are located around 5-10 Km from the health facilities and require more than one hour to reach the health facility. Outreach sessions involve health workers going to the villages but returning back to the health center the same day, while mobile sessions involve overnight stays in remote places. Outreach services are to be provided once every three months with at least four annual rounds.

While there is an over-reliance on outreach as the main immunization delivery strategy, outreach still suffers from insufficient program support with staff needing to revert to the use of private funds and transport for performing these necessary activities. In addition, the regularity and effectiveness of outreach visits is affected by difficult road conditions and inaccessibility during the rainy season, limited transportation means and language barriers.

At the same time, limited demand for health services is found in the non-Lao ethnic groups, in particular among the Hmong population. Insufficient knowledge of local languages affects program performance. Inconsistent and delayed budget disbursement for outreach sessions, coupled with ad-hoc activities (e.g. polio and measles SIAs) often disrupts planned activities. There is limited monitoring, supervision and

mentoring from provincial and district health staff and lack of technical training, especially in remote areas.

In spite of these shortcomings, progress has been made and fixed site delivery functions well across the country with regular (usually 5 days/week) provision of routine immunization. Outreach is performed at least 4 times/year, albeit not always as planned. The practice of vaccine administration is appropriate and in line with safe injection standards. Immunization waste management is generally respecting recommended practices. In several, but not all, district hospitals, the delivery of hepatitis B birth-dose within 24 hours is being achieved. Strengthening of immunization through outreach may have contributed to increased immunization coverage; however, the cost of the outreach strategy and its impact of vaccine demand may indicate that in the mid-term this approach will not be sustainable and effective.

A World Bank and UNICEF-supported program covering 50 priority districts in 14 provinces supports integrated outreach services by utilizing a results-based framework with disbursement-linked indicators. This 'Healthy Village Program' includes MCH and nutrition services and preferentially targets less-well served provinces with a pro-equity approach. The promotion of integrated outreach services also attempts to mainstream immunization into the broader set of health services. A parallel structure with separate NIP outreach is, however, continuing, while the 'integrated' outreach covers other MCH services. Attempts are being made to truly integrate these services. Concerns are being voiced regarding outreach visits incentivized by additional per-diem payments, which may risk crowding out of some fixed-site services and consequently increase the overall operational costs of the program

The MoH / MCHC addresses some of these issues in a number of provinces and districts, including improved supportive supervision by all administrative levels and training on microplanning at the health center level. Other agencies also target specific regions or districts with additional objectives, such as JICA in the Southern provinces or the WB in the central provinces, while the national government supports the remaining districts. Additional funds have been made available in late 2018 and allocated to priority NIP interventions and activities in order to ensure that i) outreach services are provided at the discretion of the local health centers taking into account the geography and social factors essential for community access; ii) funds, transport, equipment, supplies and staff are available to provide the full integrated MCH service package during outreach; (iii) health facilities have clear guidelines and job aids to undertake micro-planning to provide quality integrated MNCH services both at fixed sites and during outreach.

The table below presents results of analysis of routine immunization of the baseline year (2017).

TABLE 4: ROUTINE IMMUNIZATION INDICATORS

Lao PDR 2017	Indicator
Immunization	Reported official estimates %: (WHO-UNICEF Joint Reporting Format)

coverage	DTP3 (Penta3)	85%
	MR (MCV1)	82%
	BCG	81%
	TT2+	38%
	HepB3	85%
	HepB birthdose (within and beyond 24 hours)	60%
	PCV3	83%
	OPV3	85%
	Household survey (2014): DTP3 coverage	83%
Immunization demand	Percentage drop-out DTP1 – DTP3	4%
	% of districts with DTP3 coverage >80%	82% (122/148)
	% of districts with DTP3 coverage <50%	5% (7/148)
	Number of high-risk communities identified for accelerated routine immunization programming	26
New vaccines introduction	Number of new vaccines introduced into the routine schedule in the last 5 years	4
	HPV coverage (First year demo project target group)	94 – 97%

Source: Routine Immunization Coverage by district, final report, 2017

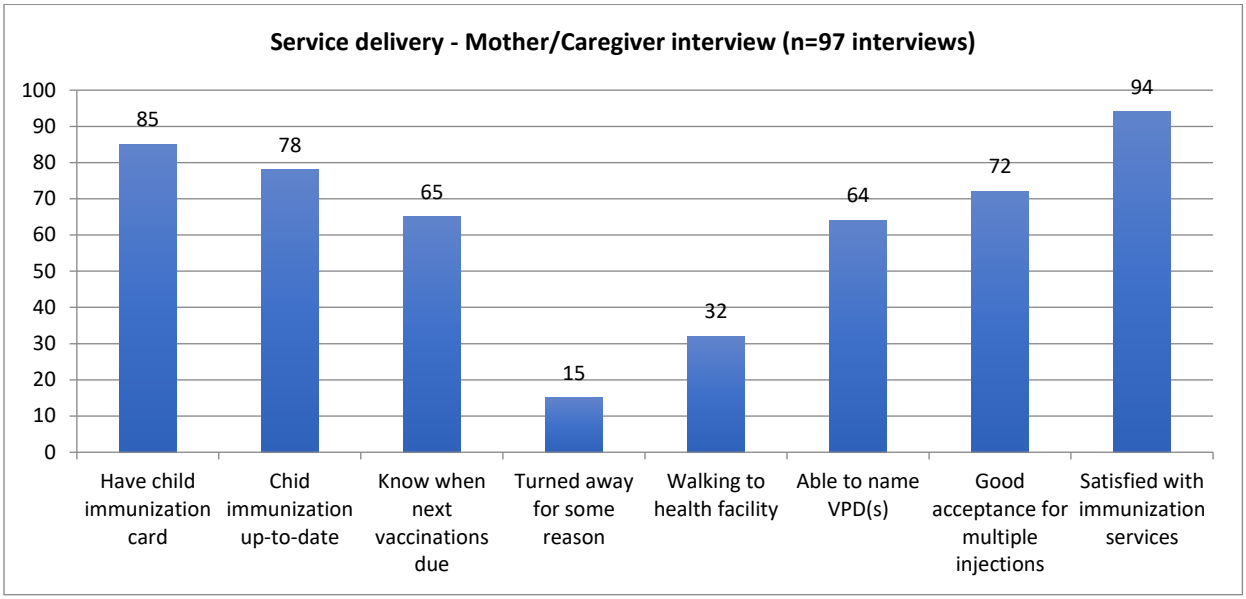
Different to these data, the LSIS-II of 2017 found that that 48% of children aged 12 to 23 months were reported to be fully immunized, i.e. received all vaccinations recommended in the national immunization schedule at any time before the survey. Vaccination coverage for all vaccines assessed in this survey was below the target of 90% with BCG coverage at 82%, Penta1 at 73%, Penta3 at 61%, PCV3 at 48%, OPV3 at 69% and measles first dose at 66%.[13]

The 2018 NIP Review identified the following additional achievements and challenges in the area of service delivery:

Quality of services: Interviews conducted with 97 caregivers showed that the vast majority of (94%) were satisfied with the immunization services provided. Child immunization records were available for 85% of the children seen at health facilities. Only 15% of children had been turned away for some reason in the past, while the immunization status of more than three quarters of children (78%) was up-to-date.

[13] Lao Social Indicator Survey II, 2017: Summary Survey Findings Report and Statistical Snapshots, June 2018

FIGURE 5: NIP REVIEW FINDINGS: SERVICE DELIVERY



Session Planning: There is no updated guidance for immunization delivery at the lower levels, e.g. in form of SOPs or updated practical guidelines. The number of sessions actually held in different facilities varies between 5 per week to only one per month. Outreach is being performed inconsistently across provinces and districts.

BCG and MR and BCG missed opportunities: The unsatisfactory BCG and MR vaccine coverage is likely related to issues related to vaccine management and the fact that BCG and MR vials are not opened at the delivery site if fewer than 3 to 5 children are present. In order to reduce vaccine wastage, an 'informal' practice has been established of instituting specific 'high wastage days' once per month, during which BCG and MR vaccines are offered only.

IEC to caregivers: Many caregivers still have limited knowledge of the benefits of vaccines and little understanding of vaccine contraindications. About one third of caregivers do not know when to return for subsequent vaccinations. There is an almost complete absence of health education or information provided to caregivers on immunization while at the same time, health education on HIV, TB and malaria is ongoing in many facilities, as these activities are funded separately through the Global Fund.

Integration: There is relatively good coordination across MCH functions at the health facility level, while this is still often insufficient at higher levels. At fixed sites, such integration is mostly straightforward, while it is more difficult to implement during outreach services, when such integration may result in relatively large teams and unsustainably high transport costs.

Multiple injections: More than two multiple injections during the same immunization session are usually not well accepted. Multiple injections occur mainly in outreach situations, with visits implemented only once per quarter and therefore with the need to provide more than two injectable vaccines to the same child at a given session. It appears as if caregivers may have fewer problems with this issue than health

workers, since 72% of mothers state good acceptance of multiple injections. However, IPV coverage could potentially be in danger due to this issue, since IPV injections are apparently not administered if two injections have already been given during the same session. The further continued implementation of JE vaccine will likely aggravate this situation.

Birth dose: The implementation of birth doses of BCG and hepatitis B vaccines within 24 hours in district hospitals is inconsistent. There are no clear SOPs regarding storage of these vaccines in either the ANC delivery room or the EPI cold chain.

NIP Review recommendations on service delivery

- Fixed site delivery should be promoted and outreach services gradually reduced.
- Health facilities should be guided in ensuring daily sessions at fixed sites with provision of MR and BCG as part of routine immunization; The policy of opening multidose vials for every child needs to be reinforced.
- Ensure the administration of childhood vaccines into the second year of life and beyond.
- Ensure that birth doses are given within 24 hours in hospitals and within 7 days outside of hospitals.
- The NIP should provide guidance on maintaining daily sessions at fixed sites and ensuring the provision of all routine vaccines including MR and BCG at every day of the working week.
- The NIP is to coordinate the development of updated guidance and appropriate materials to ensure the regular provision of IEC sessions on immunization at all levels.
- The NITAG should provide clear recommendations and guidance on the need to administer more than 2 injections during the same session in outreach situations.
- The MCHC should reinforce the cooperation between related health programmes with improved joint planning for the continued provision of integrated service delivery packages.

Equity

Between 2000 and 2017, Lao PDR recorded a significant decline in early childhood mortality rates. Some factors explaining this progress are continuous improvements in the socio-economic status and the increased utilization of essential health services, in particular immunization, as well as improvements in nutrition with early initiation and exclusive breastfeeding.

Still, however, the country is among the countries with highest child mortality levels in the South-East Asia and the national average conceals disparities in child mortality across socio-economic groups, by ethnicity, geography and educational level of mothers.

An estimated 12,000 children[14] die in Lao PDR every year before reaching their fifth birthday. These deaths occur among poor and disadvantaged populations and are due to few preventable and treatable conditions. Immunization program performance varies widely across provinces and districts, with lower coverage mainly seen in minority groups, in particular the Non-Lao Ethnic Groups comprising about 25 to 30% of the population (15% Hmong), with partly mobile communities. There is also an acknowledged

[14] UN Interagency Group for Child Mortality Estimation, 2017

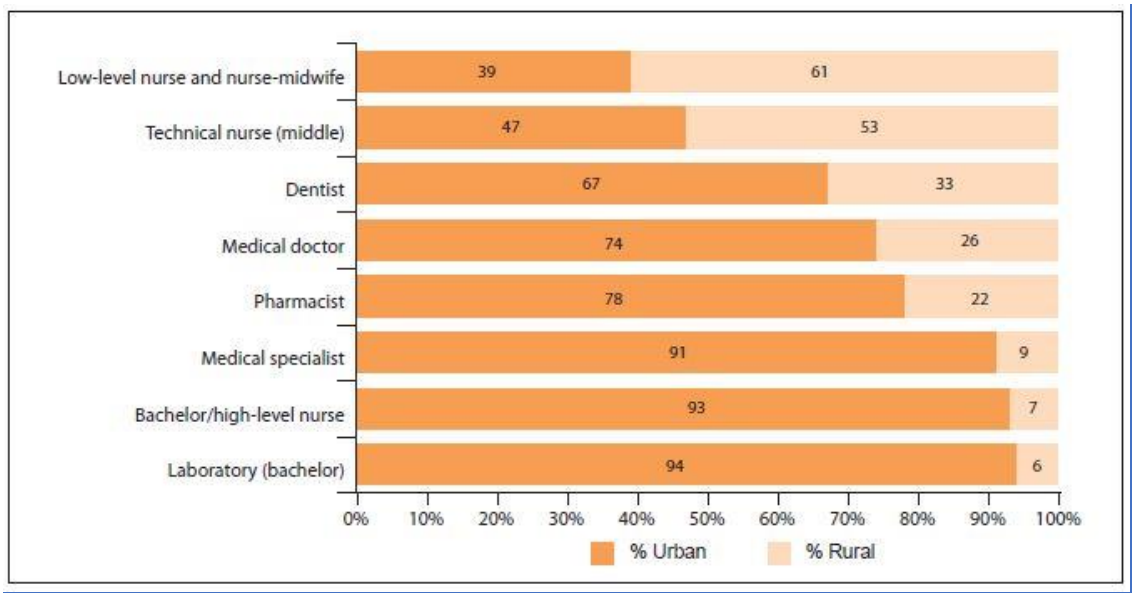
difficulty of immunization service delivery in certain urban areas, with a substantial migration to and from Thailand and fluctuating denominators.

Lao PDR has reported multiple pertussis outbreaks, primarily affecting the Hmong community. Differences exist in service delivery and utilization in these communities and highlight the need to strengthen routine immunization service delivery in high risk populations. [15] [16]

Equitable geographical distribution of the health staff is one of the major challenges faced by the NIP. As seen in **Error! Reference source not found.**, the majority of skilled workers are located in urban areas, while the rural areas have the largest share of low-level nurses and midwives. Only 26% of medical doctors are presently working in rural areas. Overall, the density of medical doctors, nurses, pharmacists and dentists found in rural areas is one-tenth of the density in urban areas. [17]

The HSR process has identified a number of challenges in equitable health care delivery, with geographic access remaining one of the major determinants. In addition, low capacity of service providers in mobilizing and educating communities on the benefits of immunization limit their ability to change attitudes of the specific populations and to increase the demand for immunization services.

FIGURE 6: GEOGRAPHICAL DISTRIBUTION OF HEALTH WORKERS



A literature review[18], supported by key informant interviews pointed out that the "bottlenecks to equity of service access" ranged from purely economic issues to psycho-social and faith-based barriers on both the demand and supply side of services. On the demand side, challenges included cultural distance, limited trust, fear of vaccination side-effects, limited knowledge about the benefits of immunization,

[15] UNICEF Lao PDR: Barriers to Immunization and Communication Channels in Lao PDR: A Review of Qualitative and Quantitative Data. January 2017

[16] Ministry of Health Lao PDR, WHO, UNICEF: Lao PDR Polio Communication Strategy and Action Plan 2015-2016. National Communication Task Force for Polio Vaccination & Routine Immunization.

[17] Lao PDR Health Financing System Assessment Dec 2017

[18] Social Inclusion: A fair chance for every child, 2017 (UNICEF)

being away from home for agricultural season, and not being informed or informed late of immunization activities. On the supply side, challenges were geographic access to health services, and insufficient micro-planning at the sub-district level to identify the hard-to-reach populations. Health workers were also found deficient of interpersonal communication skills, likely due to poor language skills and insufficient training in social mobilization.

The Lao Social Indicator Survey (LSIS)[19] was conducted in 2011-2012 and repeated in 2017, with summary data available from the more recent survey. In 2011, immunization coverage did not vary by children's sex, however, a wide degree of variation was observed across the country by province. Full vaccination coverage steadily increased with the mother's education. At that time, only 24% of children whose mothers had no education were fully vaccinated compared to 73% of children of higher educated mothers. Similarly, only 29% of children in the lowest wealth quintile were fully vaccinated in 2011, compared to 61% of children in the highest wealth quintile, even though vaccinations are provided free of charge. Children of Hmong-Mien headed households had the lowest vaccination coverage compared to children in other ethno-linguistic households; only 20% had received all vaccinations and as many as 35% had not received any vaccinations.

The 2017 LSISII Data are not yet available disaggregated by geographies. However, new data on child mortality point to continued discrepancies by socio-economic characteristics such as wealth quintile (63/1000 live births in the poorest vs. 23/1000 lb in the richest stratum) and mother's education (54/1000 lb in those without education vs. 10/1000 lb in those with higher education) and rural (53/1000 lb) and urban (24/1000 lb) area. Also care-seeking behavior for fever, symptoms of ARI and diarrhea show continued inequities with children from the rural, poorest quintile and mother with no education less likely to seek care for their children.[20]

Immunization inequalities also point to supply side bottlenecks. Additional support is planned for increasing the quality of outreach services (see above) and for integration with other services, such as family planning, antenatal and perinatal care, nutrition (deworming, Vitamin A), and growth monitoring as part of the broader health sector reform strategy. At the same time, static health services are being enhanced with the aim of substantially reducing the overreliance on outreach services, aiming at 80% immunization service delivery via static clinics by 2025.

Epidemic Prone Disease Control

Sustaining the polio-free status

Lao PDR sustained the polio-free status since 2000. In October 2015, however, a cVDPV1 case was confirmed. The genetic difference of the isolated virus to the vaccine virus suggested that the virus had been circulating in the community for at least three years. All subsequent cases were detected among

[19] Ministry of Health and Lao Statistical Bureau 2012: Lao Social Indicators Survey 2011-2012 (Multiple Indicator Cluster Survey / Demographic and Health Survey)

[20] Lao Social Indicator Survey II, Summary Survey Findings Report and Statistics Snapshots, June 2018

the Hmong ethnic population that have had historically low vaccination coverage rates not only for polio vaccine, but also for other vaccines.

In response and in addition to the routine vaccination sessions, the NIP conducted supplementary polio vaccination activities, along with other vaccination campaigns to close immunity gaps. The cVDPV outbreak was declared ended in January 2017. Reported national OPV-3 coverage in 2017 was 85%, slightly down from 88% in 2014.

A nationwide system of Acute Flaccid Paralysis (AFP) surveillance is in place with overall good performance, but varying subnational surveillance quality. Within the framework of the polio end-game strategy, the NIP introduced inactivated polio vaccine (IPV) in October 2015 followed by the implementation of the national switch from trivalent to bivalent oral polio vaccine in April 2016.

Measles and rubella elimination

The Government of Lao PDR is committed to eliminating measles in line with the resolution of the WHO Regional Committee for the Western Pacific of 2005. The country has made good progress in implementing measles elimination activities.

The reported routine measles vaccination coverage at national level increased from 40% in 2007 to 89% in 2015, but thereafter dropped to 82% by 2017. Nation-wide measles SIAs were conducted in 2007, 2011 and 2014 with a reported administrative coverage of 96%, 97% and 100% respectively.

Lao PDR introduced a routine measles second dose into the national immunization schedule in late 2017.

Surveillance of fever and rash improved in most of the provinces in the country, however, further efforts need to be made for establishing improved reporting systems for identified cases and timely testing of samples at the Central Public Health Laboratory.

Measles outbreaks happened between 2012 and 2016 mostly in children less than 5 years of age. All of these outbreaks show a preponderance amongst the Hmong ethnic population. In some provinces, nearly all of the cases had not received any dose of measles vaccine either during routine vaccination or in SIAs.

The NIP continues to conduct nationwide MR SIAs to achieve and sustain interruption of measles and rubella transmission. The next round is planned in 2019 and then again in 2022. During these SIAs, successful collaboration has been achieved between the NIP and the Department of Education including implementation of social mobilization plans at the community level using village health volunteers, village headmen/women and members of the Lao Womens' Union. School principals and teachers of kindergarten, pre-school and primary school in every province are involved in supporting health center staff during the implementation of the SIAs in schools. Lessons were derived from this approach for the upcoming introduction of HPV vaccine in schools.

Maternal and neonatal tetanus elimination

Lao PDR has achieved the MNT elimination status in 2014 by vaccinating pregnant women and women of child-bearing age (15-49 years) with tetanus toxoid and tetanus adult diphtheria (TT/Td) vaccine administered in accordance with the 5-dose schedule recommended by WHO. The approach includes provision of clean deliveries, i.e. deliveries in health facilities or by trained birth attendants, and hygienic postnatal cord care as well as improved surveillance. At the same time, protection against tetanus also hinges on increasing routine Penta3 coverage for children.

Since the mid-2000s, the provision of TT to pregnant women and child-bearing aged women steadily improved. The results of the recent LSISII[21] also show considerable progress in skilled attendance at birth. In 2017, 64% of women were assisted during the time of delivery by a health professional, a significant increase in comparison to the 2011 data[22] when only 38% of deliveries assisted by skilled birth attendants.

TABLE 8: SUMMARY DATA ON ACCELERATED DISEASE CONTROL INITIATIVES IN 2017[23]

	Indicator	2017
Polio	Routine OPV3 Coverage (administrative)	85%
	Non-Polio AFP rate per 100,000 children under 15 years of age	1.1
	Number of rounds of NID or SNID conducted/Coverage range	8 / 72-100%
	IPV1 coverage	77%
Maternal and Neonatal Tetanus	TT2+ coverage	37%
	% protection at birth[24]	66%
	Number of districts with neonatal tetanus reporting rate of > 1 per 1000 live births	0
	TT (Tetanus Toxoid) / Td (Tetanus adult diphtheria) SIA	No
	Neonatal deaths reported and investigated[1]	38%
Measles and rubella	Measles / MR vaccination coverage 1st dose	82%
	Measles / MR vaccination coverage 2nd dose (introduced in late 2017)	N/A
	Number of laboratory-confirmed measles/rubella outbreaks	0
	Total measles cases (Lab/clinical/epidemiological)	3
	Total rubella cases (Lab/clinical/epidemiological)	10

Hepatitis B vaccination

Hepatitis B virus infection during the perinatal period is the most important risk factor for developing chronic infections resulting in hepatocellular carcinoma and cirrhosis. The WHO Western Pacific Region endorsed a regional accelerated hepatitis B control goal in 2013, with the objective of reducing hepatitis B chronic infection prevalence to less than 1% among 5-year-old children.

According to administrative data,[25] in 2017, around 60% of newborns received a hepatitis B birth dose within 7 days of birth, while 85% of children were vaccinated with three doses of hepatitis B vaccine as

[21] Lao Social Indicator Survey II, 2017
[22] NT Mortality Survey, 2001
[23] WHO VPD Monitoring System 2017 Global Summary
[24] LSIS MISC-DHS - 2012

part of the pentavalent vaccine. The within-24 hours dose of hepatitis B still remains a concern. In order to improve the immediate provision of the vaccine after birth, the NIP undertook an initiative to use hepatitis B vaccine out of the cold chain and to improve information about newborn vaccination through involvement of village health volunteers.

Japanese Encephalitis control

After conducting wide-age Japanese Encephalitis campaigns in selected provinces in mid-2015, the NIP introduced the JE vaccine in the national immunization schedule, fully supported by domestic funds. After initial widespread campaigns targeting children from 12 months through 14 years of age, transition into routine immunization was hampered by serious supply constraints in 2016 and 2017, caused partially by ineffective ordering and the lack of a standardized distribution system. 2017 JE coverage was only 39%. Supply has been re-established in early 2018, leaving at least one full child cohort unvaccinated.

HPV vaccination demonstration project

Cervical cancer causes significant morbidity and mortality globally, and persistent infection with human papilloma virus (HPV) is responsible for most cases of cervical cancer. In 2013, Lao PDR received GAVI support for an HPV vaccine demonstration project, implemented in two provinces and using the 3-dose quadrivalent vaccine Gardasil™, targeting all girls enrolled in grade 5 in school and 10 year-old girls not enrolled in school. Lao PDR continued the demonstration project in 2014-2016, using a 2-dose schedule, as recommended by WHO. Following the first year of the HPV demonstration program, a post-introduction evaluation (PIE), a community-based vaccination coverage survey, and a costing evaluation were done. The PIE showed that health workers were trained, HPV vaccine was available, girls in grade 5 were vaccinated, and doses were recorded properly. However, out-of-school girls were not actively sought for HPV vaccination in many areas. The surveys performed showed that three-dose HPV vaccination coverage was between 94% and 97% in both provinces. Over two thirds of respondents reported having received information about the campaign with the majority receiving such information from school teachers. Overall, the Lao PDR HPV vaccine demonstration program was well accepted in schools, but limited information became available during the pilot project on out-of-school girls. In comparison with countries with a low population density, vaccine introduction costs in Lao PDR were lower and recurrent costs were in about the same range.

New Vaccine Introductions

Preparation and implementation of HPV and RV vaccine introduction

Following a 2017 NITAG decision, ICC endorsement and successful application process, the NIP will include HPV and rotavirus vaccines in the national immunization schedule in 2019 with Gavi support. HPV vaccine will be given to grade 5 girls in primary school and to all 10-14 year-old girls out of school. Rotavirus vaccine will be given to infants at the same time as the first and second dose of Pentavalent

[25] Unpublished data, 2018

vaccine. The aim of these vaccine introductions is the reduction of morbidity and mortality of cervical cancer and its precursor stages and of rotavirus gastroenteritis in young children.

HPV vaccine introduction

A strategic plan for comprehensive cervical cancer control in Lao PDR has been developed in 2011 and is in the process of being updated. This plan is in alignment with the Western Pacific Regional cancer control goals stipulating a region free of avoidable cancer burden, with reduced preventable and avoidable burden of morbidity, mortality and disability due to cancer.

Existing adolescent health approaches are being combined as part of an adolescent health initiative, supported by UNDP, WHO and UNICEF. This initiative (NOI) includes comprehensive sexual education approaches in Grade 5 of primary school and allows for the inclusion of messaging around cervical cancer, STIs (genital warts) and HPV vaccination in this age group. Further integration with sexual and reproductive health services (reduction of teenage pregnancies) could be foreseen with the further expansion of the NOI program.

Interrelated programs include hygiene education, anemia iron supplementation, deworming and oral health. Further interventions of an integrated program are planned, such as approaches to reduce STI, HIV, early marriage and teen pregnancies, trafficking and programs to increase family planning, as well as counselling of adolescents via a telephone hotline. Guidelines for these approaches are in development with a first evaluation planned in 2019. HPV vaccination will be included in these service offers.
The expected impact of the HPV vaccine (e.g., on disease incidence and mortality, and on equity related to gender, wealth and geography) will be evaluated. Cervical cancer ranks as the 3rd most important cause of female cancer in Lao PDR with more than 300 new cervical cancer cases per year and no appropriate treatment opportunities. Vaccination is expected to reduce the incidence of HPV infection rates in girls and transmission rates of the virus in the adolescent population. HPV will also reduce the incidence of early stage cancers (CIN1/CIN2 lesions) and of cervical cancer.

Rotavirus vaccine introduction

The main goal of the rotavirus vaccination program will be the reduction of severe gastroenteritis, hospitalization and death from rotavirus disease. Rotavirus vaccine will be delivered together with the other routine vaccines in the NIP. As RVV is an orally administered vaccine, the NIP anticipates that the vaccine will be widely accepted by health care workers and caregivers alike.

Accompanying measures of the rotavirus vaccine introduction will be implemented to enhance the awareness of and preparedness for AEFI detection and reporting, specifically related to the possible occurrence of intussusception. An existing intussusception surveillance network in Asian countries will be expanded to include Lao PDR, allowing the country to enhance monitoring of AEFI subsequent to introduction of the vaccine. Site investigators conduct active surveillance to prospectively identify cases of intussusception and obtain vaccination histories. Through a self-controlled case series approach identified intussusception cases can be linked with their vaccination status while neither external controls nor population level vaccination data is required for risk assessment.

In order to support the RVV introduction, integrated surveillance of diarrheal diseases in infants, and improvement of a routine disease surveillance system related to diarrheas in children under 5 years of age will be established. Reporting forms will be changed accordingly.

Lao PDR NIP adheres to the principles of the Global Action Plan for the Prevention and Control of Pneumonia and Diarrhea (GAPPD) which recommends that rotavirus vaccines should be part of a comprehensive and integrated strategy alongside other related interventions such as oral rehydration therapy, exclusive breastfeeding, zinc treatment, improvements in water, sanitation, and hygiene, as well as proper nutrition. Implementation of activities are ongoing through different programmes such as the integrated community case management for childhood illnesses.

Typhoid conjugate vaccine introduction decision

During the May 2018 ICC meeting, the possibility of the introduction of typhoid conjugate vaccine with Gavi support was discussed. The NIP is in the process of collating the necessary background data – including on typhoid burden of disease - to allow for a NITAG discussion and evidence-based decision by 2019.

Vaccine Management

Vaccine Regulation

The Food and Drug Department (FDD) within the Ministry of Health in Lao PDR is responsible for the regulation of vaccines, along with pharmaceuticals and other medical products. The FDD performs the regulatory oversight for pharmaceuticals and some vaccines within the constraints of the current system, where vaccines for use in the NIP are currently exempted from registration at the NRA.

An assessment of the NRA for Pharmaceutics and Vaccines conducted in 2015 identified regulatory gaps, and an Institutional Development Plan and implementation road-map were developed. The NRA basic functionality includes the ability to assess safety, efficacy and quality, register, monitor and regulate vaccines and biological products in both the public and private sector. Overall, however, the FDD is not fully functional yet. In 2017, the NRA was re-assessed using the Global Benchmarking Tool (GBT) to assess the nine function areas of the NRA in terms of progress made and identified gaps and the Institutional Development Plan has been revised accordingly.

Procurement and shipping

All vaccines used in the National Immunization Program (NIP) are WHO prequalified and procured through UNICEF. Licensing by the NRA (FDD) is not a requirement. Vaccines procured through UNICEF need a certificate of analysis, certificate of batch release, certificate of conformity and release notification. The MOH applies and obtains necessary clearance documents in advance for all approved vaccines. Potency testing of some vaccines is performed by the Institut Pasteur in Vientiane as needed.

Vaccine needs are forecasted, taking into account the size of the target population by year and the estimated number of doses and injection supplies required. In addition, vaccine technical and product specifications are prepared jointly between UNICEF and the NIP. The MoH disburses funds for vaccine procurement in regular installments. Use of the government budget to procure vaccines is subject to the

current public procurement rules and regulations. An exemption from the application of the public procurement rules has been granted by the MoF for vaccine procurement to be conducted through UNICEF Supply Division (SD) on an annual basis, based on a MoU signed between the MoH and UNICEF. Given the increased government funding required for both traditional and new vaccines, procurement rules will need to ensure that procurement through UN agencies such as UNICEF remains a preferred option.

Shipping and distribution, including customs regulations and respective requirements are presently handled by UNICEF. All vaccine shipments are consigned directly to the NIP and the Central Medical Stores Depot, which is responsible for clearing shipments using their appointed clearing agent.

Vaccine cold chain and logistics

Vaccine shipments are received by air at the national vaccine store in Vientiane. The supply interval varies from 3 to 4 months depending on the availability of vaccines.

Vaccines and cold chain logistics are managed by the NIP in collaboration with the Medical Procurement Supply Centre. Vaccines are sent by domestic flights or public transport to the two regional and 18 provincial vaccine stores. The supply interval varies from two to three months. From the regional and provincial vaccine stores, vaccines are collected or delivered by road to the 148 district vaccine stores. Central provinces are supplied directly from the central vaccine store (in its function as third regional store). The supply interval varies from one to two months. Health centers with functioning cold chain equipment receive or collect vaccines by car or motorbike.

An initial effective vaccine management (EVM) assessment in 2010 raised serious alarm with all nine attributes falling short of the accepted threshold of 80%. With continuous support from partners the NIP addressed the identified gaps. The EVM assessment was repeated in 2014. At that time key strengths were identified in temperature monitoring, storage capacity, building, equipment and transport, and distribution. The assessment again, however, identified gaps in performance of the immunization supply chain, particularly in the area of maintenance, stock management, information system and supportive functions.

While mean EVM scores had improved, improvements were not as significant as expected and performance in certain areas was still poor. The table below provides the comparison of the EVM assessment results in 2010 and 2014 for all four levels of vaccine distribution/storage.

FIGURE 6: EFFECTIVE VACCINE MANAGEMENT ASSESSMENTS, 2011 AND 2014

Year	Level	Vaccine arrival E1	Temperature monitoring E2	Storage capacity E3	Building, equipment, transport E4	Maintenance E5	Stock management E6	Distribution E7	Vaccine management E8	Information systems E9
2010	LAO_1PR	58%	47%	84%	78%	47%	44%	35%	32%	36%
	LAO_2SN	80%	53%	70%	48%	72%	49%	57%	65%	
	LAO_3LD	80%	65%	50%	48%	51%	48%	56%	68%	
	LAO_4SP	68%	58%	54%	37%	37%	56%	62%		
2014	LAO2_1PR	65%	55%	92%	81%	69%	48%	49%	80%	47%
	LAO2_2SN	83%	80%	81%	65%	73%	80%	81%	67%	
	LAO2_3LD	77%	79%	73%	56%	63%	82%	78%	50%	
	LAO2_4SP	76%	88%	81%	53%	44%	82%	76%	36%	
	PR: Primary Level; SN: Sub-National Level; LD: Lowest Distribution Level; SP: Service Point									

Key issues described in the EVM assessment of 2014 were as follows: There was little clarity on policies, guidelines and SOPs governing vaccine management and logistics, including maintenance and transportation. Logistics technical capacity and management functions at all levels were limited. Planning including distribution of vaccines and assessment of quantities needed was not done properly. An inventory of cold chain equipment was long overdue, procurement of equipment was ad-hoc and there were instances of using non-prequalified cold rooms and passive coolers. The central budget for procurement of logistics supplies did not adequately define cold chain equipment, maintenance of fridges, building safety standards, distribution of vaccines and supplies, or funds for supervision and transport maintenance. There was inadequate recording of information in stock books, and inadequate reporting and archiving of important records (stock books, vaccine wastage records, lot release certificates). Contingency planning was lacking at all levels.

A PIE following the HPV vaccine pilot project in 2014 pointed at issues to be resolved at the main cold room at the national level with temperature logs showing inappropriate temperatures for several days. For routine EPI vaccines, auto-disable syringes were not always supplied bundled with vaccines and in many places, there were inappropriate stock records. Vaccines with VVM in stage 3 and 4 and expired vaccines were found in some of the storage areas at the sub-national level.

FIGURE 7: KEY BOTTLENECKS IDENTIFIED POST EVMA

Distribution	Clarity on policies	Supportive supervison	LMIS	Maintenance
•No distribution plan for vaccines. •Distributution is ad-hoc •No standard means for distibution of vaccine and related supplies	•Lack of clear policies • No policy on cold chain performance •Need for quality SOP to enforce policies. •Capacity building: Quality training needed with carefully prepared training package •Limited induction and refresher training	•Poor or limited supervision •No checklists iin use •Limited training of HC staff by supervisors	• No LMIS for flow of information • Stock mgmt. insufficient due to poor information keeping and no sharing of practices	• Political and inter sectioral unclarity between NIP and MPSC and between province, districts and health centers • Sub optimal process to attend and repair faulty units. Prone to much larger impact in future with large fleet of refrigerators broken down and not repaired

Based on the results of the 2014 EVM assessment and of a bottleneck analysis, the NIP developed a comprehensive EVM Improvement Plan for 2016-2020, articulating actions and steps to improve performance of the immunization supply chain systems. This plan focused mainly on staff capacity building to enhance knowledge and skills on preventive maintenance of cold chain equipment, vaccine forecasting and stock management, procurement support services and distribution and monitoring of vaccines and commodities.

However, several of the recommendations in the 2014 EVM assessment related to challenges with existing systems for stock data recording and collection at national and sub-national levels are still valid today. There is the need to move towards an e-LMIS system for vaccines, cold chain and supplies. A regular physical stock check needs to be performed. At NIP central level, manual records must be brought and kept up to date and routine reporting improved to include a distribution summary each month. Finally, the vaccine forecast must be reviewed every 6 months and adjusted pending deliveries as necessary to minimize risk of stock-outs or wastage due to expiry of excess stock.

A National Immunization Logistics Working Group was established with technical and management capacity to steer the implementation of the improvement plan. This group prepares budget estimates to support IP activities. Major recommendations implemented since 2015 include the procurement of the cold chain equipment for national and sub-national levels, installation of 3 walk-in cold rooms at central level and the procurement of refrigerators for all 18 provinces. Two new regional cold chain and distribution facilities were created and another three cold chain hubs will be established to improve the distribution system. Cold chain maintenance services will be provided at the provincial level through the establishment of 5 provincial cold chain hubs, each with a mobile workshop, regularly serving the surrounding provinces and thus ensuring that cold chain equipment remains in proper use throughout.

A vaccine supplies stock management system (VSSM) is now in place at the national level, and vaccine management tools will be updated to include HPV and RV. Pilot initiatives supporting provincial level

stock inventory using SMS systems are being incorporated into the regular monitoring system. A system of monthly reviews of vaccine stocks at provincial and district levels, and of quarterly reviews of cold chain equipment status at all three levels, including triangulation of this information with reported coverage of VPDs is being implemented.

A recent analysis of cold chain capacity shows that the current central level cold chain functional capacity is 142m3 and two regional cold rooms 73m3; provincial level 11m3, district level 25m3 and at health facility level 44m3. In addition, 8.4 m3 refrigerators were brought into the country in 2017 which brings the total capacity of the cold chain at all levels to 303m3[26]. At present, all 9 vaccines in the NIP require an annual estimated volume of 8m3. The introduction of HPV vaccine and RVV will increase vaccine volume by 1.5m3 in the next 5 years.

Lao PDR therefore has sufficient capacity for inclusion of present and future vaccines in the NIP schedule. The government has significantly increased the cold chain capacity at the central level. However, much of the capacity is from non-WHO Performance, Quality and Safety (PQS) approved devices or equipment older than 10 years. After subtracting the capacity from non-PQS or > 10 years old equipment, Lao PDR will potentially face a shortage at provincial and district level. Moreover, about 5 m3 storage capacity at district and health facility levels are run by kerosene fueled refrigerators; these will need replacement in the near future with solar direct drive (SDD) equipment. Lao PDR will therefore need to make incremental investments in CCE. Additional 179 refrigerators, compressors and other spare parts have been ordered in 2017.

In view of the need for further improvement and upgrade of the cold chain, Lao PDR has applied in October 2018 for Gavi funds to increase cold chain capacity through the Cold Chain Equipment Optimization Platform (CCEOP). In preparation of this application, the cold chain inventory was updated. Based on this inventory another 186 refrigerators will need replacement as a first priority with 157 additional refrigerators added in the expansion and another 75 in an extension phase in 2019. For 2020 804 refrigerators are to undergo rehabilitation[27]. The total planned budget for the CCEOP amounts to US$2.5M.

Vaccine wastage

High vaccine wastage remains a major concern of the immunization system. Average vaccine wastage rates are estimated to be 80% for BCG, 50% for Polio, 60% for Measles, 40% for DTP-HepB, and 35% for TT. Wastage rates will likely remain high due to the scattered population with high reliance on outreach service provision and limited cold chain capacity at health facility level.

Waste management

The Lao PDR waste management plan follows the national guidelines and the Basic Environmental Health Standards in Health Care Facilities. The plan requires that safety boxes are supplied and used by health care workers to dispose used syringes and needles and store them in a safe location. The filled safety boxes are then collected for incineration at higher administrative levels, where incinerators are

[26] UNICEF cold chain analysis, 2017

[27] Lao PDR Cold chain inventory 2018, July update

available. Immunization safety is a regular topic of training for health staff and vaccinators including universal precautions in practicing safe disposal of used syringes and needles.
n the past 10 years, additional incinerators were installed to support the proper disposal of medical and injection waste of curative and preventive services. Further incinerators are being procured as part of the Gavi HSS support.

NIP Review findings

In 2017, stock reports from sub-national health facilities have highlighted that every regional distribution hub (i.e. provincial vaccine store) experienced at least one vaccine falling below minimum stock each month in 2017. Similar gaps have been identified at the district level, but existing systems for stock data recording and collection at the lower levels of the health system are weak. Stock reports from the lower levels can take more than 10 weeks to reach the central level, rendering them of limited utility for responding to stock challenges rapidly, and making it difficult to evaluate to what extent lack of vaccines stock contributes to gaps in immunization performance across immunization units.

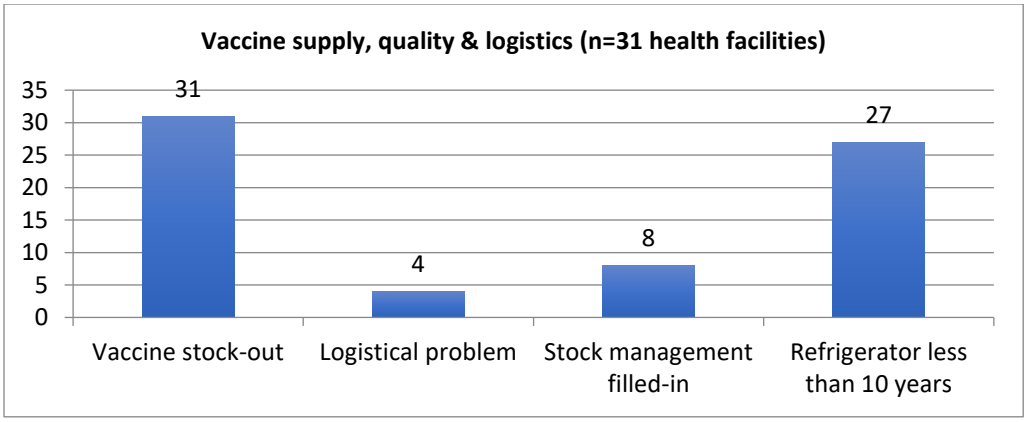
Shortages, stock-outs and oversupplies were observed: Some vaccine stock-outs (e.g. of JE, IPV, BCG, HepB, MR vaccines) were seen in every health facility visited. In some health facilities expired vaccines (Td and BCG, reconstituted MR vaccines) were found. Over-supply of other vaccines was witnessed at the same time, leading to risks of expiration.

Vaccine and cold chain management practices vary quite a lot. Most concerning is a persistent lack of planning for cold chain maintenance, cold chain inventory tracking system and emergencies. There is variance in the quality and use of batch cards and there are knowledge gaps of staff in vaccine management, cold chain maintenance and repair, reporting and quality of data for evidence-based decision making.

On the other hand, there is good progress at national and sub-national level. At national level, the central vaccine storage now meets good quality standards and uses good vaccine management practices. Improvements have also been made on cold chain infrastructure at the provincial level. In some health facilities/districts/provinces, good practices were observed, including: Vaccines are kept well inside plastic boxes to reduce risk of freezing; most equipment is younger than 10 years; for those older, replacement plans exist; stock management tools (stock cards) were properly completed; full-time staff responsible for cold chain and supply chain is available at each level in some provinces.

Some further challenges related to cold chain management were seen. In particular, equipment was missing (such as fridge tags) and old or broken (refrigerators and freezers) found at the province, district and health facility level without a contingency or replacement plan or SOPs for what to do when equipment is broken.

FIGURE 8: NIP REVIEW: COLD CHAIN AND LOGISTICS



NIP Review recommendations on vaccine management

- The NIP to prioritize the implementation of critical components of 2015 EVM improvement plan, in line with national MOH supply chain reforms, including:
    - Standardize distribution, including stock transportation of vaccines from regional distribution hubs to the lower health system levels;
    - Implement a vaccine management information system, aligned with the national supply chain policy;
    - Improve good storage infrastructure and practice, including short term replacement of broken fridge tags and thermometers.
- The NIP to develop a reporting and monitoring system to track the implementation of the 2015 EVM improvement plan quarterly, including to:
    - Identify individuals and define responsibilities;
    - Define a system for reporting and tracking progress.
- The MOH and NIP to prepare for transition by identifying skills and activities currently supported by external partners to be transitioned to the NIP (i.e. vaccine forecast and procurement).

Information, Data Recording and Reporting

Immunization Coverage

According to the routine administrative reports, DTP3 coverage increased from 49% in 2005 to 89% in 2015 with 79% of districts achieving more than 80% DTP3 coverage. MCV1 coverage also rose from 50% in 2005 to 88% in 2015. However, in 2016, coverage data showed a substantial decline for the majority of antigens for the first time in many years. Particularly, between 2015 and 2016, the coverage for MCV1 and RCV1 dropped by 12% (from 88% to 76%), and for BCG, DPT1, DPT3, Pol3, HepB3 and Hib3 between 5 and 8%.[28] Sub-national data for 2017 show that, for BCG, 11 out of 18 provinces reported immunization coverage levels below the national average of 81%; and, similarly, for Penta3, 10 provinces' immunization coverage was below the reported national coverage of 85%. In 2017, however,

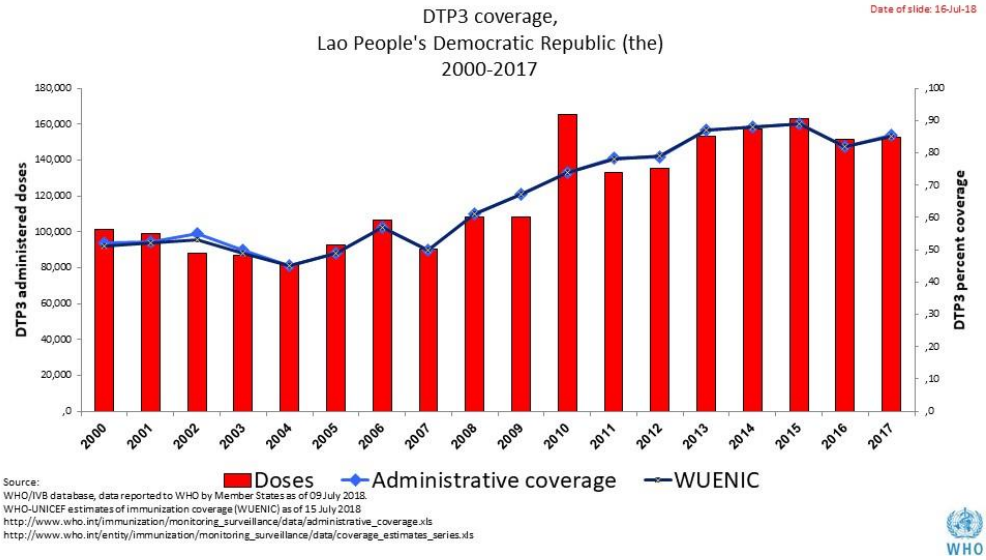
[28] Lao PDR WUENIC estimates 2016

administrative data point again to an encouraging trend with Penta3 coverage at 85% and MCV1 coverage at 82%, albeit still lower than in 2015.

Possible reasons for the intermediate drop in coverage were the to the 2015 cVDPV outbreaks necessitating intensive polio vaccination campaigns through to January 2017. These SIAs likely reduced the availability of staff for outreach services. In addition, even though routine vaccinations may have been provided during SIAs, doses may not have been properly recorded. Several additional VPD outbreaks had been observed in recent years including outbreaks of diphtheria, pertussis and measles, putting into question the validity of some of the reported administrative coverage data.

The NIP denominator target was so far based on projections from the previous census of 2005, while the data from the 2015 census have not been officially introduced into the NIP, although these data are being used in specific instances. The new census provides evidence of a reduced population size with resulting consequences for future coverage levels.

FIGURE 9: DTP3 COVERAGE, LAO PDR 2000-2017



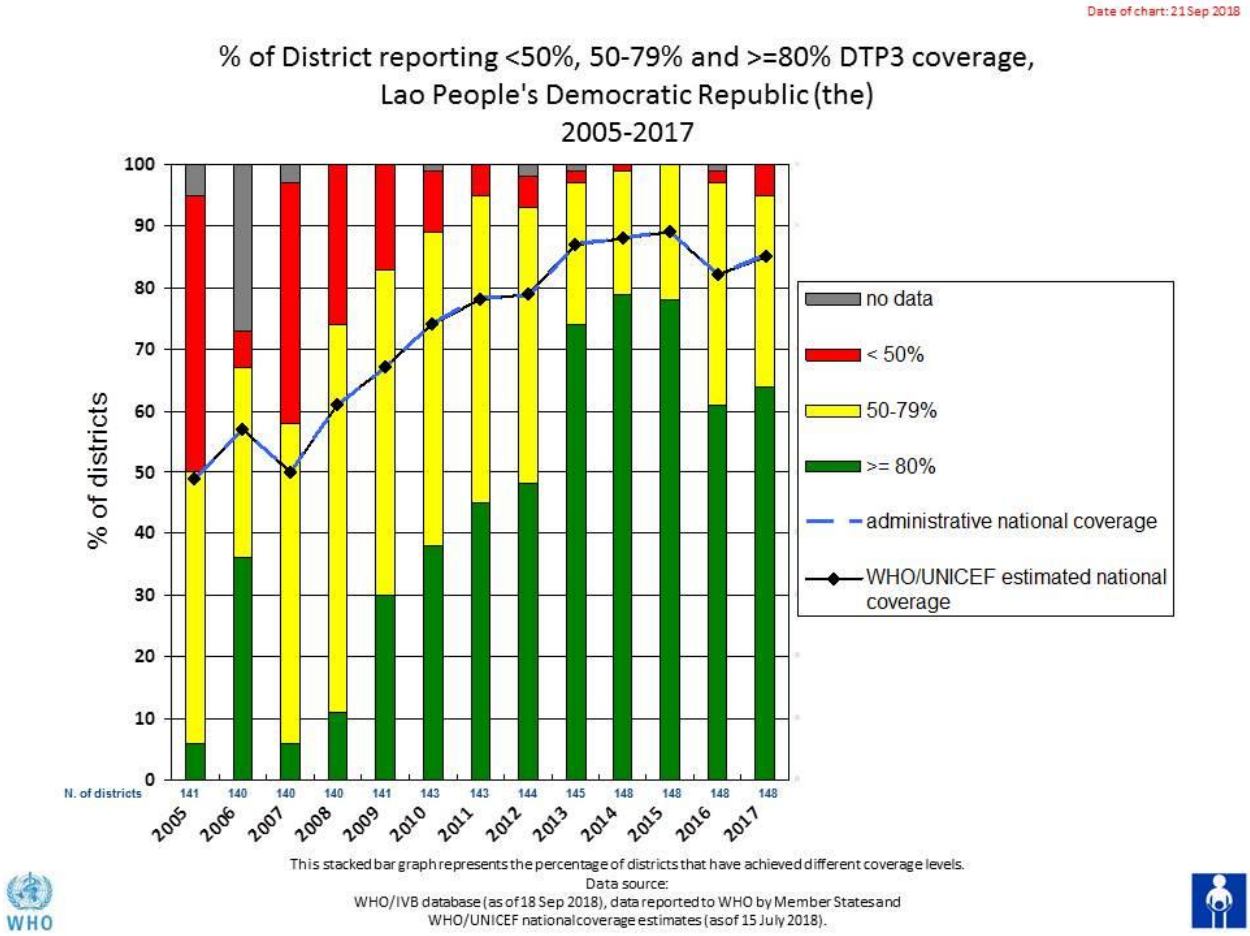
For the newly introduced vaccines, coverage of IPV (introduced in 2015) increased from 13% in 2015 to 77% in 2017. The PCV3 coverage increased to 83% in 2017, while coverage of JE vaccine (introduced in 2015) reached only 39% in 2017. This vaccine experienced major stockouts in 2017 in most provinces, so that coverage approached zero for the year[29].

The WHO UNICEF joint reporting forms indicate that prior to 2010, only 40% of districts reported DTP3 coverage equal or above 80%, while in 2014, this was the case in 79% of districts. However, with the recent decline in coverage only 65% of districts reported ≥80% DTP3 coverage in 2017, 31% of districts had DTP3 overage between 50 and 79%, while 5% of districts had DTP3 coverage of less than 50% (see graph below)[30]

[29] RI administrative coverage by district, NIP Lao PDR, report 2017

[30] Routine immunization coverage by district, NIP Lao PDR final report 2017

FIGURE 10: DISTRICT REPORTING OF DTP3 COVERAGE, LAO PDR 2005-2017



Coverage data point to a relatively high drop-out rate, especially in rural areas with predominantly ethnic populations. The national level drop-out rate (Penta1 – Penta 3) was 4%, but several provinces had much higher rates. Timeliness of vaccination is often low, with many infants vaccinated late, indicating problems with access and follow-up.

In addition to the routine immunization coverage reports, the 2015 coverage survey showed the following results:[31] Based on evidence from home-based records, health facility registries and caretaker recall, the crude coverage (i.e. vaccination received at any time regardless of recommended schedule) for routinely recommended vaccinations by the time of the survey ranged from 89% nationally for BCG to 72% for the birth dose of hepatitis B vaccine. Coverage for Penta1 was 88%, for OPV3 82% and for MR 81%. According to the survey, 63% of children were fully immunized having received a dose of BCG, a birth dose of hepatitis B vaccine, three doses of oral polio vaccine, three doses of pentavalent vaccine

[31] Lao PDR EPI Coverage Survey Report 2015

11 https://www.unicef.org/progressforchildren/2004v1/eastAsiaPacific.php

and a dose of measles-rubella containing vaccine. There was evidence that 9% of children had never received any routine vaccination.

The recent Lao Social Indicator Survey II (LSIS-II) of 2017 showed consistently lower coverage rates as follows: BCG 82%, Penta1 73%, Penta3 61%, PCV3 48%, OPV3 69% and Measles containing vaccine 66%. Based on the LSIS-II Only 48% of children 12 to 23 months of age were reported to be fully immunized with all vaccines recommended in the national immunization schedule.

Immunization information and data management

The strengthening of the Health Information System and the improvement of quality and use of data is one of five pillars of the Lao HSR. In December 2017, the MoH approved the National Health Information System Strategic Plan 2018-2025. According to this plan, in 2025, the HMIS should function effectively, using an integrated central platform and provide timely, high quality, evidence-based information for policy formulation, decision making, program implementation, monitoring and evaluation for all national and international health stakeholders.

In December 2017, the new web-based, open source District Health Information System 2 (DHIS2), was established by decree and operationalized in all provinces. DHIS2 is managed by the Department of Planning and International Cooperation (DPIC) with the Statistics Units at all levels in charge of managing and ensuring data quality.

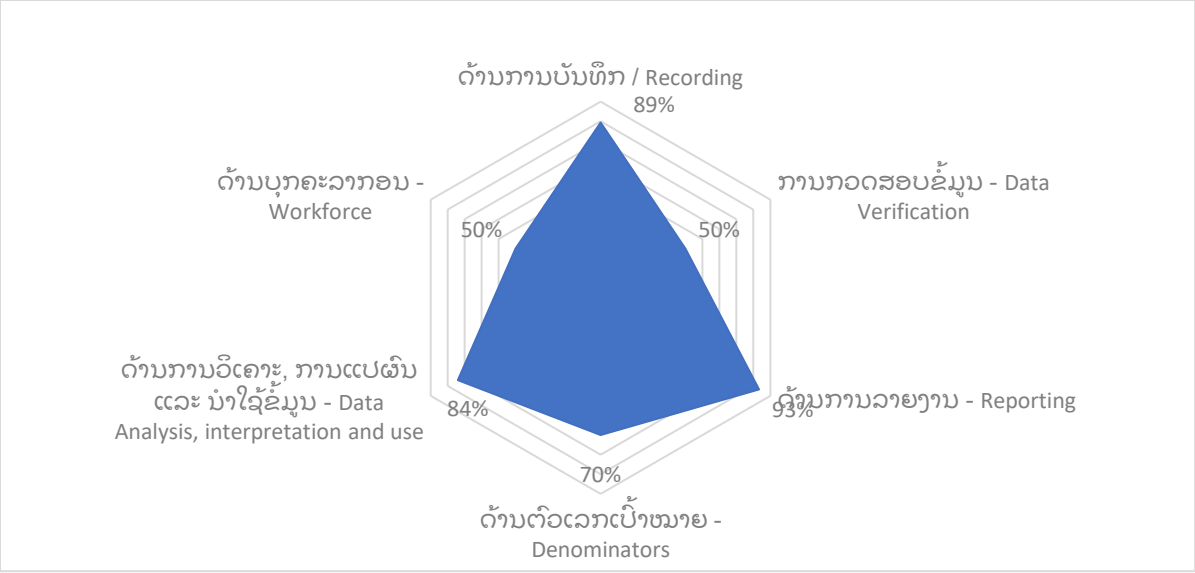
The NIP, however, is not yet an integral part of this information system, and still uses its own excel-based immunization information system for data recording of monthly indicators at all levels. Limited capacity of staff on data analysis and computer literacy has hindered the usability of DHIS2 to monitor data quality and to produce useful health information data for planning, reporting and action. Poor internet connectivity in some provinces is an obstacle to timely data collection of electronic information systems with infrequent feedback from the higher levels.

DHIS2 is to be used as the sole platform for collection of agreed NIP indicators to end the practice of repeated and parallel manual loading of the same data as of 2019. An agreed protocol for immunization data reporting has been developed to allow for these data to be fully integrated into DHIS2. DHIS2 implementation is being expanded and training of district level staff is incorporated in annual planned activities. Components of data quality assessments are included into supportive supervision check-lists for program managers.

A data quality assessment (DQA) is conducted annually at the national level and also in 5 provinces and 10 districts focusing on verifying the quality of routinely reported immunization coverage data from all health administrative levels. The most recent 2017 DQS[32] results show that reporting (93%) and recording (89%) and data analysis (84%) are sufficiently well done, while there are deficiencies in data verification (50%) and in the workforce understanding and taking action (50%).

FIGURE 11: DATA QUALITY ASSESSMENT 2017

[32] Ministry of Health, Lao PDR: Lao PDR Immunization Data Quality Self-Assessment (DQS), December 2017



In 2016 the NIP drafted a data quality improvement plan (DQIP) covering the timeframe 2016-2020 and including strengthening immunization coverage monitoring; the quality of data of the supply management system; the quality of data of VPD surveillance and the quality of data of AEFI surveillance.

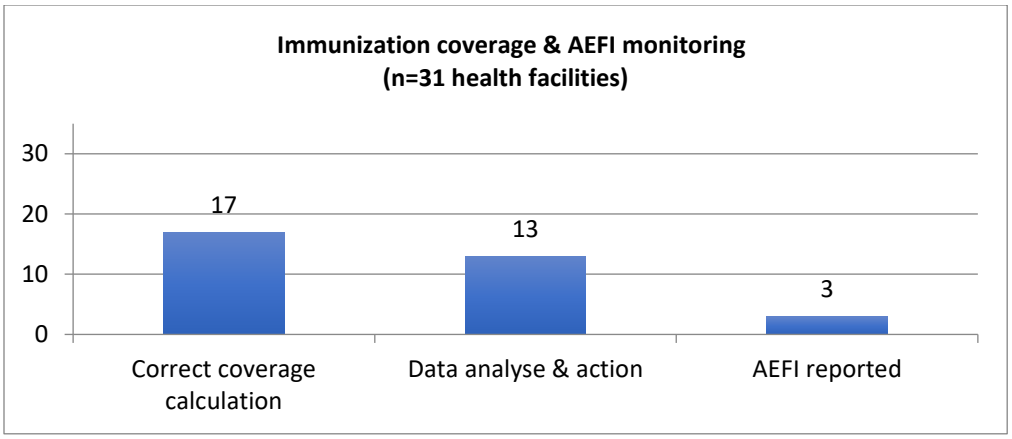
The NIP workplan includes periodic data quality assessments in at least 3 provinces each year and improvement of data quality figures prominently as part of monitoring and evaluation capacity strengthening. The NIP, in collaboration with the National Statistics Bureau, recently revised the immunization target population estimates, up to district level, based on most recent census data. District-level data from the 2015 immunization coverage survey (with sample size large enough to provide representative estimates at district level), are not yet available.

EPI Review findings on data

Coverage information is inconsistent at different levels with the greatest discrepancies identified between health facility and district levels. A main contributing factor is the divergent estimation of target populations and denominators. The DHO uses official population estimates to monitor coverage at district level, which do not align well with local census data collected at many health facilities. In the absence of catchment population registries at the health center level, projected population numbers derived from the previous census are used for calculation of vaccination coverage. In addition, projections of target populations vary between district, provincial and national levels. As a result, there are significant differences in vaccination coverage estimates between the three levels with a lack of data validation and verification.

Data recording and reporting is still incomplete and inaccurate and there is a mismatch between what is recorded in registries and reported through different channels. Capacity of staff in data analysis is limited and there is little demand and use of data for decision making.

FIGURE 12: NIP REVIEW: DATA ISSUES



NIP Review recommendations on data

The NIP and MoH should:

- Follow up on recommendations detailed in the DQA reports:
    - Develop brief guidance and SOPs for health facility on definition of target population in the catchment area, and on registration of doses administered within and outside of the catchment area, doses administered late and newly introduced vaccines;
    - Provide training on new guidance and SOPs (based on a problem-solving approach).
- Finalize and endorse the DQIP, including timeline and budget.
- Sustain mentoring and supportive supervision for immunization coverage monitoring and data use through the ISDS project with focus on health facility and district levels.
- Unify reporting systems by using exclusively DHIS2 and ensure that this system meets demands from both NIP and MOH.
- Increase communication, collaboration and sharing of information between NIP and the Division of Health Information Systems.
- Conduct a feasibility assessment for eIR to potentially develop a mid-term implementation plan in step-wise manner.

Post introduction evaluations

Post introduction evaluations were conducted following introductions of the pentavalent vaccine in 2011 and of the PCV13 vaccine in 2014. These evaluations identified important issues and bottlenecks in vaccine implementation.

The pentavalent PIE identified that provinces went through a phased introduction, due in part to some other immunization activities in some districts but not in others. The PCV-13 PIE identified challenges including hesitancy from providers and recipients due to the fact that multiple injections were scheduled at the same immunization session. Similar issues were reported with IPV at the 14 weeks of age time point.

VPD Surveillance, Outbreak Response and AEFI Monitoring

Vaccine preventable disease (VPD) surveillance provides critical information for monitoring progress towards disease control and elimination goals and initiating a timely public health response in the country. VPD surveillance also provides information for monitoring the quality of the NIP and progress towards national disease elimination and control goals. Communicable disease surveillance and response in Lao PDR was implemented in 1989, with the addition of case-based acute flaccid paralysis (AFP) surveillance in 1994 and integrated case-based surveillance for measles and rubella (acute or febrile rash - AFR) in 2008. Overall, AFP and AFR surveillance is functioning well, meeting most of the standard quality indicators and proving, during the cVDPV outbreak response, that there is capacity for further strengthening, i.e. by increasing the sensitivity threshold.

An Early Warning and Response Network (EWARN), an integrated disease surveillance system, was established in 2009 and includes systematic reporting of 17 priority diseases including VPDs: AFP, AFR, neonatal and non-neonatal tetanus, diphtheria, and pertussis. Through EWARN, reports are provided as aggregate data and diseases are reported prior to case investigation and/or laboratory confirmation. Ad-hoc reporting of unusual clusters of cases or suspected outbreaks is done from health centers to provincial level, or from the communities via a national hotline. Aggregate data are entered into the EWARN platform at the provincial level and sent to the National Centre for Laboratory and Epidemiology (NCLE). Case-based data on AFP and acute febrile rash (AFR), collected following case investigations, are managed at the sub-national level and entered in a web-based data entry system at the national level, which finally links epidemiological and laboratory surveillance data.

Surveillance for vaccine-preventable diseases is the responsibility of the NCLE, Department of Communicable Disease Control, MOH. Use of vaccine-preventable disease surveillance data by the NIP was incoherent in the past, which led to the initiation of a joint review of the program and surveillance data through quarterly review meetings between NIP and NCLE.

The overall quality of VPD surveillance has been variable, with a decrease in sensitivity of surveillance for AFP and sub-optimal performance of surveillance for measles, Japanese encephalitis, pertussis and, diphtheria. Implementation of surveillance system-related activities still depends largely on external financial support. HR issues in this context are high turnover of staff and inadequate capacity and competency in data analysis at provincial and district levels, limiting the use of surveillance data for decision-making and action. Numbers of reported cases of measles, rubella, diphtheria and specifically of polio (cVPDV) have come down since 2015, but are still highlighting immunity gaps.

TABLE 9: REPORTED CASES OF VACCINE PREVENTABLE DISEASES (2017)

Disease	Reported cases	Disease	Reported cases
Polio	0	Rubella	10
Diphtheria	10	Neonatal Tetanus	17
Measles	3	Pertussis	111

Source: WHO vaccine-preventable diseases monitoring system, 2018

In addition, and outside of EWARN, sentinel surveillance for Japanese encephalitis and rotavirus gastroenteritis has been established at selected hospitals. At present, the latter is performed as part of the WHO supported rotavirus surveillance network at Mahosot hospital in Vientiane. It is planned to expand this surveillance to include additional children's and MCH hospitals in four provinces, with support provided by the Asian Development Bank, the World Bank and WHO. Rotavirus surveillance will be coordinated by the NIP in collaboration with the NCLE. This will vastly improve the ability of the MoH to assess trends in gastroenteritis incidence following the introduction of the rotavirus vaccine. The surveillance system is part of the WHO Global Rotavirus Gastroenteritis Surveillance Network and includes a strong laboratory component with regular external quality assessment and control procedures.

Lao PDR has introduced an Immunization and Surveillance Data Specialists (ISDS) project, a pilot implementation supported by Gavi and US CDC's Stop Transmission of Polio Program with focus on at capacity building for health and immunization information systems with frequent supportive supervision and mentoring at sub-national level. The ISDS project is set to improve immunization and surveillance data, which will be used for policy making and introducing key interventions to effectively address vaccine preventable diseases. The project emphasizes a systems-focused approach to improving immunization and VPD surveillance data quality and to develop system and human resource capacity for data utilization. Five international ISDS participants partner with local counterparts are deployed to one of six provinces for two years. Lao trainees are involved in assisting with EPI and surveillance activities in support of the NIP and the NCLE. They conduct supportive supervision for routine immunization in the field as well as AFP and AFR cases search and they attend trainings on vaccine management and micro-planning organized by NIP. It is intended that local trained staff will eventually be absorbed by MOH.

The MoH is working on establishing processes for the impact assessment of HPV vaccine use by means of a newly initiated HPV surveillance approach. At the same time, in line with the existing cervical cancer control strategy, establishment of a cervical cancer registry as part of a population-based cancer registry is one of the more prominent and sustainable approaches for vaccine impact assessment.

Surveillance review findings

The first VPD surveillance review was completed in September 2015. In response to the cVDPV1 outbreak in 2015–2016 and a diphtheria outbreak in 2016, an updated review of the VPD surveillance was conducted in December 2017, with the following recommendations submitted for consideration:

Strengthen surveillance:

- Improve quality of supportive supervision at all levels through development and use of tools (e.g., plans, SOPs, checklists, forms/templates, etc.), provision of quality verbal and written feedback, and follow up on implementation of activities to address recommendations (high priority);
- Emphasize problem/case-based learning activities in future staff trainings to increase confidence at lower levels (medium priority);

- Integrate private health facilities into surveillance activities (medium priority); and
- Strengthen collaboration, communication between the surveillance team in NIP and NCLE.

Improve use of technology where appropriate:

- Strengthen communications between all levels, with a particular focus on sharing of information (e.g., laboratory reports, written feedback, etc.) from province to district, and to facility (high priority);
- Develop and deploy tools for data analysis and decision-making at the district-level (high priority);
- Evaluate the extent of Electronic Medical Record (EMR) planned transition and the impact of EMR on future surveillance activities (medium priority); and
- Continue reinforcement of EWARN use at provincial level for data analysis for decision-making (low priority).

Improve case management and specimen collection, especially for AFR:

- Increase access to laboratory testing strategies below the provincial level (e.g. dried blood spot, testing of stored clinical specimens) (medium priority).
- Ensure VPD surveillance is addressed in forthcoming MR elimination plans.
- Continue support for cross-border surveillance activities.
- Continue integrating FETP graduates and STOP personnel into VPD surveillance activities, particularly in high-risk, low-performing settings.

NIP Review findings on surveillance

Major achievements were noted including the weekly reporting of VPDs (AFR, AFP, diphtheria, pertussis, neonatal tetanus, non-neonatal tetanus) with zero-reporting and active search of AFP and AFR cases implemented at the provincial level. There is at least one dedicated surveillance focal point available at all health facilities. A budget dedicated for VPD surveillance activities is available at the provincial level with support from WHO; and sufficient supply and other necessary documents for VPD surveillance are available in the provincial health office.

Challenges included that no dedicated budget for VPD surveillance is allocated for lower levels including district health office and health facilities. Not all suspected VPDs are fully investigated for appropriate response and some health facilities are relying on village health volunteers on investigating and reporting VPDs to the health facilities. There is lack of adequate knowledge on the case definitions of VPDs among the health staff at the health facility level and a shortage of supplies (including specimen collection kits) and forms for case investigation in the district health offices and health facilities. Supervision and communication on data issues and surveillance performances is weak between health staff from district health office and health facilities, while communication through informal electronic means is increasingly replacing official channels.

NIP Review recommendations on surveillance

- NCLE to sustain current level of performance and strengthening response to identified clusters and outbreaks, considering that VPDs surveillance has already good performances.
- NCLE to implement high priority recommendations issued during VPDs surveillance review, focusing on capacity building and supervision.
- MoH NIP to ensure all health facilities (with priority on hospitals) have sufficient capacity (including finance, logistics and well-trained health staff) for proper detection of suspected VPD cases.
- MoH NIP to ensure that district health offices (DHO) have sufficient capacity for investigation of suspected VPDs reported through EWARN.

Vaccine Pharmacovigilance: Adverse Events Following Immunization (AEFI)

Legal provisions, regulations and guidelines required to define the regulatory framework of pharmacovigilance are in place and senior NIP staff were trained in pharmacovigilance. The Lao pharmacovigilance center is a full member of the Uppsala Collaboration and has comprehensive access to the Vigiflow database, which captures serious and non-serious adverse reactions.

Legal provisions are being further developed for marketing authorization holders to require registration, data collection and maintenance, assessment and monitoring of vigila nce events and to report to the national regulatory authority (NRA) on these activities. Several amendments to the present law and regulation reflect the manufacturers' responsibility to inform the NRA of safety signals and to include contentious, periodic and immediate reporting from the public and private sector for both ADR and AEFI.

The National AEFI Expert Committee was re-established in 2017 with a strong mandate to improve the AEFI reporting system and performance. This is in line with the newly adapted guidelines covering the field of drug and vaccine safety, including the updated guidelines on essential measures required to protect health (of Sept 2016) and the Basic Environmental Health Standards in Health Care Facilities.

In spite of these advances, AEFI surveillance is still not robust. Recording, reporting and investigation of AEFI is suboptimal and the AEFI surveillance system must be strengthened to be able to promptly react in case of serious AEFI. Weaknesses include that the minimum number of expected AEFI are being reported, that there were inconclusive investigations of some severe AEFI, and that insufficient feedback is provided to communities. Moreover, the NRA involvement remains unclear.

Requirements for staffing and of staff competencies (education, training, skills and work performance) in this field were assessed and are further detailed. This will in turn enhance the training of HCW and EPI managers. The NIP and the Food and Drug Department (FDD) is operationalizing a customized AEFI database using Vaccine Adverse Events Information Management System (VAEIMS) software. The NIP will use this system to submit completed monthly AEFI line-listings (from the public and private sectors) to FDD-PV Centre.

Importantly, the Asian Intussusception Network, supported by US CDC has plans of including Lao PDR, next to Pakistan, Nepal, Bangladesh and potential further countries, such as Myanmar and Afghanistan.

This will allow the use and implementation of a well-established self-controlled case series protocol for the assessment of a possible increase of intussusception incidence with the introduction of rotavirus vaccine.

EPI Review Recommendation on AEFI

The NIP and MOH-DFD (Department of Food and Drugs) should strengthen AEFI surveillance, investigation and management. This includes the definition of roles and responsibilities and of specific tasks to be taken forward and provision of proper feedback to communities.

Demand Generation, Communications and Advocacy

Political will and advocacy

The recognition of the NIP amongst policy planners and decision makers as one of the successful public health programs can be ascertained from the involvement of the office of President and of the Prime Minister in advocacy events of various immunization programs. High-level commitment for immunization exists, with a substantial increase in the NIP budget over the past decade and the timely payments of Gavi co-financing commitments. The NIP continues to engage with senior officials of both the government of Lao PDR and the development partners to ensure that this high recognition is maintained. The government views MCHC and the NIP as important parts of the health sector reform strategy.

Still, disparities in immunization performance at the subnational level highlight the need for even more engagement with the political leadership. Approaching other line ministries (MoF, MoIP, MoE) and stakeholders, including provincial authorities (e.g. Provincial and District Governors) is necessary. In doing so, high level advocacy is not only needed for increasing resource allocation and for possibly introducing immunization legislation, but also for further promoting the benefits of immunization.

It was recommended to establish a 'Secretariat Committee on Immunization' with wider ministerial composition (MoH, MoF, MPI, MoE) to coordinate program management activities including partner-supported activities. At the same time, the Provincial Assemblies are to take more responsibility for advocacy on immunization-related matters. The use of existing forums for advocacy is being improved, e.g. including the Lao Women Association with wide representation both at the national and sub-national level. Special immunization events, such as Immunization Days, School Health Days, the World Immunization Week and supplementary immunization campaigns are additional opportunities for advocacy.

NIP Review findings on communications

The NIP acknowledges challenges with insufficient demand of vaccination services in rural communities, especially those of ethnic minorities living in remote and hard-to-reach areas. Based on qualitative studies conducted in 2015, the low community demand could be attributed to a lack of sufficient communication with these communities, linguistic and geographic barriers, and low literacy levels, all of which resulted in limited knowledge about immunization and acceptance of its benefits. Research also

suggested that ethno-cultural factors, mistrust in the effectiveness of health care, and lack of collaboration among local authorities, community leaders and volunteer networks may have exacerbated the situation, along with questions about the quality of services.

The wide inequities in access to health services and in immunization coverage among ethnic communities are evidenced by the fact that the majority of outbreaks occurred in ethnic groups such as Hmong communities where vaccine hesitancy appears to be spreading due to a variety of reasons.

An equity and bottleneck analysis to identify key barriers leading to vaccine hesitancy resulted in the recognition of several factors thwarting full immunization coverage among the underserved populations. Overall, 26 rural communities including ethnic minorities, migrant populations and remote rural areas are suffering from socio-economic challenges, linguistic and geographic barriers and low literacy levels. There have been gaps in establishing involvement with these communities and in raising demand in vaccination services. Moreover, many health providers communicate poorly with ethnic groups due to cultural and language differences.

Other communication and behaviour change challenges persist, such as gaps in providing information to mothers about multiple injections at the health center level. Some caretakers fear the development of fever in the vaccinated children as this would prevent the parents from working in the field. Whether an improved understanding of the importance of vaccination could overcome this fear remains to be seen. There was evidence that fear and rumours of severe adverse events following vaccination may contribute to vaccine hesitance.

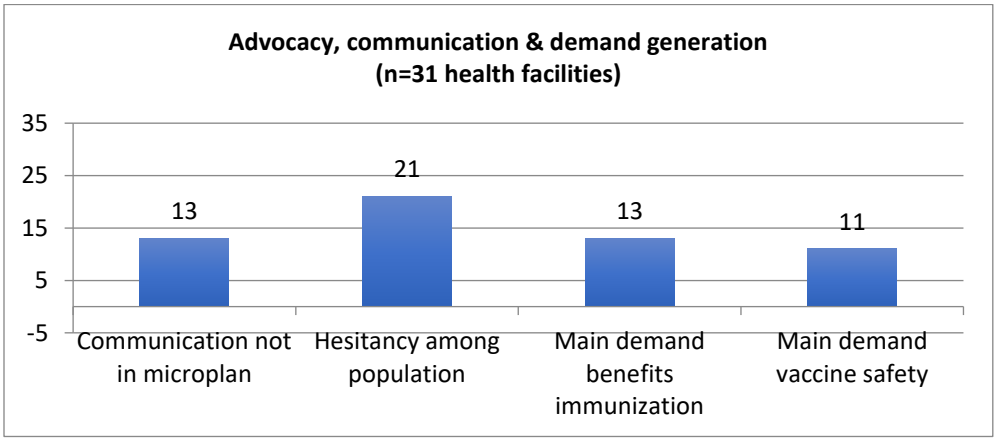
To address these factors, the NIP works to: a) update the communication strategy and materials for mobilizing underserved communities; b) strengthen communication demand for vaccination services by engaging with leaders, local authorities and local civil society organizations; c) plan and implement communication and awareness campaigns; and d) train service providers in communication, social mobilization and awareness raising.

Influential authoritative support from District Administrators or Governors and village leaders appears to have a significant impact on social mobilization for immunization activities. Efficient coordination is apparent at provincial, district and health facility levels as evidenced by monthly review meetings with community volunteers and leaders. These meetings with the hospital and health facilities are convened by the District Health Officer and are used as forums for reviewing progress, discussing issues, identifying solutions and providing feedback. A range of communication strategies have been applied, e.g., distributing memory cards and use of portable LCD projectors and loud speakers in villages with immunization audio-visual messages.

Based on findings from the KABP studies for specific ethnic group such as Akha, Hmong, Katou and Lavea, Keummu and Makong, animation cartoons were made with messages translated from Lao language into four minority languages targeting districts and villages with low vaccination coverage. The content includes the vaccination calendar and common questions raised by parents or caretakers about vaccination. Other methods include training in interpersonal communication for doctors, nurses, community leaders in targeted provinces, districts, health facilities and community volunteers including village leaders.

Conceived lack of knowledge of communities of the importance of vaccination in preventing childhood diseases could potentially be addressed through innovative, multiplatform methods of communications, including the use of social media. However, use of mobile phones is still limited in improving social mobilization for immunization. The absence of budget lines for advocacy, communication and demand generation in the District Health Offices and health facilities hampers coordination and advocacy with communities at village level. The Lao PDR Integrated Communications Strategy and 5-year communication plan (2016-2020) for EPI describes work towards creating political commitment and advocacy at all levels.

FIGURE 12: NIP REVIEW: COMMUNICATIONS AND DEMAND GENERATION



EPI Review main recommendations on communications

- MOH with support of development partners to maximize the use of multiple and appropriate new platforms to deliver integrated MCH and immunization messages that are customized to the community, their concerns and hesitance issues, their language, and their cognitive level of understanding to reach communities in hard to access areas.
- MOH to increase the capacity of health staff in interpersonal communication.
- MOH to prioritize community participation in health through funding communication and social mobilization for immunization activities at provincial, district and health facilities levels.
- MoH to conduct an impact analysis of current communication and behavior change approaches and reasons for vaccine hesitancy.
- Guidance to be provided on IEC at immunization sessions with integration of health education activities with MCH, Malaria, HIV, TB and other programs.
- The NIP to review and possibly update the existing integrated communication strategic plan 2015-2020.

Operational Research

The following research studies are planned to be performed by the NIP and partners in order to close gaps in the understanding of vaccine acceptance, communication barriers, data discrepancies and the feasibility of performing sero-surveys.

- Assess acceptance of multiple injections
    - Perform qualitative study among different populations on knowledge, attitudes, beliefs and acceptance among health care workers and caregivers of multiple injections during the same (outreach) visit
- Assess communication barriers in immunization of ethnic populations
    - Conduct qualitative research on successful communication approaches regarding vaccine acceptance and immunization performance in ethnic populations
- Validate data recorded in DHIS2 with EPI DQA
    - Perform validation study to assess accuracy and quality of immunization data recorded in DHIS2 and compare to data derived from NIP DQA
- Review feasibility of MR serosurvey
    - Perform MR sero-survey in one province and assess feasibility and quality and usability of data for improvement of MR vaccination

SWOT Analysis

Strengths	Weaknesses
• Overall increase in immunization coverage. • Government commits to finance NIP and increase allocations of financial resources for vaccines and vaccine delivery services. • Integration of immunization activities into MCH package and decision to strengthen outreach to the community level. • Achievement of MNT elimination and retaining the Polio-free status in spite of cVDPV outbreak; Td coverage increasing. • Seven new vaccines have been and will be introduced during less than a decade: Pentavalent, Pneumococcal conjugate, Japanese Encephalitis, Influenza (expansion), second dose of Measles-Rubella, Human Papillomavirus, Rotavirus. • Successful OPV switch and tOPV withdrawal and introduction of IPV. • Cold chain expansion ongoing according to plan	• Overall DTP3 coverage not moving significantly above 80%. Intermittent drop in coverage in 2016/17. • Gaps between administratively reported and assessed coverage rates. • Inequities and disparities in vaccination coverage with pockets of low immunization particularly in remote areas and in communities with ethnic populations. • Outreach immunization activities not regularly conducted; Very low proportion of static clinic delivery. • Insufficient coordination and communication between NIP and local district authorities including weakness in addressing immunization needs of migrant population. • Uneven distribution of health and immunization staff; Updated staff terms of reference not available in most health facilities.

• Standard data information approaches implemented in most health facilities for successful monitoring of immunization coverage. • Communication innovations implemented targeting community leaders.	• Lack of adequate planning skills among the front-line service providers. • Several activities of recent EVM improvement plan not yet implemented. • AFP and other VPD surveillance not working optimally in some provinces. • Continued communication gaps between providers and rural communities, especially in ethnic population and hard-to-reach communities.
Opportunities	**Threats**
• Advocacy efforts successful with top leaders at central, province and districts actively involved in immunization efforts and supporting immunization at all levels. • Recognition of NIP as a highly successful public health program. • Imunization law approved by the Parliament allowing for sustained domestic funding for NIP. • Government commitment to invest in improved service provision and increase the allocation of domestic funding towards achievement of UHC and SDGs. • Positive economic outlook. • Availability of technical assistance and readiness of implementing partners to support cMYP. • Steady progress towards MR elimination.	• Insufficient funding of NIP due to financial/budget issues and/or further unexpected decrease of external funding. • Economic downturn with inability of government to take on transition financing as planned. • Multiple VPD outbreaks diverting attention to outbreak response rather than routine immunization strengthening. • Identified persistence of vaccine hesitancy in ethnic minority communities. • Internal migration of population without proper registration in villages and health care facilities and thus external to service delivery provision.

Comprehensive Multi-Year Plan 2019 – 2023

The updated cMYP for Immunization of Lao PDR 2019-2023 is based on the overall concept of improving immunization service delivery and coverage with an underlying agenda of achieving long-term sustainability of immunization services with increased government ownership.

The ongoing dependence of the NIP service delivery upon financial support from development partners, specifically Gavi, is a major threat despite increasing government financing of vaccine costs in recent years. Thus, the cMYP clearly identifies the existing and future funding gaps so that appropriate measures can be taken.

A major focus of the cMYP is the improvement of the quality of immunization service delivery at the community level. The cMYP particularly addresses strengthening of routine immunization with special focus on ethnic communities and the need for reducing dependence on outreach for routine service

provision, which will not be sustainable in the medium term. As such, by 2025, 80% of service delivery is anticipated to be done in static clinics.

Vaccine hesitancy has been identified as an important issue, specifically in remote ethnic communities. Issues of existing inequities and disparities in service delivery and vaccination coverage will be tackled by adopting improved community-specific interventions and target social mobilization and communication activities to these communities.

On the supply side, strengthening of microplanning at the health centres with improvement of the enumeration of target populations will be key as a prerequisite for overall improvement of service delivery. Data quality and use of data to facilitate local-level decision making will be enhanced through regular data quality assessments. Closing the human resource gap in immunization service delivery is part of the wider human resource development approaches.

The cMYP addresses disease-specific goals (e.g. epidemic prone VPDs) as part of the routine immunization agenda based on sustainable local-level strategies.

The strategic objectives of the cMYP are linked to the objectives of the Regional Framework for Implementation of the Global Vaccine Action Plan. The coverage target of all major antigens has been set at 95% in line with the Regional Framework for GVAP implementation in the Western Pacific Region, endorsed by the Regional Committee in October 2014.

The identified priority areas for the period 2019-2023 are based on the recommendations derived from the NIP Review conducted in May 2018. cMYP activities were planned to address each of the findings of the review while continuing the successful implementation of the ongoing cMYP 2016-2020.

Mission of the NIP

The mission of the National Immunization Program of Lao PDR is:

"To provide high-quality immunization services through a combination of appropriate approaches to reach all eligible population groups to prevent morbidity, mortality and disability from vaccine preventable diseases through the optimum use of currently available vaccines and introduction of new vaccines that become available over time and to integrate immunization services in the broader context of health systems development."

Goals, Objectives and Activities of cMYP 2019-2023

The strategic objectives of cMYP Lao PDR 2019-2023 are aligned with the objectives of the Regional Framework for Implementation of the Global Vaccine Action Plan in the WHO Western Pacific Region and the existing HSR.

The cMYP is part of the broader RMNCH Strategy of Lao PDR 2016-2025 (see below), which includes a set of key activities in the areas of policies, strategies and guidance; management, monitoring and supervision; training; service delivery; and communication and demand generation.

Strategic Objective 6 of the RMNCH Strategy refers to immunization with the objective of protecting all children under 5 years from vaccine preventable diseases and the specific objective of 95% of one-year old children fully immunized and 90% of pregnant women vaccinated for TT2 by 2025.

TABLE 9: NATIONAL STRATEGY AND ACTION PLAN FOR INTEGRATED SERVICE ON REPRODUCTIVE, MATERNAL, NEWBORN AND CHILD HEALTH 2016-2025

	Indicators	Baseline	Target						Source of data
		2014	2016	2017	2018	2019	2020	2025	
Strategic Objective 6: All children under 5 years old are protected from vaccine preventable diseases through immunization									
Specific Objective 6.1: **By 2025, 95% of one-year old children are fully immunized and 90% of pregnant women are vaccinated for TT2+**	Proportion of pregnant women received full course of tetanus immunization (Protection at birth) (%)	29%	65%	70%	75%	80%	85%	90%	NIP
	Proportion of HepB birth dose (within 24 hours after birth for hospital births and <7days for outreaches) (%)	50%	55%	60%	65%	70%	75%	80%	NIP
	Proportion of under 1 year-old children immunized against DPTHepB_ Hib3 (%)	88%	90%	92%	93%	94%	95%	95%	NIP
	Proportion of under 1 year-old children immunized against measles (%)	87%	90%	92%	93%	94%	95%	95%	NIP
	Proportion of under 1 year-old children fully immunized (%)	59%	70%	75%	80%	85%	90%	95%	NIP

In line with the RMNCH strategy, the primary targets to be achieved in the immunization area during the cMYP period 2019-2023 are the following:

- 95% coverage of all antigens in the NIP, with 90% of children fully immunized.
- 80% fixed site delivery of immunization, with outreach delivery reduced to 20%.
- Vaccine cold chain functioning well allowing uninterrupted supply at all levels.
- A self-sustained fully domestically financed NIP.

The following issues were considered necessary to achieve these goals:

- Improved collaboration and integration between NIP and MNCH delivery platforms.
- High quality service delivery at all levels with promotion of fixed site delivery, but with a parallel improvement of ongoing outreach services in identified high-risk and hard-to-reach areas including in ethnic populations.

- Excellent program governance with good microplanning for immunization services at the health center level.
- A well-educated health workforce.
- A 'continued care' approach including during the 2nd year of life.
- Accelerated control of all vaccine preventable diseases including those with epidemic potential.
- Secure supply of high-quality and safe vaccines.
- A well-maintained logistics infrastructure with strengthened cold chain maintenance capacity at the provincial level.
- Improved data recording, reporting and monitoring and use of routine vaccination data for local level actions.
- Strengthened VPD surveillance including AEFI surveillance.
- Successful introduction of HPV and RV with evidence-based decisions taken on the introduction of other new vaccines (e.g. Typhoid) and expansion of the use of IPV and influenza vaccines.
- Increased community awareness and community engagement with strengthened village and community authorities at the lower level governance system.
- Sufficient availability of resources in the context of shifting donor funding: Increased government allocation to NIP over and above the present allocation for service delivery, cold chain, procurement, and training and taking on operational costs and increasing vaccine co-financing payments.
- Inclusion of research components, where appropriate.

Comprehensive Multi-Year Plan objectives and key strategies

The plan of activities for the period 2019 – 2023 covers the following main areas:

1. Program governance and management
2. Human resources
3. NIP service delivery for routine and SIAs
4. New and underutilized vaccine implementation
5. Vaccine management, cold chain and logistics
6. Information, data recording and reporting
7. Surveillance, outbreak response and AEFI monitoring
8. Demand generation, communications and advocacy
9. Operational research

Routine immunization activities as well as those related to epidemic-prone disease control (e.g. Polio, MR, JE, MNTE) are listed conjointly under these categories.

cMYP alignment with Regional Framework

The National Immunization Program of Lao PDR and the Government of Lao PDR takes into account the Regional Framework for implementation of GVAP in the Western Pacific Region. While different in its overall structure, NIP components and key strategies are aligned with the Regional framework and national objectives:

TABLE 10: REGIONAL AND NATIONAL GOALS AND OBJECTIVES OF THE IMMUNIZATION PROGRAM

Regional Framework for implementation of GVAP in WPR	National Objective
1. Sustaining polio-free status	**1.** Maintain Polio Free Status
2. Measles elimination	**2.** Eliminate measles
3. Rubella elimination	**3.** Eliminate rubella
4. Maternal and Neonatal Tetanus elimination	**4.** Maintain elimination status of maternal and neonatal tetanus
5. Meeting regional vaccine coverage targets	**5.** Improve coverage of routine vaccines with special emphasis to addressing identified inequities associated with geo-topography and ethnicity
	6. Strengthen community demand for vaccination services
	7. Strengthen and maintain cold chain and logistics system including vaccine management
6. Evidence-based introduction of new vaccines	**8.** Introduce new and underused vaccines based on evidence
7. Accelerated control of Japanese Encephalitis	**9.** Accelerate control of JE through extension of JE vaccination in high risk areas
8. Hepatitis B accelerated control	**10.** Accelerate Hepatitis B control

Components and Key strategies of Lao PDR cMYP 2019-2023

Following are the main components and key strategies of the cMYP for Lao PDR for the period 2019-2023.

Details of activities for each strategy including a preliminary budget, responsibilities and timelines are provided in the Annex.

TABLE 11: CMYP MAIN COMPONENTS AND KEY STRATEGIES

Main Components	Key Strategies
Governance and Program Management	Develop and improve standard immunization policy documents and guidelines in the context of integrating MCH and EPI services and ensure their availability and implementation
	Prioritize the development and monitoring of an integrated costed bottom-up microplan across NIP, MCH and Nutrition

	Enhance governance capabilities of districts and communities to ensure program sustainability
	Build awareness and harness action about the transition plans
	Evaluate and revise supervision tools and processes to ensure high quality supportive supervision
	Strengthen capacity of NITAG
	Consider revision of ICC TORs, aligned with other coordinating mechanisms
	Implement the immunization law in collaboration with MoE
Human Resources Capacity Building	Continue implementation and alignment of workforce planning within the Health Sector Reform
	Strengthen the development and utilization of TOR and job descriptions
	Assess and strengthen HR capacity at the central/provincial/district and health center levels
	Improve and systematize in-service training including on-the-job training and rotation on MCH/EPI technical issues
	Improve microplanning
	Update and improve pre-service curricula related to immunization
	Support adoption of Thai MCH/EPI model through exchange of experience with partner provinces in Thailand
NIP Service Delivery for Routine and SIA	Increase routine immunization coverage in identified areas - focusing on ethnic communities and on districts with consistently low performance
	Promote fixed site delivery and improve and gradually reduce outreach services as a mid-term goal
	Increase frequency of delivery of present outreach services
	Perform ‘catch up vaccination’ during national immunization rounds
	Ensure daily sessions at fixed sites with provision of all vaccines
	Reinforce adherence to multidose vial policy (MDVP)
	Strengthen 2nd year of life as well as school and adolescent health platforms
	Provide guidance on the administration of more than 2 injections during the same session in outreach situations
	Ensure birth dose vaccines (Hepatitis B and BCG) are given within 24 hours in hospitals and health HCs and within 7 days outside of hospitals/HCs
	Strengthen province- and district-level staff supervisory, monitoring and evaluation skills
	Establish accreditation system to ensure constant high-quality service delivery
	Implement all measures required as part of the Polio Endgame Strategy
	Achieve and maintain high levels of population immunity of measles and rubella vaccine to achieve elimination of measles and rubella
	Increase Td coverage in women of reproduction age with special focus on high risk areas
	Achieve at least 90% coverage with the primary series of JE in routine vaccination
New and Underutilized Vaccine Introduction	Introduce HPV vaccine
	Introduce Rotavirus vaccine
	Review options for introduction of Typhoid conjugate vaccine
	Enhance seasonal influenza vaccination
	Enhance capacity for adding new vaccines to the NIP portfolio

	Mitigate the risk of new vaccine introduction for sustainability
Vaccine Management, Cold Chain and Logistics	Develop a quarterly reporting and monitoring system to track the implementation of the Essential Vaccine Management (EVM) Improvement Plan
	Prioritize implementation of critical components of the EVM improvement plan, in line with national MOH supply chain reforms
	Perform repeated EVM assessments
	Forecast and procure all vaccines with adequate national funds and optimized product selection
	Prepare and submit Gavi CCEOP application and follow up on implementation
Information, Data Issues	Follow up on recommendations detailed in DQA reports
	Finalize, endorse and implement the DQ Improvement Plan
	Improve immunization coverage monitoring and data use
	Unify immunization recording and reporting system through DHIS2
	Review feasibility of electronic immunization register (e-IR)
	Monitor integrated MNCH service provision at subnational levels
VPD surveillance and Outbreak Response, AEFI	Ensure all health facilities (with priority on hospitals) and district health offices have sufficient capacity (including finance, logistics and well-trained HR) for proper detection, reporting (through EWARN) and investigation of suspected VPD cases
	Improve coordination and collaboration between the NIP and the National Center for Laboratory and Epidemiology (NCLE)
	Continue integrated immunization surveillance and data specialists (ISDS) project
	Ensure timely detection and response to any poliovirus, measles, rubella or MNT transmission/outbreak
	Sustain and contribute to the regional polio-free status until global certification takes place
	Ensure sensitive and timely detection and reporting of suspected measles and rubella cases
	Establish congenital rubella syndrome (CRS) surveillance
	Ensure appropriate outbreak preparedness, timely detection and response to any poliovirus, measles, rubella or MNT transmission/outbreak
	Strengthen surveillance of MNT in all districts
	Strengthen routine JE surveillance
	Enhance HPV surveillance
	Enhance Rotavirus surveillance
	Strengthen AEFI surveillance, investigation and management in all provinces and districts, and integrated with ADR surveillance, where possible
Demand Generation, Communications, Advocacy	Conduct analysis of current communication and behaviour change approaches
	Update the integrated communication strategic plan
	Expand the use of new communication platforms and innovations to deliver customized immunization messages to ethnic groups
	Ensure prioritization and funding of communication and social mobilization for immunization activities
	Provide HCWs with hands-on guidance on interpersonal communication for health education sessions
	Employ and deploy immunization staff with appropriate cultural skills to areas

	with dominant ethnic populations
	Integrate health education activities with MCH, Malaria, HIV, TB and other programs
	Support control of epidemic-prone VPDs (Polio, MR, MNT, JE) with appropriate communication approaches
	Assist implementation of hepatitis B birth dose vaccination with social mobilization campaigns
Operational Research	Assess acceptance of multiple injections
	Assess how to overcome communication barriers in immunization of ethnic populations
	Validate data recorded in DHIS2 with EPI DQA
	Conduct MR sero-survey

Costs, Financing, Sustainability

Background

The immunization program in Lao PDR is still heavily dependent on external funding for the operational costs to deliver vaccines, while the government contribution towards procurement of traditional, new and underutilized vaccines has been growing steadily. External funding is still substantial and includes funds from Gavi, UNICEF, WHO, US CDC, the World Bank Group, and others. Donor support is shrinking and the cessation of the immunization operational cost support by the World Bank in the Southern provinces of Lao PDR is an example.

In the past, financing of vaccines in Lao PDR was highly dependent on donors: All vaccines had been procured with JICA financial support for 16 years then replaced with UNICEF and LuxDev financial aid from 2007 onwards. The country has benefitted from Gavi New Vaccine Support (DTP-HepB) that doubled the cost of traditional vaccines, without co-financing. The country started co-financing Gavi-supported vaccines from 2009 while traditional vaccines were still financed from external sources. The first contribution (albeit modest) to financing of traditional vaccines was documented in 2012 and only in 2014 funding from domestic sources exceeded donor funding for traditional vaccines.

The situation has moved dramatically during last five years towards country ownership of vaccine financing. Government funding for vaccines alone reached more than US$ 1M in 2017 (including US$0.3M for co-financing), thus covering 23% of total vaccine costs. Given this increase in domestic financing, UNICEF's share in supporting traditional vaccines decreased to as low as 4%.

Lao PDR is in the Gavi accelerated transition phase and the last year of Gavi support is predicted to be 2021. With HPV and Rotavirus vaccines introduced in 2019, Gavi support will extend for another 4 years including the year 2022. The country also intends to introduce Typhoid conjugate vaccine with Gavi support and has submitted a Gavi application to the Cold Chain Equipment Optimization Platform (CCEOP) for additional support before graduation.

As in many other countries, Gavi has earlier bypassed the MoF and sent funds directly to the NIP, with no recurrent budget line in the MoF for immunization and some items may have been left off budget. Financial management is still relatively poor. With a senior MoF official as member of the NITAG, discussions have started on how to best reflect the costs of the NIP openly and transparently in the MoF budgets and plans. This includes both vaccine costs and delivery costs, which will eventually need to be transparently 'on budget' by working closely with the MoF.

The Government's commitment to co-financing is clear. However, the Government's ability to replace Gavi support after 2022 is open to many economic variables. There is a firm commitment in principle as outlined in the Gavi transition plan and endorsed in a letter from the Minister of Health. It is unclear at this stage whether any loans may be available to cover any immunization program costs, but it is hoped that UHC and evolving PHC plans will cover the majority of the NIP costs post-2022.

NIP Review: Challenges in Health and Immunization Financing

Government stewardship is necessary to lead program transition plans and coordination across multiple stakeholders in view of the rapid reduction of external funding from bilateral and multilateral partners. There is a risk of reliance on increased OOP expenditure for financing routine immunization and other priority public health services during the transition and post-transition periods, if the government should not be able to increase domestic funding or find other sources of funds. An increasing private health sector could potentially procure and deliver vaccines to those able to pay.

The cMYP outlines government financing requirements, with a substantial widening of the funding gap from 2022, after the country's graduation from Gavi funding. While the NIP is transitioning away from external funding, other priority public health programs, including the three disease programs supported by the Global Fund as well as family planning supported by UNFPA, are also undergoing transitions at the same time. As external funding for priority public health services phases out, the NIP will introduce HPV and rotavirus and possibly typhoid conjugate vaccines. In the long-run, Lao PDR will face increasing expectations and demand on providing and financing various interventions, whether financed through government budget or health insurance, calling for a transparent, evidence-informed decision-making process for priority setting and resource allocation.

Regarding budgeting and expenditure tracking in the planning process, the lack of a full bottom-up approach may not allow adequate planning and budgeting from the health facility level to district and to province, and potentially does not fully capture immunization service needs at the subnational level. Since late 2017, the Department of Finance, MoH initiated an annual budgeting and expenditure tracking system for programs across various donors in five provinces. While progress was made on strengthening the public financial management system, financial management capacity is still limited at provincial, district, and health facility levels.

In terms of the government disbursement of funds, some longer delays were experienced in 2017, potentially due to the adjustment of aligning the calendar year with the fiscal year and the implementation of the national health insurance scheme with possible delays in reimbursements. However, there was sufficient flexibility in the government budget to be able to temporarily cover the expenses at the provincial level. At the district level, lack of funds for VPD surveillance, advocacy, and

communication activities were reported. At the same time there may be incoherent incentives to health workers for providing immunizations versus integrated outreach services, with financial incentives for providing immunization outreach being larger than those for other services.

Generally, in the case of emergencies, such as outbreaks, the NIP can apply for contingency funds through the Ministry of Health. The NIP also has the ability to outsource to private companies for technical support, in particular, with cold chain management and maintenance.

NIP Review recommendations on financing

The following recommendations, several of which are a reiteration of those mentioned in recent reviews, including the health financing system assessment (World Bank Group, Lao PDR MOH, Australian Aid, and Gavi, 2017), are outcomes of the NIP review 2018.

- MOF, MPI, MOH-DPC, MOH-DOF, NIP, other programmes and partners to strengthen government stewardship and capacity to manage multiple program transitions from external to domestic financing, and coordination across national, provincial, and district level, ensuring that there is no increased risk of OOP health payments during and beyond the transition period.
- MOH-DPC, MOH-DOF, NIP, MOF and MPI to further integrate the immunization transition plan within the context of other program transition plans and health sector reform. Specific actions of the transition plan include continuing to increase government co-financing of routine vaccines and operational costs; managing the knowledge transfer with contract staff and discuss options for post-transition of human resources management; and designing coherent incentives for uptake of fixed site services and integrated outreach.
- MOH-DOF and MOF to analyse fiscal space for health and feasible options to progress in the health sector reform in support of immunization financing and other program financing transition plans, in addition to other areas of priority in the health sector reform.
- MOH-DPC and MOH-DOF to improve the planning and budgeting processes, including completion of microplanning and linkages across planning, budgeting, and financing based on need at provincial, district, and health facility levels.
- MOF to strengthen financial management capacity at all levels, including discussions on how to improve the disbursement schedule and where the bottlenecks are with support by The World Bank. Flexibilities are to be maintained regarding government budget available for emergencies and extension of fund expiration when funds are delayed.
- MOH to enable use of financing mechanisms and incentives to support integrated service delivery. Financing for specific program areas and incentives (e.g. for integrated outreach) are critical to the immunization program and its linkage with other programs.
- All decision makers to build and use more evidence, including the monitoring and evaluation analytical functions within the Ministry of Health and other institutes to support improved health system performance and health policy development; stronger linkages to financial information; and establishment of clear criteria and transparent, decision-making process involving multiple stakeholders for public financing of interventions, such as the introduction of new vaccines.

cMYP costing

The two recent cMYPs (2012-2015 and 2016-2020) provide details on costs and sources of funding of routine and SIAs as well as on domestic and external funding for vaccine and operational costs. The cMYP costing tool was adapted and used to estimate costs of the immunization system for the years 2019 to 2023 in line with the cMYP goals and including the introduction of HPV and Rotavirus vaccines.

Large increases in NIP costs are evident since 2012 due to both the extension of immunization services and to the introduction of additional vaccines. For the coming 5 years, financial commitments and provisions have been made to ensure that Lao PDR will be able to fulfil its co-financing requirements and payments for traditional vaccines. In the Gavi accelerated transition phase co-financing increases progressively until the country will fully self-finance its pentavalent and PCV vaccines in 2022, and HPV and rotavirus vaccines in 2023. Gavi estimates that Lao will need to pay US$2.89 million for pentavalent vaccine and PCV by 2022. It is assumed that IPV will be fully funded by Gavi through 2022.

FIGURE 13: GAVI CO-FINANCING PROJECTION 2019-2023

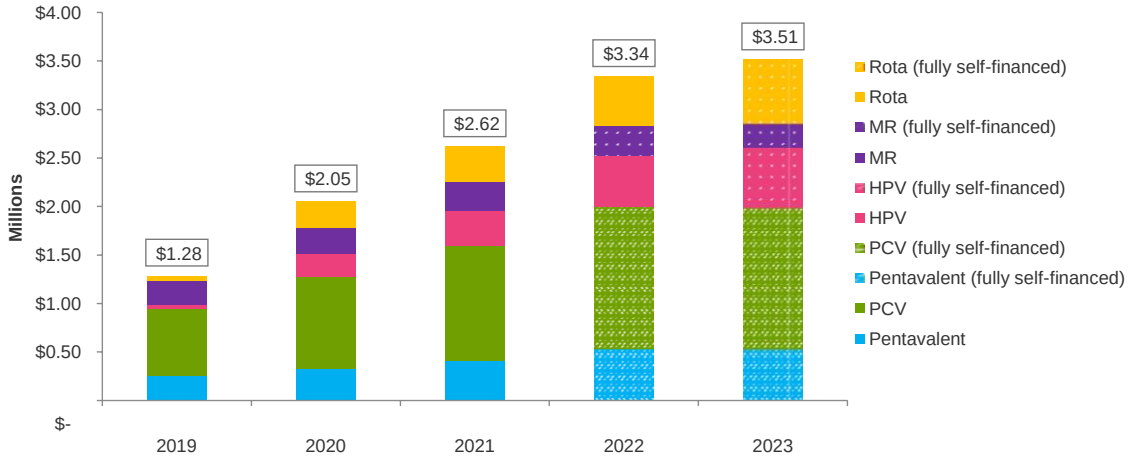


TABLE 12: GAVI CO-FINANCING PROJECTIONS 2019-2023 (US$)

Vaccine / Year	2019	2020	2021	2022	2023
Pentavalent	250,585	329,190	406,568	533,777	529,667
PCV	695,242	944,038	1,189,008	1,467,179	1,455,884
MR	242,013	264,446	289,890	307,683	244,252
HPV	43,858	240,869	365,942	522,108	614,213
Rotavirus	50,044	268,354	363,969	507,211	666,949
Total	**1,281,742**	**2,046,898**	**2,615,378**	**3,337,958**	**3,510,964**

The government in committed to increasing the General Government Health Expenditure to 9% of General Government Expenditure. As such, domestic funding for immunization is increasing particularly for HR, infrastructure, cold chain equipment and vaccines, but is still largely insufficient for operational

costs (service delivery, transportation, supervision, surveillance, monitoring, maintenance, communication and social mobilization and incentives for outreach activities) particularly at district and health center levels and for hard to reach populations.

Donor environment

The European Union, WHO and the H6 in the UHC partnership can improve support to Lao PDR through provisions to the social health insurance and other possible taxation mechanisms. The WB support for outreach (both integrated and non-integrated) has the potential to fund immunization services to address equity issues and link with integrated approaches to health care provision.

Key NGOs, including Lao Far, Village Forecast International, NPA, Promotion Family Health Association, CARE, Save the Children Australia and PLAN could play a role in demand generation and service delivery in places with weak government infrastructure and their continued engagement in the ICC will be critical.

There has been no support from JICA for NIP in the present 5-year plan and it is unlikely that JICA will further support the NIP. However, JICA do support four provinces in the South with strengthening of community health approaches. JICA is an important partner in the UHC agenda and is expected to jointly support integrated approaches to outreach together with the WB.

LuxDev supports three central provinces with 39 districts and about 1.0 million people in areas of governance, health information systems, infrastructure, quality of care, capacity building and quarterly budget support for static and outreach services.

The Global Fund for AIDS, TB and Malaria (GFATM) is supporting the integrated management in MoH (so far outside MoF). Moving GFATM specific planning groups into main stream MoH planning and financing units is challenging. GFATM support will end in 2023. There is a major malaria initiative to knock out drug resistance and achieve eradication with a budget of US$700 million per year. TB/HIV funds were reduced to US$7.5 million each for 3 years (about US$5 million per year in total), thus to about half of previous funding levels. GFATM also levies a 15% co-financing contribution by the MoH and lessons learned here will be crucial for the financial sustainability in the overall health sector.

Costing summary (cMYP costing tool)

Expenditures on Immunization in 2017

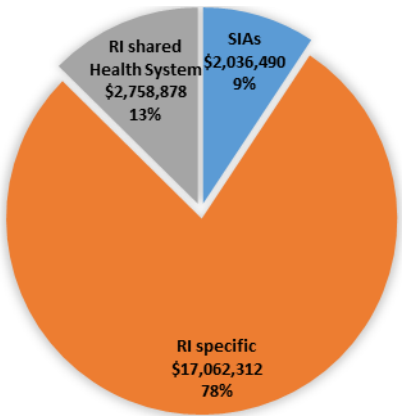
Overall immunization expenditures in 2017 reached almost US$22M. Some 9% of the total health expenditures (or 16% of the government health expenditure) was spent on routine immunization in 2017.

TABLE 13: BASELINE INDICATORS 2017

Baseline Indicators	2017
Total Immunization Specific Expenditures	**$19,098,802**
Supplemental immunization activities	$2,036,490
Routine immunization only	$17,062,312
Per capita	$2.55
Per DTP3 immunized child	$112.85
% Vaccines and Supplies	36.0%
% Government Funding	52.4%
% Of Total Health Expenditures (THE)	8.5%
% Government Health Expenditures	16.4%
% GDP	0.1%
Total shared costs	**$ 2,758,878**
% Shared Health Systems Cost	12.6%
Total Immunization Expenditures	**$21,857,680**

Shared health system costs (US$2.8 million) accounted for 13% of the immunization expenditures in 2017. The major part of costs was incurred for routine immunization specific activities (78%) and SIAs (9% of total expenditures for immunization in 2017). The cost of fully (DTP3) immunized child was 113 US$ in the baseline year, which was relatively high, but driven by the costs for the combined OPV/MR SIAs conducted in the baseline year among under 5 children.

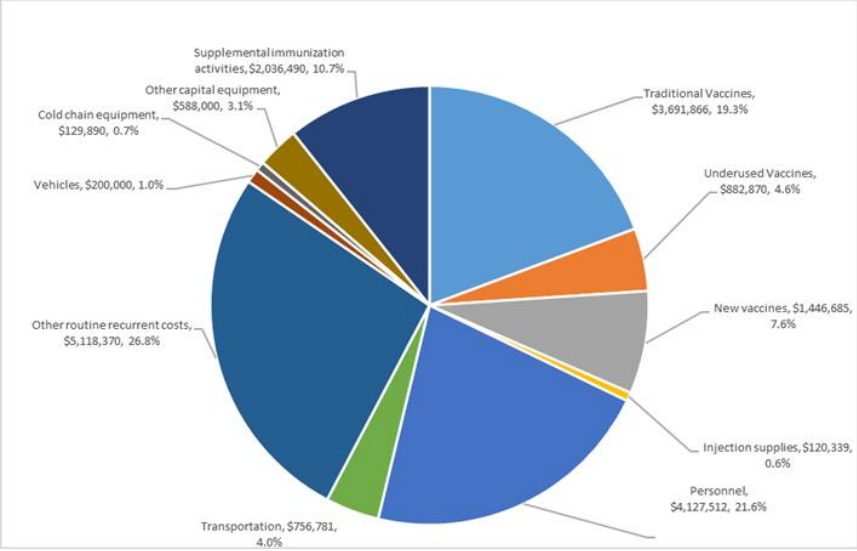
FIGURE 14: SHARED HEALTH SYSTEM COSTS OF ALL ROUTINE IMMUNIZATION EXPENDITURES



"Vaccines and injection supplies" were the major cost driver accounting for 36% (or US$6.1 million) of all expenditures as shown in Figure 15 below. "Other routine recurrent costs" were the second major cost driver accounting for 30% (or 5.1 million US$) of all immunization specific expenditures, followed by "Personnel" costs accounting for 24% (or 4.1 million US$) of the total expenditures on immunization. 4% of program expenditures (or 0.76 million US$) was spent on transportation and approximately 3% (or

0.59 million US$) of routine immunization costs was spent on procurement of other capital equipment. 1% of routine immunization expenditures (or 200,000 US$) was spent on vehicle procurement. Costs for cold-chain equipment accounted for only 1% (or 129,890 US$) of routine immunization expenditures in the baseline year (2017), while costs of SIAs accounted for 11% (or 2.04 million US$) of total immunization specific expenditures.

FIGURE 15: MAJOR EXPENDITURE CATEGORIES, ROUTINE IMMUNIZATION (2017)



Routine immunization cost structure

Personnel

Out of the total of more than 3000 staff engaged in the national immunization program, 2,881 persons allocate only a portion of their work to the immunization program) and 187 persons were immunization specific personnel dedicating full time to the immunization. District and province level EPI managers (148 and 18 respectively) constituted the great majority of immunization specific staff.

Vaccines

In total 3.7 million US$ (or 60% of total cost of vaccines and injection supplies) were spent on traditional vaccines, approximately 0.9 million US$ (14% of total expenditures for vaccines and injection supplies) was spent on underused vaccines and nearly 1.4 million US$ (or 24% of total costs of vaccines and injection supplies) on new vaccines in 2017. The total expenditures on vaccines and injection supplies amounted to 6.1 million US$ which constituted 32% of total program costs (or 36% of routine immunization costs) in the baseline year.

Other routine recurrent costs

The total for "other routine recurrent costs" in the baseline year (2017) amounted to 3.7 million US$ (22% of total program costs). "Program Management" was the main cost driver of "Other routine recurrent costs" accounting for 15% of (or 2.9 million US$) of total program costs, followed by "short-term trainings" accounting for 4% (or 335,000 US$) of total program costs. This was followed by 2.6% (or

0.5 million US$) of total program costs spent on “building overheads (electricity, water, etc.)” and “Cold-chain maintenance and overhead” costs accounting for 2.5% (0.47 million US$) of total program costs. “IEC/Social Mobilization “consumed only 2% (or 368,080 US$) of total program costs.

Vehicles and Transportation

In total US$200,000 was spent on vehicle procurement during the baseline year (2017), which constituted 1% of total recurrent expenditures on routine immunization.

Supplemental Immunization Activities (SIAs)

During the baseline year, the NIP conducted a joint OPV and MR campaign among 0-5 year old children. The total cost of this SIA was US$ 2,036,490, out of which US$ 570,000 was spent on vaccines and injection supplies. The operational cost of the campaign amounted to US$1.5 million.

Immunization financing in 2017 (baseline year)

The Government of Lao PDR was the major source of financing of the national immunization program in the baseline year. The government funding of 9.4 million USD$ accounted for 49% of all funds if shared health system costs are excluded and 57% (12.8 million US$) if shared health system costs are included as shown in figure 16 below.

Gavi was the second major source of funding accounting for a combined (including HSS funds channelled through WHO and Unicef) 29% share of financing when shared health system costs are accounted for. In 2017 Gavi provided in total 6.5 million US$ out of which 1.9 million US$ were provided through New Vaccine Support (NVS) program (constituting 8.3% of total funding including shared health system costs or 9.7% of total funding excluding shared health system costs). 3.8 million US$ were provided through the HSS program implemented by NIP, accounting for 16.9% of total funding if health system costs are included and 19.8% excluding shared health system costs.

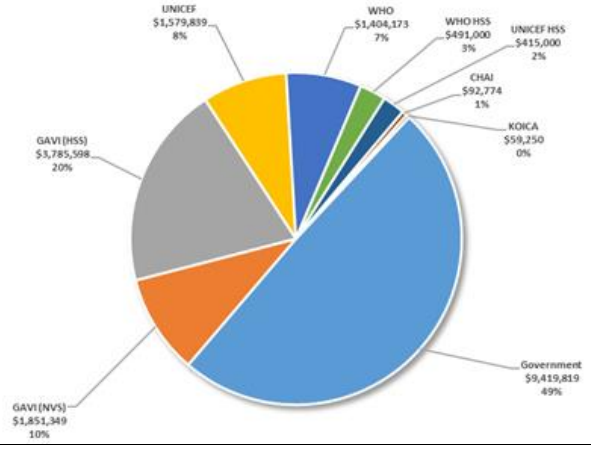
The contribution of UNICEF in the amount of US$1.6 million accounted for 7% of total program costs if shared health system costs are included or 8%, if shared health system costs are excluded.

WHO contributed US$1.4 million (6% of total funding when shared health system costs are included or 7% when shared health system costs are excluded).

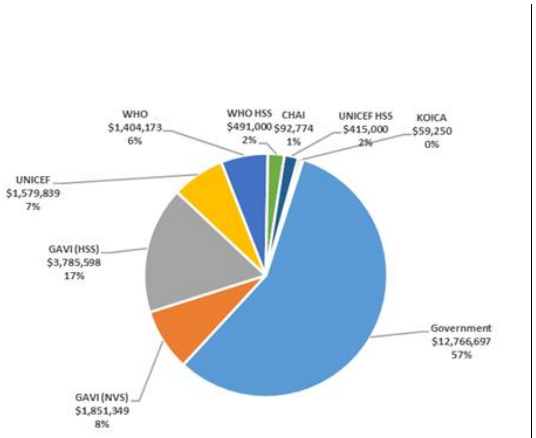
WHO / Gavi HSS contributions amounted to 491,000 US$, which constituted approx. 2% of total program costs with shared health system costs and 3% excluding shared health system costs. Unicef / GAVI HSS contribution of 415,000 US$ constituted approximately 1.9% including shared health system costs and 2.1% excluding shared health system costs.

FIGURE 16: IMMUNIZATION FINANCING 2017

Excluding shared health system costs



Including shared health system costs



Future resource requirements

The total resource requirements for the national immunization program during the period 2019-2023 were estimated at approximately US$103 million (including shared health system costs).

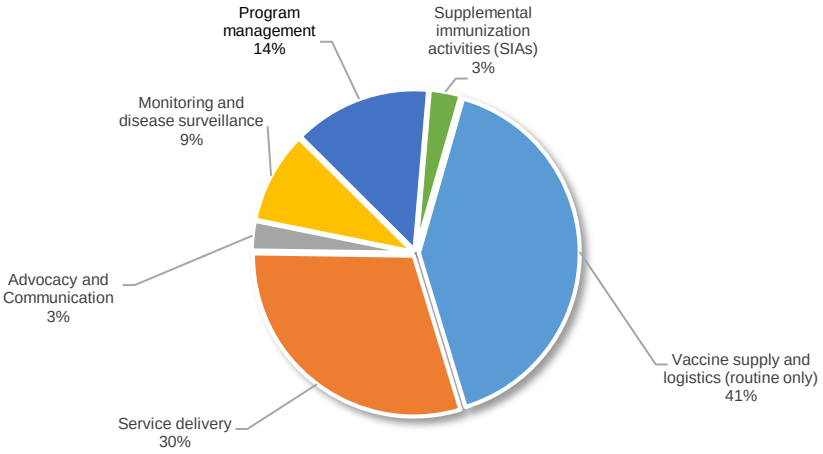
TABLE 14: NATIONAL IMMUNIZATION PROGRAM COSTS SUMMARY BY SYSTEM COMPONENT – BASIC SCENARIO

Immunization system components	Expenditures	Future resource requirements					
	2017	2019	2020	2021	2022	2023	Total 2019 - 2023
Vaccine supply and logistics (routine only)	6,963,565	9,869,642	7,839,885	6,084,059	5,795,846	6,000,286	**35,589,719**
Service delivery	4,207,321	6,027,892	5,105,208	5,516,326	4,504,464	4,906,756	**26,060,647**
Advocacy and Communication	368,080	1,005,000	690,000	295,000	290,000	290,000	**2,570,000**
Monitoring and disease surveillance	1,353,472	1,687,472	1,724,972	1,542,472	1,549,972	1,577,472	**8,082,358**
Program management	4,169,875	3,440,152	2,607,975	2,011,014	2,034,334	2,002,921	**12,096,397**
Supplemental immunization activities (SIAs)	2,036,490	1,296,477	0	0	1,399,339	0	**2,695,816**
Total immunization Immunization costs	**19,098,802**	**23,326,635**	**17,968,040**	**15,448,871**	**15,573,956**	**14,777,435**	**87,094,936**
Shared Health Systems Costs (EPI Portion)	2,758,878	2,889,429	2,992,442	3,109,229	3,226,018	3,342,811	**15,559,929**
Total immunization resource requirements	**21,857,680**	**26,216,063**	**20,960,482**	**18,558,100**	**18,799,974**	**18,120,246**	**102,654,865**

Description of cost drivers of future resource requirements

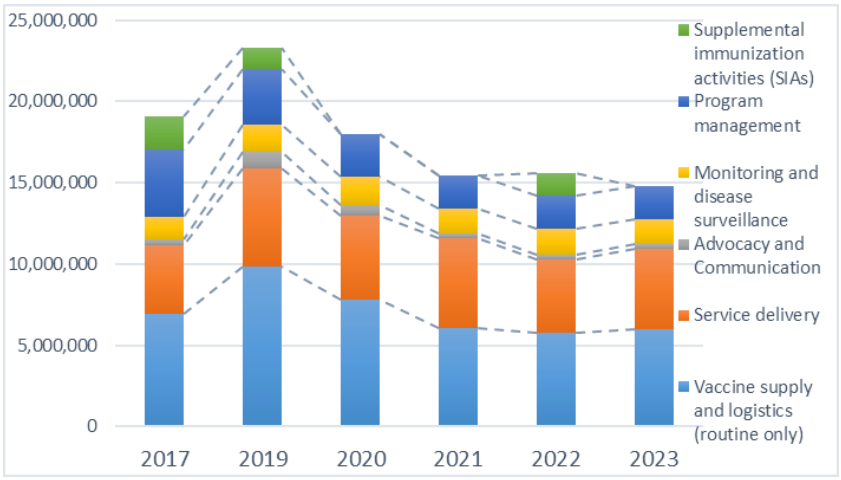
"Vaccine supply and logistics" is the major cost driver of the future resource requirement accounting for 41% of the total costs for 2019-2023 as shown in Figure 17 (excluding shared health system costs). "Service delivery" is the second major cost driver and accounts for 30% of the future resource requirements followed by 14% required for "Program Management" and 9% for "monitoring and disease surveillance". Resource requirements for "SIAs" and "Advocacy and Communication" during the cMYP period account for approximately 3% for each component

FIGURE 17: FUTURE RESOURCE REQUIREMENT STRUCTURE BY CMYP COMPONENT (SHARED COSTS EXCLUDED):



When shared health system costs are excluded, the annual resource requirements for the routine immunization program vary between US$14 and US$23 million over the course of the cMYP period (2019-2023). In the first projection year (2019) the resource requirements for routine immunization will increase by 22%, from approximately US$19 million in the baseline year to US$23 million in the first year of projection (2019). This increase is attributable to the introduction of two new vaccines (HPV and Rotavirus) and the implementation of the MR SIA, requiring substantial financial resources. In the second projection year (2020) routine immunization resource requirements will decrease again by 23% (or US$5.4 million) in the absences of any planned SIAs or implementation of new vaccine strategies. Resource requirements for routine immunization will further decreasing by 14% (or by US$2.5 million) in 2021, followed by a modest 1% increase (or US$125,000) in 2022, the year of a planned SIA. In the final year of projection 2023, the routine immunization resource requirements will decrease again by 4% (or US$715,000). The planned supplementary immunization activities (Polio and MR campaigns) in 2019 and 2022 increase immunization program resource requirements by US$2.7 million US$ over the course of cMYP cycle.

FIGURE 18: STRUCTURE OF FUTURE RESOURCE REQUIREMENTS BY CMYP COMPONENT (SHARED COSTS EXCLUDED):



Vaccine and injection supplies

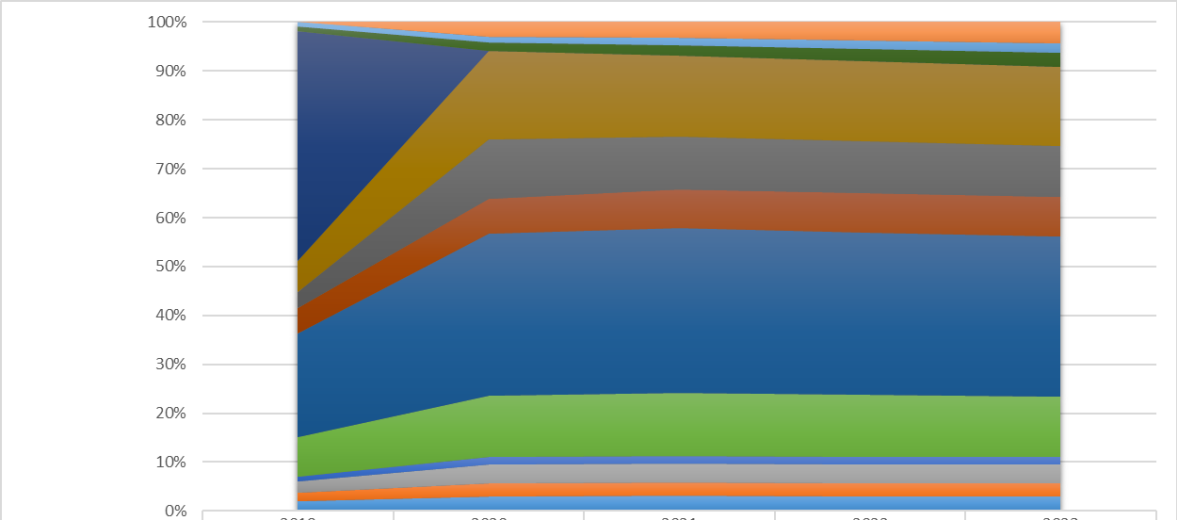
The following assumptions were used for the projection of vaccine and injection supply requirements:

Coverage rates were set in line with the objective and targets of National Immunization Program by 2023.Wastage rates are estimated at 80% for BCG and at 35% for OPV and MR vaccines. For Td vaccine the target wastage rate was set at 25% and for JE vaccine at 20%. For the rest of vaccines included in the national immunization schedule, the wastage targets were set at 5%.

The present projections for vaccines are based on loaded vaccine prices, which include estimates provided by the UNICEF Supply Division and all overhead costs related to vaccine insurance, handling and transportation to the country.

The resource requirement projections for vaccines (basic scenario) envisages costs of the following vaccines: Traditional vaccines: BCG, OPV, MR1, Td and Hepatitis B birth dose, JE and influenza vaccines; Underused vaccines: Pentavalent and MR2 vaccines (set as 'underused' solely for the appropriate use of the cMYP costing tool); New vaccines: PCV, IPV, HPV, Typhoid and Rotavirus vaccines. An illustration of the structure of routine vaccine and injection supplies costs is provided below (Figure 19).

FIGURE 19: VACCINE AND INJECTION SUPPLIES COST PROJECTIONS (ROUTINE IMMUNIZATION)

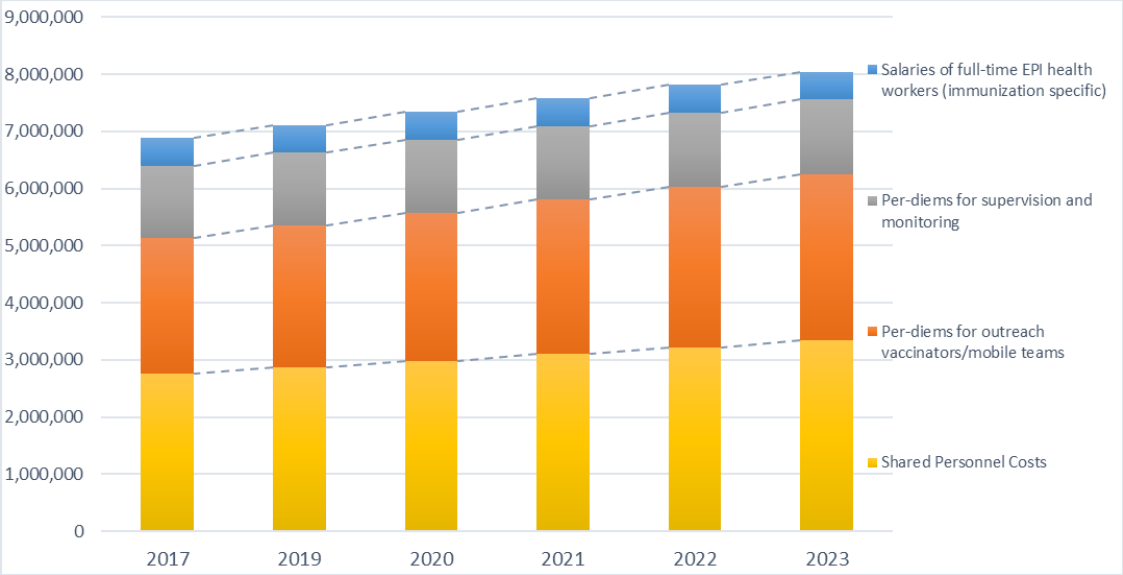


	2019	2020	2021	2022	2023
Thyphoid	$0	$150,717	$161,130	$194,729	$229,299
MR2	$69,404	$57,186	$76,100	$91,970	$108,299
Flu	$66,229	$87,730	$110,021	$132,961	$156,564
HPV first year 10-14	$3,599,753	$0	$0	$0	$0
Rota virus vaccine	$488,050	$925,438	$833,784	$846,291	$858,985
HPV - routine	$247,019	$618,510	$544,357	$552,522	$560,810
IPV	$404,144	$367,013	$401,445	$429,800	$430,692
PCV	$1,611,136	$1,687,708	$1,699,865	$1,725,363	$1,751,243
DPT-HepB-Hib	$624,225	$640,226	$648,160	$657,882	$667,751
HepB (Birth Dose)	$68,673	$74,554	$75,697	$77,840	$80,031
Td	$0	$0	$0	$0	$0
MR1	$190,657	$195,544	$197,967	$200,937	$203,951
OPV	$130,175	$136,361	$137,343	$139,403	$141,494
BCG	$147,531	$154,543	$155,659	$157,994	$160,364

Personnel

Personnel costs were estimated at US$ 18 million for the period 2019-2023, and salaries of the shared personnel were estimated at approximately US$16 million accounting for 86% of total resource requirements for salaries. Shared salary costs for NIP staff constitutes the remaining 14%.

FIGURE 20: PERSONNEL COSTS BY COST CATEGORY AND YEAR (ROUTINE IMMUNIZATION)



The personnel costs such as per diems related to outreach vaccination, supervision and monitoring remain relatively constant throughout the baseline and projection years at the levels of 2.4-2.9 and 1.3 million US$ respectively as shown in **Error! Reference source not found.**. Increasing personnel costs are explained by the NIP plans of recruiting additional personnel at the district and health center level to strengthen fixed site service delivery capacity and gradually reduce outreach service delivery.

Cold chain equipment

The NIP plans to make significant investments in cold chain capacity strengthening and upgrading of the cold chain equipment at service delivery points across the country in the first two years of projection. Investments will be made in solar fridges, cold boxes, vaccine carriers, cold rooms, RCW or MK refrigerators, generators and stabilizers. Cold chain equipment will be the major cost driver accounting for 56% of cold chain related resource requirements over the projection period (or 2% of total program resources requirements).

TABLE 15: COLD CHAIN RESOURCE REQUIREMENTS:

	2017	2019	2020	2021	2022	2023	Total 2019-2023
Cold chain maintenance and overhead	$469,415	$504,268	$571,578	$571,578	$102,163	$102,163	**$1,851,750**
Cold chain equipment	$129,890	$1,034,083	$1,346,202				**$2,380,285**
Total	**$599,305**	**$1,538,351**	**$1,917,780**	**$571,578**	**$102,163**	**$102,163**	**$4,232,035**

Cold chain maintenance and overhead costs account for 44% of the 4.2 million US$ estimated to cover the cold chain related needs as shown in table 15 above.

Other recurrent costs

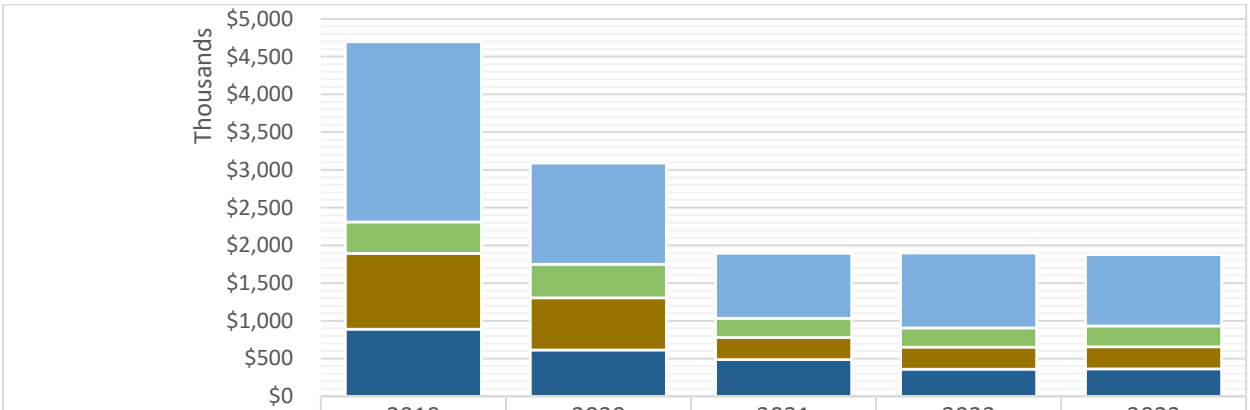
Out of the total of approx. US$19 million required for activities and other routine recurrent costs, 32% or US$6.1 million will be required to cover “program management”, followed by “maintenance and overhead costs” accounting for 31% (or US$5.8 million). The latter consists of “Building overheads,

electricity, water, etc." (18% of total other recurrent costs), "cold-chain maintenance costs" (10% of total other recurrent costs) and "maintenance of other capital equipment" (3% of total other recurrent costs).

"Short-term training" and "IEC/Social Mobilization" account for approx. 14% of routine recurrent costs each and "Disease Surveillance" for 9% of these recurrent costs.

The five-year trend of the "activities and other recurrent costs" shows a significant drop in planned costs for program management and disease surveillance, coinciding with the anticipated end of donor funding, mirroring the dependence of both components on external funding (see Figure 21).

FIGURE 21: FUTURE RESOURCE REQUIREMENTS FOR ACTIVITIES AND OTHER RECURRENT COSTS (TOTAL US$13.455M)

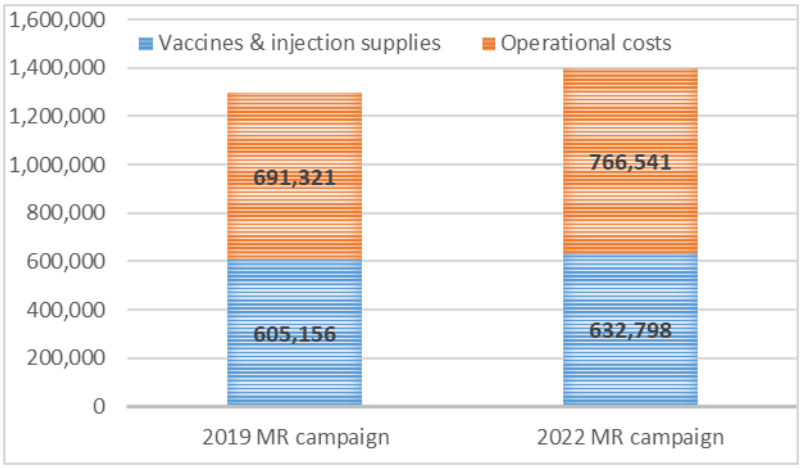


	2019	2020	2021	2022	2023
Program management	$2,384,679	$1,340,020	$860,000	$995,000	$945,000
Disease Surveillance	$415,000	$445,000	$255,000	$255,000	$275,000
IEC/Social Mobilization	$1,005,000	$690,000	$295,000	$290,000	$290,000
Short-term training	$890,000	$615,000	$485,000	$360,000	$365,000

Supplementary immunization activities

The total cost of two rounds of MR campaigns in 2019 and in 2022 was estimated at 2.7 million US$. The cost structure of these campaigns is shown below (Figure 22). The projection of operational costs of the campaigns was calculated based on historical unit costs and established at 0.92 US$ per immunized child.7

FIGURE 22: FUTURE RESOURCE REQUIREMENTS FOR SIAS 2019 AND 2022



Future financing and funding gaps

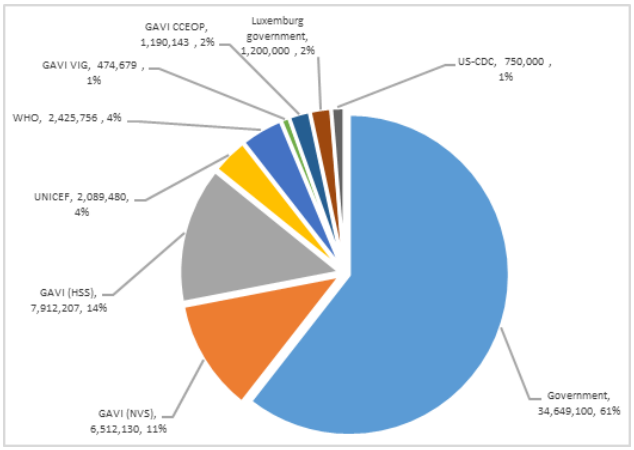
The total financing (secured and probable) for 2019-2023 is estimated at 72.8 million US$ (including shared health system costs) or at 57.2 million US$ (excluding shared health system costs).

- The government of Lao PDR will be the major source of financing of the NIP. The total amount expected from the government equals 50.2 million US$ (including shared health system costs), constituting 69% of total probable and secured financing of the program.
- GAVI is the second major funding source for the Lao PDR National Immunization program and is expected to provide approximately 16 million US$ through its NVS, HSS and CCEOP programs.
- More specifically, through its NVS program GAVI is expected to provide 6.5 million US$ (or 11% of total probable and secured funding, with shared costs excluded); through the VIG approx. 0.5 million US$ (accounting for around 1% of total probable and secured funding); through the HSS program approximately 7.8 million US$ (14% of secured and probable funding during the cMYP period); while CCEOP funding is expected to the amount to 1.26 million US$ (or approx. 2% of total secured and probable funding).
- The WHO and UNICEF contributions (2.4 and 2.1 million US$ over the course of the cMYP period) will account for approx. 4% of total expected funding each.
- The government of Luxemburg will contribute 1.2 million US$ which will account for 2% of total probable and secured funding.
- US CDC will provide approximately 750,000 US$ which will account for another 1% of total secured and probable funding.

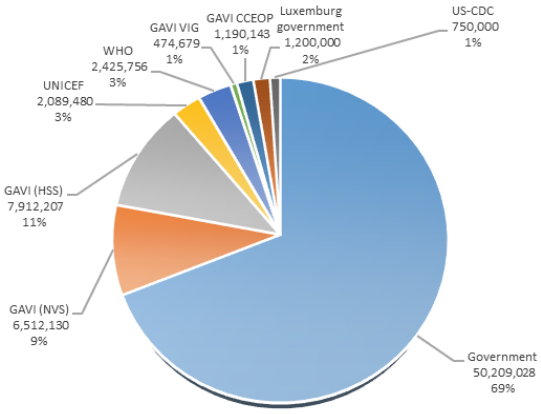
Details of the expected NIP funding during the projection period are provided below. Further program financing details can be reviewed in the annex.

FIGURE 23: FUTURE FINANCING WITH SECURED AND PROBABLE FUNDS

Excluding shared health systems costs



Including shared health systems costs



Out of the total immunization specific financing of approx. 85 million US$, 79% of funding is considered to be secured as shown below:

When only secured funding is considered (excluding shared health system costs, the share of the government financing is 71% (49 million US$ out of total 69 million US$ secured funds); the share of GAVI financing is 18% of total secured funds (approx. 12.6 million US$); UNICEF financing will account for 3% of total secured funds (or 2.2 million US$) and WHO contribution will equal to 4% of total secured funds (2.7 million US$); while the Luxemburg government will contribute less than 1% of total secured funds each (or 600,000 US$).

The secured funding is sufficient to cover about two thirds (67%) of the total resource requirements in 2019-2023 (excluding shared health system costs). The funding gap taking into account only secured financing ranges between 18% and 45% in the final year of projection with an overall funding gap of almost 34 million US$ for the whole cMYP period.

If probable funds are secured, the available financing will be sufficient to cover 71% of the total resource requirement for 2019-2023 and the funding gap range will be between 18% and 39% during the projection years with a total funding gap amounting to about 30 million US$ for the five-year period.

FIGURE 24: FINANCING BY SOURCES AND FUNDING GAP WITH SECURED FUNDS ONLY

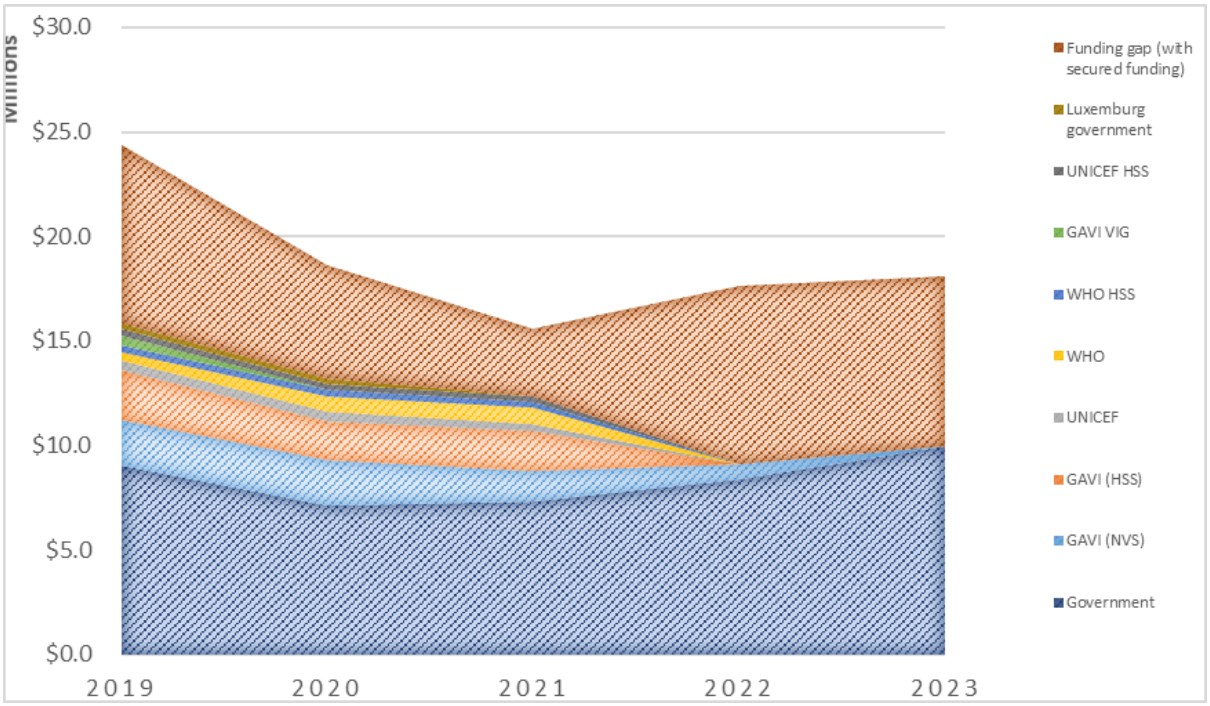
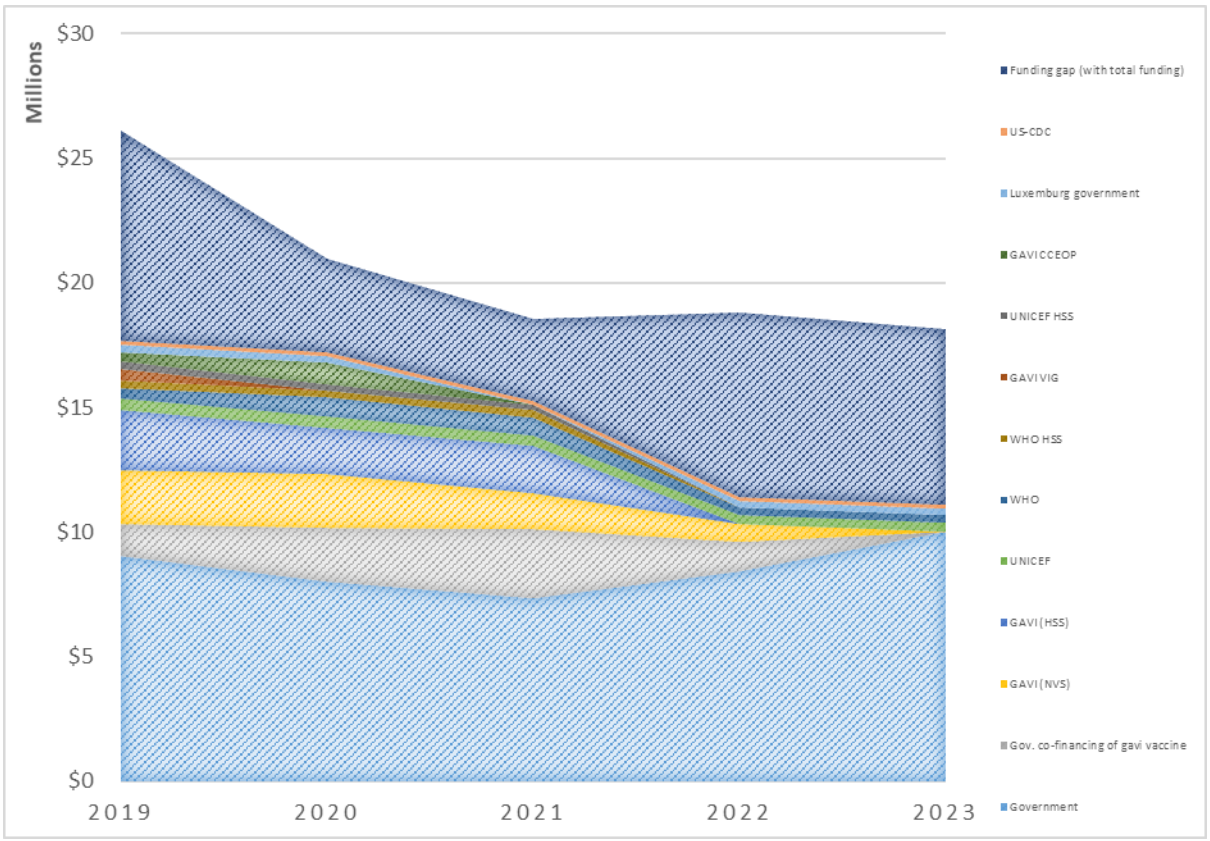


FIGURE 25: FINANCING BY SOURCES AND FUNDING GAP WITH SECURED AND PROBABLE FUNDS



Total Resource requirement	$26,216,063	$20,960,482	$18,558,100	$18,799,974	$18,120,246	$102,654,865
Secured funding						
	2019	**2020**	**2021**	**2022**	**2023**	
Government	$9,029,589	$7,151,633	$7,329,285	$8,398,646	$9,993,385	**$41,902,538**
Gov. co-financing of gavi vaccine	$1,281,562	$2,175,737	$2,794,019	$1,183,799	$0	**$7,435,117**
GAVI (NVS)	$2,187,054	$2,151,490	$1,438,485	$735,101	$0	**$6,512,130**
GAVI (HSS)	$2,382,461	$1,846,143	$1,900,103	$0	$0	**$6,128,707**
UNICEF	$490,096	$494,996	$394,796	$0	$0	**$1,379,888**
WHO	$393,500	$731,128	$731,128	$0	$0	**$1,855,756**
WHO HSS	$312,500	$282,500	$282,500	$0	$0	**$877,500**
GAVI VIG	$474,679	$0	$0	$0	$0	**$474,679**
UNICEF HSS	$305,000	$260,000	$250,000	$0	$0	**$815,000**
Luxemburg government	$300,000	$300,000	$0	$0	$0	**$600,000**
Total Secured funding	**$17,745,973**	**$15,543,628**	**$15,270,316**	**$10,317,545**	**$9,993,385**	**$68,870,847**
Funding gap (with secured funding	**$8,470,090**	**$5,416,854**	**$3,287,784**	**$8,482,429**	**$8,126,860**	**$33,784,017**
	32%	26%	18%	45%	45%	33%

Secured and Probable Financing						
	2019	**2020**	**2021**	**2022**	**2023**	
Government	$9,029,589	$7,993,244	$7,329,285	$8,398,646	$10,023,147	**$42,773,911**
Gov. co-financing of gavi vaccine	$1,281,562	$2,175,737	$2,794,019	$1,183,799	$0	**$7,435,117**
GAVI (NVS)	$2,187,054	$2,151,490	$1,438,485	$735,101	$0	**$6,512,130**
GAVI (HSS)	$2,382,461	$1,846,143	$1,900,103	$0	$0	**$6,128,707**
UNICEF	$490,096	$494,996	$394,796	$359,796	$349,796	**$2,089,480**
WHO	$393,500	$731,128	$731,128	$285,000	$285,000	**$2,425,756**
WHO HSS	$312,500	$282,500	$282,500	$0	$0	**$877,500**
GAVI VIG	$474,679	$0	$0	$0	$0	**$474,679**
UNICEF HSS	$305,000	$260,000	$250,000	$0	$0	**$815,000**
GAVI CCEOP	$348,531	$841,611	$0	$0	$0	**$1,190,143**
Luxemburg government	$300,000	$300,000	$0	$300,000	$300,000	**$1,200,000**
US-CDC	$150,000	$150,000	$150,000	$150,000	$150,000	**$750,000**
Total Funding	**$17,745,973**	**$17,226,850**	**$15,270,316**	**$11,412,341**	**$11,107,943**	**$72,763,424**
Funding gap (with total funding)	**$8,470,090**	**$3,733,632**	**$3,287,784**	**$7,387,633**	**$7,012,302**	**$29,891,441**
	32%	18%	18%	39%	39%	29%

Funding gap analysis and sustainability

Analysis of funding gap with secured funds only showed that the existing gap of approximately 34 million US$ affects all major components of the immunization system: “vaccines and injection supplies”, “Personnel”, “Transport”, “Activities and other recurrent costs”, “Logistics” (vehicles, cold-chain and other equipment) and “SIAs”.

The funding gap related to “vaccines and injection supplies” (9 million US$) accounts for 26% of the total funding gap. The gaps related to the “personnel” and “transport” components account for 26% and 20% of the total funding gap respectively. The funding gap related to the “logistics” and “activities and other recurrent costs” constitute 14% and 7% of the total funding gap. The funding gap related to the SIAs accounts for 8% of total funding gap as shown below.

TABLE 15: FUNDING GAP 2019-2023 WITH SECURED ONLY AND SECURED AND PROBABLE FINANCING:

	2019	2020	2021	2022	2023	Total
With secure financing						
Vaccines & injection supplies	3,559,259	558,216	585,347	1,866,689	2,467,222	**9,036,734**
Personnel	1,571,444	1,688,384	1,805,324	1,922,264	2,039,204	**9,026,621**
Transport	978,223	1,652,072	1,585,272	1,204,164	1,497,016	**6,916,748**
Activities and other recurrent costs	223,187	-436,585	-933,299	1,870,238	1,875,000	**2,598,541**
Logistics (vehicles, cold chain and other equipment)	2,177,700	1,954,767	245,139	219,734	248,418	**4,845,758**
Supplemental immunization activities	1,296,477	0	0	1,399,339	0	**2,695,816**
Total funding gap	**9,806,290**	**5,416,854**	**3,287,784**	**8,482,429**	**8,126,860**	**35,120,217**
With secure and probable financing						
Vaccines & injection supplies	3,559,259	558,216	585,347	1,696,893	2,297,426	**8,697,142**
Personnel	1,571,444	1,688,384	1,805,324	1,922,264	2,039,204	**9,026,621**
Transport	978,223	1,652,072	1,585,272	1,204,164	1,497,016	**6,916,748**
Activities and other recurrent costs	223,187	-436,585	-933,299	945,238	930,238	**728,779**
Logistics (vehicles, cold chain and other equipment)	841,500	271,544	245,139	219,734	248,418	**1,826,335**
Supplemental immunization activities	1,296,477	0	0	1,399,339	0	**2,695,816**
Total funding gap	**5,372,597**	**3,793,893**	**3,586,413**	**5,585,902**	**6,939,748**	**29,891,441**

Further analysis of the funding gap structure (with secured funds only) shows that the funding gap related to the "vaccines and injection supplies" accounts for 31% of total resource requirements for this cost category implying that if sufficient funding is not secured, the NIP may not be able to reach its coverage targets, given the risk of potential vaccine shortage. Therefore, if the funds are not secured the NIP may need to revise its strategy and implementation action plan related to the procurement of vaccines, coverage and wastage and overall service delivery strategy.

"Personnel" related funding gap in the amount of 9 million US$ accounts for 40% of total resource requirement for this category, implying that if sufficient funding is not secured, the NIP may not be able to strengthen its HR capacity through further recruitment and deployment at all levels of the immunization system.

The funding gap related to "Transport" of approximately 7 million US$ accounts for 79% of the total resource requirements in this cost category and implies that the program may not be able to upgrade its fleet to improve transportation of vaccines and outreach services and may therefore need to consider alternative strategies for ensuring effective distribution and delivery of vaccines.

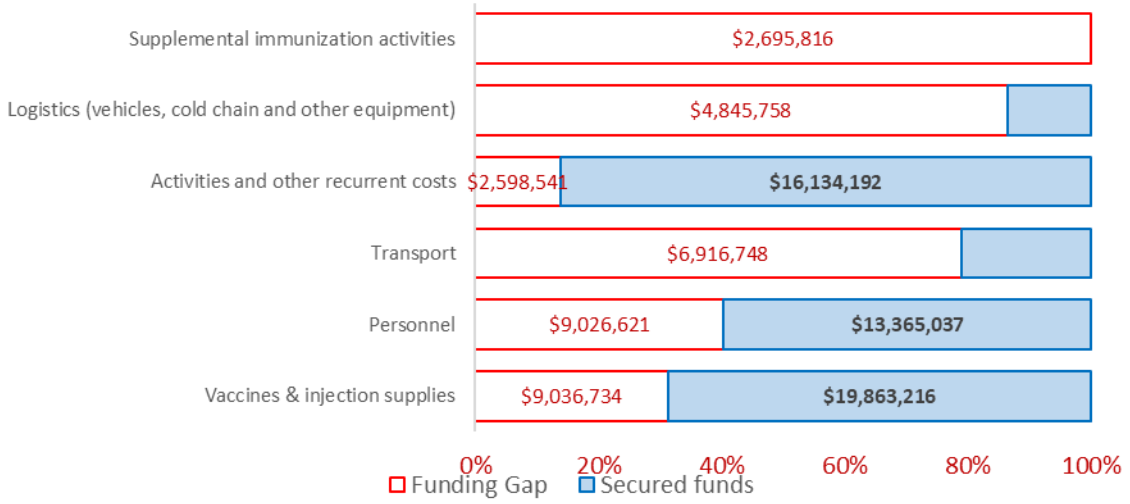
The "activities and other recurrent costs" related funding gap, in the amount of approximately 2.6 million US$ accounts for 14% of total resource requirements of this cost category and implies that without sufficient funding, the NIP may not be able to implement all planned activities and thus may have to revise its cMYP strategy and implementation action plan related to important components such as disease surveillance, IEC/Social Mobilization, capacity building and program management.

The funding gap (with secured funds only) for "Logistics, cold chain and other" of 4.8 million US$ accounts for 86% of resource requirement under this category, suggesting that if probable funds and additional funding are not secured, the NIP may not be able to procure the necessary cold chain equipment, install the maintenance hubs for rehabilitation of cold chain equipment as planned, which in turn may put at risk effective vaccine management including new vaccine rollout and put at risk the further improvement of the quality of immunization services.

The SIA related funding gap in the amount of US$2.7million accounts for 100% of the total resource requirement for this category, implying that if the probable funds and additional financing will not be

secured, the NIP may not be able to implement the two planned rounds of MR campaigns during the cMYP period putting achievement of key progam objectives at risk. In this case, the NIP may need to resort to alternative scenarios to reach and maintain the necessary MR immunization coverage levels throughout the cMYP period.

FIGURE 26: FUNDING GAP 2019-2023 - WITH SECURED FUNDS ONLY - BY MAJOR COST CATEGORIES:



The analysis of the program funding with secured and probable funding shows that even with all probable funds secured, the NIP still will need to secure approximately 30 million US$ to ensure financial and programmatic sustainability of the NIP.

Financial sustainability strategies

Strategies to ensure financial and programmatic sustainability of the NIP during the cMYP period 2019—2023 period could include the following:

- Increasing the reliability of financing from the domestic sources. This would include advocacy with the MoH for the timely full release of funds for critical components of NIP such as vaccine procurement, cold-chain rehabilitation, disease surveillance and program management.
- Securing probable funds, through additional advocacy and fundraising activities related to the implementation of the National MR follow-up campaigns.
- Revising the present outreach service delivery strategy with a more rapid increase of static clinics to substantially reduce transport and staff costs for outreach.
- Optimizing immunization program activities with a further integration of immunization with other health service delivery components to allow sharing of costs of program activities
- Reaching consensus with key stakeholders on immunization coverage and wastage targets in order to optimize resource requirements for procurement of vaccines and immunization supplies.
- Completing the Health Financing Strategy (HFS) 2021-2025, including the NIP into HFS with costing contributions building on the cMYP.

ANNEX:

cMYP activity sheet with budget, responsibilities and timelines

Assumptions used for cMYP costing

The following assumptions were used for macroeconomic projections for the cMYP costing exercise:

- GDP per capita (in current US$) was estimated at 2,270 in 2017 (according to World Development Indicators Database 2018).
- 7% - 8% range of GDP annual growth rate in accordance with the WB annual GDP growth rate forecast.
- Total Health Expenditure (THE) per capita was US$30 in 2017 (according to the World Development Database). THE per capita projections were made using the GDP per capita annual growth rate within the range of 7-8% as described above.
- GHE as % of THE – constant value at the rate for the baseline year (2017) – 52% (in accordance with the WHO and WB Fact Sheets 2017 and Health Financing System Assessment Dec. 2017).
- Total population estimated at 6,682,696 in 2017 (in accordance with data provided by NIP Lao PDR).
- Population growth projected at annual growth rate of 1.5% (in accordance with the MoH data).
- Infant mortality rate – constant at the rate 49 per 1000 live birth in 2017 (in accordance with WHO Global Health Observatory).
- Number of Childbearing Age Women (CBAW) in 2017 approx. 1.857 Million or 27% of total population.
- Girls in grade 5 make up 1.1% of the population (approx. 75,500 in 2017) and girls aged 11-14 make up 4.4% of the population (approx. 302,000 in 2017).