Republic of Mozambique

Ministry of Health

National Immunization Program

Comprehensive multi-year plan (cMYP)
2020 - 2024

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Executive Summary

The Republic of Mozambique is committed to the attainment of the Sustainable Development Goals and the Universal Health Coverage with equitable services in the center that is being translated through the primary Health care approach.

The Ministry of Health, National Immunization Program aligning with the national Development & National Health strategic plan (2019-2024) has developed its 4th Costed comprehensive Multiyear plan 2020-2024, to guide priority immunization activities for all eligible population in Mozambique aiming to provide equitable immunization services to continue prevent mortality, reduce morbidity, contribute to the control, elimination and eradication of targeted Vaccine Preventable Diseases. It also aims to contribute to the reduction of mortality from the targeted Vaccine preventable diseases along the life course beyond infants and children using the integrated service provision model.

This plan will guide the Provincial, District, Health facilities and stakeholder's development of their annual Immunization operational plan and will serve to mobilize and advocate for the required resources. The inter-agency coordination committee will be re-vitalized to monitor the progress of implementation as per the set timeline while a comprehensive program review will be conducted by mid-2024. The National Immunization Technical Advisory Group will provide evidence-based recommendation for the new vaccines introduction or any schedule change. The revised Reach Every District strategy with its full components implementation will be operational in all Health facility catchment area to ensure Immunization service is provided to all eligible population and empowers the local community for their engagement. The National Immunization policy will be updated and disseminated to ensure standard policy practices implementation towards quality immunization services. Among the planned additional antigens that are envisaged to be introduced are vaccine against HPV, introduction of Birth dose of Hepatitis B the switch from using Tetanus toxoid to Td formulation with revision of schedule.
The current cMYP, 2020-2024 is estimated to cost $316,289,134. in the 5 years of its life that will be updated on annual basis to accommodate realistic changes that may occur anticipating the post 2020 Global and Immunization targets aligned with the Sustainable Development Goals.
The National Immunization program will work with its supporting partners such as the GAVI, WHO, UNICEF, USAID and Village Reach to mobilize the resources required to meet the objectives set in this plan, which will be the working document for the Ministry of Health Immunization program in the next 5 years. It will be from the cMYP that will be drawn the annual EPI working plans and, through the measurement of indicators contained in the document, it will also be used to monitor the progress towards the achievements of several objectives that the government and partners have proposed themselves to achieve within the national immunization program.

1. INTRODUCTION

1.1 Country Profile

The Republic of Mozambique lies in the south east of Africa with a total surface area of 799,380 km^2 and a population estimated at 29 494 628 (2019 mid-year population estimates). The country has 11 provinces and 163 districts. Maputo is the country's economic and political capital. Mozambique is bordered by South Africa, Eswatini, Zimbabwe, Zambia, Malawi and Tanzania. The population density varies from 35 inhabitants per km^2 in Nampula to 6 inhabitants per km^2 in Niassa.

1.2 Demographic and Health indicators

According to the National Institute of Statistics (INE) the total population of the Republic of Mozambique is 29 494 628 (2017 population census). The cMYP has been developed based on the projection of the population. Table 1 outlines the total population for the different age categories for the Republic of Mozambique

Table 1. Demographic Characteristics; Republic of Mozambique

	2020	2021	2022	2023	2024
Total Population	31,354,776	32,232,710	33,135,226	34,063,012	35,016,776
Births	1,410,965	1,450,472	1,491,085	1,532,836	1,575,755
Surviving infants	1,316,007	1,352,855	1,390,735	1,429,676	1,469,707
DTP-immunized children (proxy)	1,118,606	1,285,212	1,321,198	1,358,192	1,396,221
Pregnant women	1,410,965	1,450,472	1,491,085	1,532,836	1,575,755
Childbearing age women	7,807,339	8,025,945	8,250,671	8,481,690	8,719,177

The population growth rate in the Republic of Mozambique is 2.8%. Table 2 summarizes the demographic and health indicators.

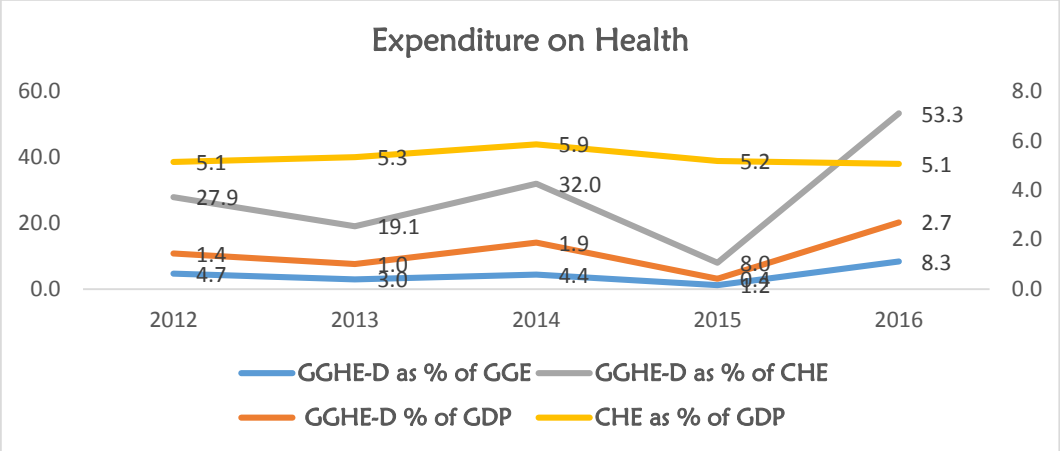
Table 2. Demographic and Health Indicators in the Republic of Mozambique

Indicator	Value
Total population (mid-year)	29,494,628
Population growth rate (%)	2.8%
Total Fertility Rate	38%
Infant Mortality Rate (per 1,000 live births)	53
Under 5 Mortality Rate (per 1,000 children live births)	67.3
Maternal Mortality Ratio (per 100,000 live births)	451.6
Crude Death Rate (per 1,000 population)	11.8
Life expectancy at birth (years)	53.7
Adult literacy rate (%)	39%

1.3 The Economy and Health

According to the World Bank[1], Mozambique is a low-income country with $440 (2018) GNI per capita. The country's investment in Megaprojects such as the Mozal aluminum smelter, the Temane gas projects in Inhambane, and the Moma titanium ore and heavy sands project in Nampula was expected to give the economy the boost, overcoming and reversing the GDP declining trend witnessed from 2014. While trying to get the economic back on good footing, the country was struck with ecological disaster with two cyclones in the first half of 2019. This has created humanitarian emergency, posing an immense challenge for reconstruction efforts reportedly estimated to cost around USD 3.2 billion. For their part, the IMF approved emergency financial assistance worth about USD 118 million, while the World Bank announced it will provide USD 350 million to help the government respond to the disaster. Responding to the development challenges may only dampen the already low level of investment in social sector including health. A further risk is discernable from high inflation and a rapidly depreciating exchange rate with its possible deleterious effect on contraction in credit demand by the private sector. The overall effect is noticed in the funding to health sector as presented in figure 1 below with Current Health expenditure as a percentage of the GDP declining from 5.9 (2014) to 5.1 (2016).

The Domestic general government health expenditure as a percentage of GDP which stands 2.7% and the domestic general government health expenditure as a percentage of Government General Expenditure of 8.3% indicate room for increased funding space



to the health sector when the overall economy is considered or the Abuja declaration of 15% spending on health which will be consistent with government desire to continue to focus on reducing malaria, HIV, and infant and maternal mortality.

Figure 1. Current Health Expenditure as % of the GDP, Mozambique

Health continue to be one of seven priority sectors, whose planning and budgeting is governed by a framework of national strategies, most importantly, the Health Sector Strategic Plan (PESS) 2014-2019. The Health Sector, along with the other priority sectors, forms the backbone of the Government's agenda for poverty alleviation. Specifically, the PESS lays out seven strategic objectives: (1) augment the access and use of health services, (2) improve the

[1] https://data.worldbank.org/indicator/

quality of health services, (3) reduce geographical inequalities in the access and use of health services, (4) better the efficiency of health services provided, (5) strengthen health partnerships, (6) increase transparency and accountability in how public resources are used, and (7) strengthen the Mozambican health system. This 4th cMYP 2020 – 2024 is developed within the overall pillars of sustainable health for the population as enunciated in development frameworks.

1.4 National Health System

The public sector, the private for profit, and the non-for profit private sector compose the health system in Mozambique. Among these and up to now, the public sector, which is the National Health System (NHS) is the main provider of health services nationwide. At central level, it plays the stewardship role in defining policies, developing strategic plans, resource mobilization and allocation as well as developing cooperation relations. The public sector is moving towards gratuitousness of services. In the current situation, the children under five years and pregnant women do not pay for health services. The government subsidizes medicines in Mozambique.
The NHS is organized into four levels of care, levels I and II, the most peripheral ones, meant for implementing the Primary Health Care (PHC) strategy and serve as a referral for the clinical conditions that do not have response at Level I. Levels III and IV are fundamentally meant for more specialized curative care and serve as a referral for the immediately inferior levels.

In general, PHC is the main strategy of health intervention to reduce the high rates of morbidity and mortality due to communicable diseases. The reproductive health problems associated with high rates of maternal mortality are also priority areas in the sector's Programme. All these interventions in the framework of PHC are important components of the Action Plan for the Reduction of Absolute Poverty (PRSP) and the Health Sector Strategic Plan (PESS 2014-2019) i.

Primary health care services; including immunization are offered free of charge at all 1625 health centers (all level 1) in the country which open Monday to Fridays. Immunization services are offered every day at these health centers. In addition; some health centers have outreach teams attached to the facilities that provide immunization in outreach sessions. In these outreach sessions the service provision is usually integrated i.e. immunization, deworming, growth monitoring and Vitamin A supplementation.

In hospitals, there is no routine vaccination services; there is provision of OPV 0 and BCG in all maternity units. Hospitalized children due for vaccination are referred to the nearest primary health center after discharge to get the relevant vaccination. There are several NGOs that work at all levels; supporting service provision but not directly offering services.

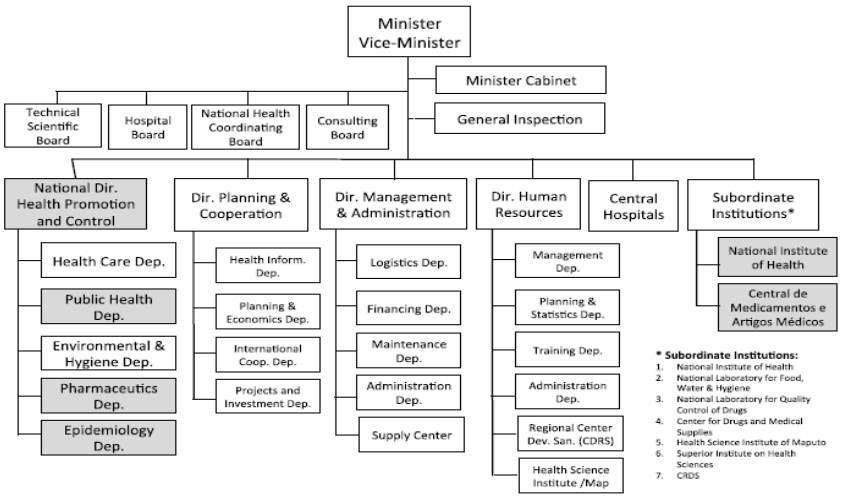
The private sector in Mozambique provides about 5% of the health services; including immunization. While this constitute a part of the overall service delivery, the data on immunization provided in the private sector is not regularly shared with the national program, making it a challenge to capture it within the overall coverage figures for the country.

1.5. Organisational & functional arrangement of the programme

Mozambique Expanded Program on Immunization (EPI) was established in 1979 under the Primary Health Care. Within the Ministry of Health, EPI is a National Programme within the National Directorate of Public Health. The central level has a mandate to establish policies, standards, strategies and priorities, builds capacity, monitors performance, co-ordinates activities with partners and provides technical support to all provinces. It also mobilizes resources and procures vaccines and injection safety materials in coordination with the Centre for Pharmaceuticals and Medical Supplies (CMAM). In turn, the provinces are responsible for capacity building, monitoring, supervision and technical support to the districts. The districts and their health facilities are responsible for planning, management and delivery of EPI services. At the district level, immunization is part of primary health care and is integrated into the child survival activities. Various communities are involved in the mobilization of community members for immunization.

All surveillance activities (including AFP, measles and new vaccine surveillance) are coordinated within the Epidemiology directorate within the National Directorate of Public Health within monthly coordination meetings.

Figure 2. The Organogram of the Ministry of Health/relation to EPI and VPD surveillance



1.5.2

1.6.2 Republic of Mozambique Expanded Programme on Immunization

The EPI schedule in Mozambique protects against 11 conditions namely: Tuberculosis, Diphtheria, Pertussis, Tetanus, Hepatitis B, Rotavirus diarrheal disease, haemophilus influenza type b, Pneumococcal Disease, measles, rubella and polio. In addition to the infant series; vaccines are also provided to under 15 children (MR supplementary immunization activity 2018); under 5 children (nationwide polio supplementary immunization activity in 2012) and to women of child bearing age (TT vaccine). The country has done piloting of the HPV vaccine introduction in 3 districts in 2014; however, HPV is not yet on the national EPI schedule, and its introduction into NIP is planned for 2021. Table 3 shows the current national immunization schedule of Mozambique.

Table 3. Republic of Mozambique National Immunization Schedule (updated August 7th, 2019)

Schedule	Vaccine
Birth	BCG and OPV 0
8 weeks	Pentavalent (DTwP+Hib+HepB); OPV 1; PCV 1; Rota 1
12 weeks	Pentavalent (DTwP+Hib+HepB); OPV 1; PCV 1; Rota 2
16 weeks	Pentavalent (DTwP+Hib+HepB); OPV 1; PCV 2; IPV
9 months	Measles-Rubella 1; PCV 3
18 months	Measles-Rubella 2
6 – 59 months	Vitamin A (every 6 months)
Pregnant women	TT (5 doses; at first contact then 1 month later; then 6 months; then 1 year after 3rd dose and 1 year after 4h dose

2. SITUATION ANALYSIS

Mozambique has conducted several programme reviews that identified the progress, strengths and areas that require improvement in the EPI programme through set of recommendations. These recommendations are to be incorporated in annual plan of action for implementation and monitored by ICC periodically for their implementation and required advocacy. The following reviews/evaluations conducted in the past 5 years generated important information for the EPI program in Mozambique and thus have contributed substantially to the situation analysis included in this plan.

Table 4. Assessments conducted in the EPI Programme, 2015-2019

Type of assessment	Year
Effective Vaccine management assessment	2015, 2019
Post Introduction Evaluation (Rota, PCV)	2016
Post MR campaign coverage survey	2018
National EPI coverage survey	2015
National cold chain inventory	2017
KAP survey	2013
Comprehensive National Immunization program review	2016
IMASIDA	2015
Service Availability and Readiness Assessment	2018
DHS (Demographic Health Survey)	2011
Gavi Full Country Evaluation	2015; 2016
Data quality Review	2018
Missed Opportunities on Vaccination	2017
Coverage and Equity assessment	2019

2.1 Situation analysis of the Immunization programme

2.1.1 Programme Management, Leadership and Coordination

Governance

The immunization programme is governed by an immunisation policy developed in 1979. A lot of changes has occurred within the program through introduction of new vasurccines in addition to the global immunization environment that requires updating of the National Immunization policy. Mozamaibique is signatory to the Addis Ababa Decleration on

Immunization (ADI) and is reporing annually on the commitments of the decleration and is expected to comply.

As part of the governance support structure for the programme, Mozambique has also established in 2001 an Inter-Agency Coordinating Committee (ICC). The ICC is the main coordination forum for dialogue and decision on all matters related to Immunizaiton programme governance, strategic direction, planning and policy. It aims to improve the coordination of government and partners in supporting and advocating of immunization programmes as per the priorities outlined in the cMYP, that guides investment of resources into the immunization Programme in the country. The functionality of the ICC has been less than optimal to fulfil its mandate and government has taken more interest in revamping the ICC. In line with WHO AFRO recommendation, the National Immunization had undergone an external comprehensive program review in 2006 and 2016 that have identified key performance areas for improvement. The implementation of the recommendations is monitored by the ICC, however reports on achievement are progressing sub optimally indicating the need to revitailise the ICC through standard orientation of their Terms of refrences for the ICC standard and requlars functionality. In addition, the delay financial release to implement the plan is a reccurent problem at national level while at sub national level program planning and management including finances is an outstanding challenge to program implementation.

There is an Immunization Technicl working group that has 4 sub-working groups and it regularly monitor Immunization plans & partner progress against plans, agree on corrective action, take technical and programmatic decisions based on analysis of sub-working groups. The sub working groups are namely the Immunization Logistics Working Group, Training, Communication & Social Mobilisation, Monitoring & Data Quality Working Group, Targeted Country technical Aassistance Working Group.

Tehcnial support from Parnters

Currently the Immunization program continues to benefit mainly from Gavi Health system strengthening and Vaccine support including through partners who have embedded Human resources to provide skill building and capacity strengthening at different level of the Ministry of Health and with different categories of the Immunization system. The partners include Gavi as main support of fiannces and through agencies that get annual finaicnal support to provide the required Targeted Technical Assitance through WHO, UNICEF and extended partners (CHAI, Acasus, JSI, Village Reach, CDC foundation, Oslo University and MG consulting. The in-country core and extended partners are members of the technical committees and play active role in the assessment of the progress of the Gavi TCA and the Immunnizaiton workplan implementation including specific roles that they play to complement the needed focus areas of support.
Review of the specific contributions of the partners functions indicates overlap of support areas with some duplication as well as not having clear mechanism of how and when the transfer of competence and expertise will be transited in guiding the long term technical support.
The Governemnt also benefits from collaborations from local institutions such as INS that supports surveillance for Vaccine Preventable Diseases and local Universitities for program evaluation and coverage surveys.

Planning

There are standard planning tool instruments used in the country and as such the Health plan is aligned to the Government 2025, Vision, the national Development Strategy, Economic and social plan (PES) that translates medium term priorities into annual activities, the Medium term fiscal framework (CFMP), which has medium term estimates of revenues and expenditures. The National Immunization program by aligning to the national priorities develops the 5-year comprehensive Multiyear plans at the national level where provinces and districts also plan to align their priorities. The annual district plans are aggregated to form the provincial plans. Despite the District plans availability, the Health facility catchment area micro plans are not available to guide equitable Immunization service delivery.

Budget

The Government of Mozambique has ratified a convection that directs 15% of the General State Budget to be allocated to the Health Sector.There line item with vaccines in the national budget; over the years, the government of Mozambique has successfully provided about 20% funding for vaccines, immunisation consumables and operational costs. However, there is lack of legislation and investment prioritization specifically for the Immunization area where 2-3% of the 15% Government funds for health is not used for the Immunization program. In addition, there is late disbursmetn of funds for Immunizaiton services at sub national level affecting services. There is an observed decline of finances for purchase of vaccines and operations as per the 2016 review findings and the Joint reporting form data comparing 2015 to 2018. At the sub-national, immunization budgets and expenditures are not regularly monitored and reported to the national level.

Monitoring of the program

The Immunization program is monitored regularly using monthly immunization reports generated from Health facility and consolidated by district which is transferred to provinces and national level. All antigens are included in the routine monitoring of Immunization including vaccines supply and logistics that are reported using the stock management tool. The reporting tools are inconfirmity with WHO standards and designed for each level although they fall short in meeting the quality required with limitations in timeliness and completeness of reporting as well as discrepancies between the levels.

The performance is assessed through the quarterly provincial level meetings with districts that may not be regularly conducted.

There is periodic comprehensive program review that is done by external partners to assess the program achivemnt and recommended actions for its improvement the latest done in 2016. The implementation of the recomendations are expected to be regularly monitored and advocated for.

In addition, periodic program coverage surveys in line with WHO standards are also conducted including DHS where estimates of the immunization coverage performance is generated.

On annual basis performance coverage of the country is officially submitted to WHO and UNICEF using the Joint WHO Unicef format (JRF) that is used globally to monitor the progress towards national and global targets such as the Addis Ababa Decleration on Immunizaion and also the progress toward Global Vaccine Action Plan and the Sustainable Development Goals

The National Regularoty Authority

There is a National regulatory authority in Mozambique that is responsible to execute six core functions: Vaccine registration and Licencing; Surveillance; Clinical Trial and Quality Control; Good Manufaturing Practices (GMP)inspection and assessment of clinic performance. Of these

six functions; 2 are not performed by the NRA i.e. GMP inspection and assessment of clinic performance.

National Immunizatin Technical Advisory Group (NITAG)

Government has established a NITAG in 2011, which is the technical committee that advises the Ministry of Health on immunisation using evidence-based policy recommendations such as introduction of new vaccines and schedule for vaccination to name a few. NITAG is instrumental in engaging the scientific community and consolidating evidence to advice on immunisation related policies and practices. The Mozambique NITAG is made up of 15 members from various areas of expertise such as public health, child health and paediatrics, epidemiology and sociology. They meet on average every 6 months where discussions are guided by agenda and the deliberations are recorded in minutes.

Supervision

Supervision being cornerstone for quality improvement in services to address equity, is yet to be implemented as per recommended standard and frequency at all levels of Structures though the Supportive supervision tools are updated and available. However, the implementation of the Supportive supervision at all levels by MOH structure is limited. The use of the ISS tool is beneifting the Immunizaiton system and data from January to May 2019 indicated total of 301 Health faciltieis were visited using the Acute Flaccide Paralysis active surviellane platform. Of the total 301 HFs, 62% had updated microplan, 93% planned Fixed Immunization services in the facilties were provided but only 63% of planned outreach services were conducted. The main reasons for the cancelation of the outreaches was as obstacle identified were lack of transport 46% and non-functional refrigerators (29%) and 20% due to HW being engaged in other activities. Mozambique can increase the scale of use of the ISS to improve the quality of Immunization services using this platform.

The EPI though currently using the AFRO recommended active case search visits as integrated supervisory platform inclusive of immunization services, supervision and monitoring policy and roles and responsibilities are not clear, there are no criteria for selecting sites and supervision is not systematic or documented to allow tracking of progress on issues/recommendations that needs to be prioritised.

Huamn Resources and Capacity building

The Ministry of Health has an updated Human resources development strategic plan that includes community participation policy. The inadequate Human resources specifically qualitied professionals is below the expected minimum of Medical Expert 1/10,000 inhabitants and 1 midwife per 100,000 inhabitants to serve the population. There is also inequality in distribution of Human resources. The 2018 Service Avaialbility and Readiness Assesment (SARA) identified inequities in distribution of health personnel to population in Nampula and Zambezia that are particularly poor. This is compounded by lack of mechanmism for retining health professions in their work areas. Only 78/161 Districts managers, are trained in program management. The Distric Health Managemetn team does not have updated Terms of reference to guide their supervisory management role. The Speciality services for cold chain maintainance, vaccine and supply forecasting, distribution and monitoring of vaccine use requires skilled human resources at national, province vaccine stores and at District and Health facility level that is an outstanding need for efficient use of the expensive vaccines with intact potency upto administration to eligible target population. The Human resources availability and the capacity is not yet optimum with 40% vacancy and skill limitation to adhere to the national quality standards of Immunization services to meet the required targets despite availability ofheatlh training institutions with capacity to

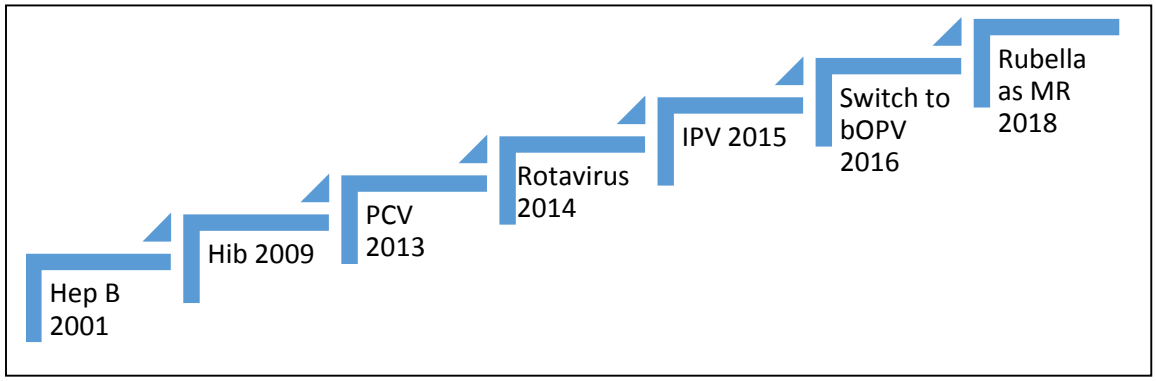
train qualified heatlh professionals. As per standard, the curriculum of the health workers training institutions has not been updated despite the changes made in the Immunization and Surveillance requirements. There needs to be Pre-Service and In-service efforts to mitigate the situation.
The limited fiscal space for recruitment of qualified health care professionals with their continued attrition will further contribute to the limitation.
Interim measures are critical to address the limitation of Human resources including exploring existing opportunities such as defining roles & responsibilities, criteria for HWs supporting Immunization, performance contracts etc… including their continued skill building. The existence of community health agents program can be used to reduce the work load on the few health workers in the Health faciltieis as an opportunity but with review of their job description for their capacity.

2.1.2 Service Delivery

The Immunization program has cMYP that guides investments and strategic directions for the immunization program. The annual District Health Development plan includes Immunization but falls short of reaching all eligible targeted population with performance gaps at sub national level. The standard Health facility catchment area microplans developed with engagement of community level that guide specific and tailor-made Immunization service delivery strategies as requirement will help address the inequity in service delivery.
The plans are to be costed, consolidated at district level to guide resources mobilization and monitored for implementation by the District Health Management Team.The main modalities of Immunization services are through fixed health facilities, 11% outreach services using mobile birgades and supplemental Immunization activities for targeted periodic camaigns and outbreak responses and also school vaccination as potential for the HPV vaccine delivery and Td containing vaccine once the schedules are introduced. Integrated service delivery with use of the MCH staff has been succesffuly demonstrated in vaccination campaings of MR introducito, Cholera vaccine introduction and can be strengthened for efficient service delivery as outlined in the updated RED guide that needs promotion of scale up at district and Health facility level.
The 2016, program review has highlighted that only 57% visited HFs had micro plans, funding for outreach services were not found to be either sufficient nor consistent that needs to be improved on.
Reported administrative coverage at national level for DPT3CV in 2018, indicates coverage of 95% in contrary to the survey data indicating 81.6% with more than 10% difference and below the GVAP target. In 2018 only 22% of districts had a DPT 3 containing vaccine coverage of >80%. At national level the DPT1-3 DOR has consistently been below 10% for the past three years while the MR1 to MR2 drop out was 34% in 2018 illustrating the limitation of intervention promotion in the 2nd year of life.

The introduction of new vaccines into the routine programme followed recommendations from the National Technical Advisory Group on Immunisation (NITAG). The introduction timeline of the new antigens is indicated in the figure below.

Figure 3. Progress of introduction of new Vaccines, Mozambique 2001-2018



The coverage of newly introduced vaccines has been generally good with a rotavirus second dose reported coverage of over 90% at national level in 2017. PCV coverage has been above 89% for the past three years. It needs to be considered that there is data quality limitation in the reported coverage that the program is trying to address. The Service utilization illustrated

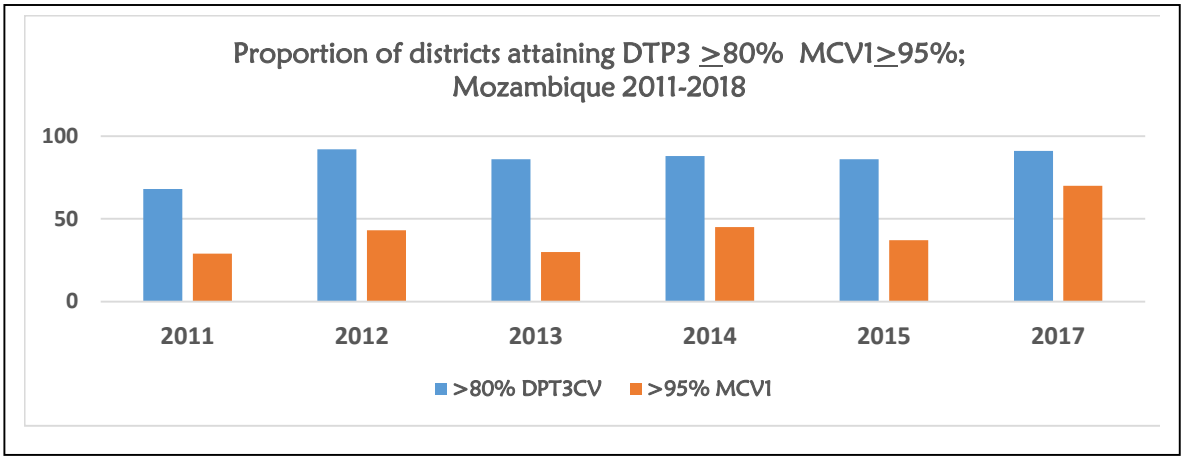


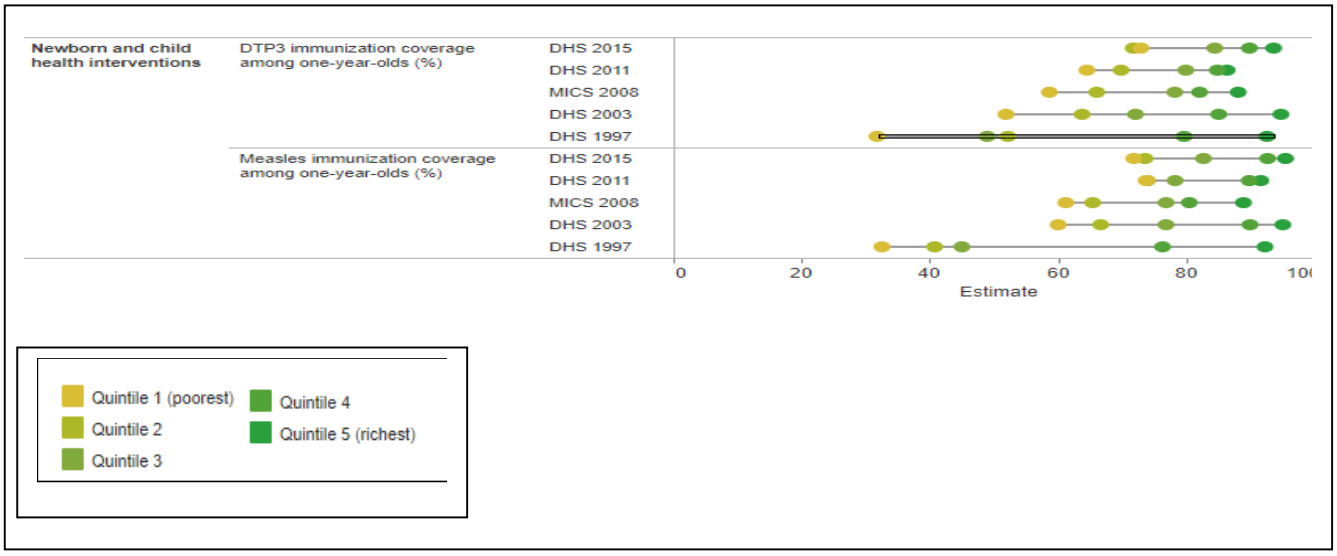
Figure 4. Proportion of districts attaining DTP3CV >80% & MCV1>95%; 2011-2018

in the figure below indicates that DPT3CV, the minimum 80% coverage is not attained by all districts leaving unreached but targeted eligible population. Similarly, the progress towards measles elimination using the MCV1 coverage, indicates the immunity gap in the districts that could lead to measles outbreaks hence improvement in MCV1 and MCV2 coverate by closing the immunity gap needs to be addressed as priority.

2.1.3 Equity parameters in Immunization

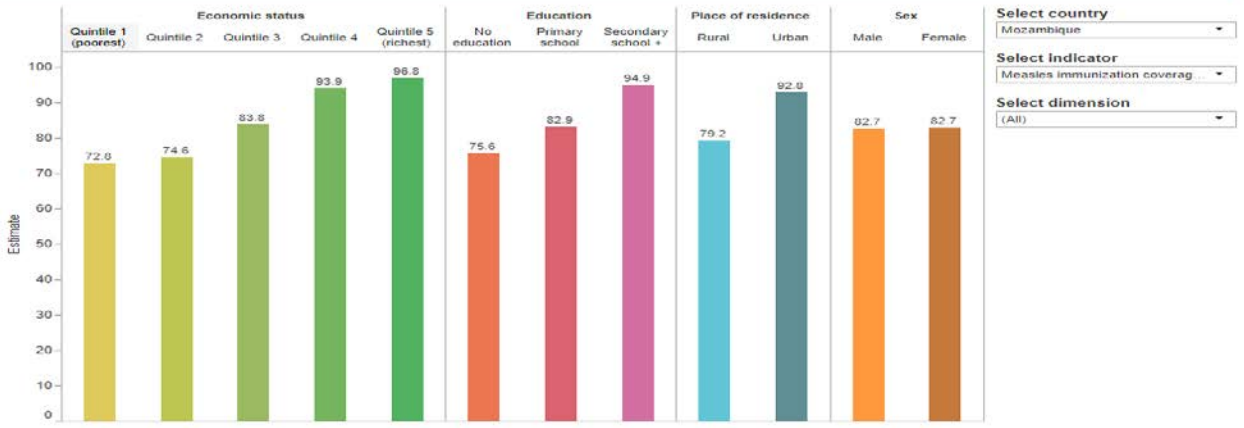
The Figures below using the WHO Health Equity Assessment tool illustrate that there is progress through the DHS 1997, 2003, 2011 and 2015 in that the widened difference in immunization coverage using DPT3 and Measles by one year of age across the economic sub groups is narrowing however there is still disparity between the rich and poor (Figure 5)

Figure 5. Inter period difference of Immunization coverage by economic quintiles,



The difference between the measles coverage by one year of age using the equity parameters also indicates the same trend of narrowing in the difference from DHS 1997, 2003, 2011 and 2015. As illustrated in Figure 6 below the coverage of measles by 1 year of age in children of the poorest quintile is 72.8% while in the richest quintile is 96.8%; children of mothers with no education have coverage of 76.6% while those born to mothers with secondary school have 94.9% coverage; children from rural areas have coverage of 79.2% while those in Urban have 92.8% although there was no difference being male or female with regards to the measles vaccination. This is illustrative of specific strategic actions that should be targeted in planning for services to ensure the services are available and utilised by all eligible children.

Figure 6. Measles coverage by 1 year across DHS 1997,2003,2011 and 2015



2.1.4 Accelerated Disease Control & VPD surveillance

2.1.4.a) Progress towards Polio Eradication

In line with the Global Polio Eradication Initiative established in 1988, Mozambique has made some progress in realizing the objective with the last confirmed case of wild poliovirus documented was in 1993.
As efforts to boost population immunity, periodic Polio National Immunization Days were conducted with latest nationwide polio SIA conducted in 2012. Mozambique introduced the IPV vaccine (5 dose presentation) in November 2015.

Active case-based surveillance for Acute Flaccid Paralysis (AFP) was introduced in 1998 and the target indicators for high quality AFP surveillance were achieved and maintained throughout the years at national level (3.5/100 000 in 2016, 3.2/100 000 in 2017 and 3.7/100 000 in 2018). Stool specimens are tested in South Africa at the WHO Regional Reference laboratory.

In 2016, Mozambique through the National Certification Committee (NCC) presented a wild polio virus (WPV) free country report to the Africa Region Certification Commission (ARCC). The ARCC then made the conclusion that Mozambique has interrupted the circulation of WPV and was free of indigenous transmission. Between 2011 to 2018, Mozambique experience of three circulating vaccine derived polio virus type 1 event/ type 2 outbreaks in Zambezia province indicative of population immunity gaps despite the high reported immunization coverage. In 2011, a vaccine derived polio virus type 1 outbreak; in 2016 a vaccine derived polio virus type 2 event and from 2018 to date (June 2019) the response to the vaccine derived polio virus type 2 outbreak was delayed due to flood. The latest cVDPV required 3 rounds of mOPV2 Sub national SIAs to interrupt transmission that is costly and preventable with high population immunity.
The AFP surveillance performance gap resulted in delayed detection of the events that is being reinforced to maintain the polio free status. The focus should be to strengthen active AFP surveillance, build population immunity, and closely monitor the risk to sustain the polio free certification in line with the Polio Endgame strategy. The quarterly polio risk assessment findings should be seriously used to implement measures to further address further risks due to either population immunity gaps that can result in polio virus importation or circulation or delayed detection of ongoing circulation. The polio outbreak prepardenss and response plan is mandatory document for timely resource mobilization to guide response in such occurences. The Polio committees (NPEC, NCC and NTF) are functioning supported by the secretariat. The country is establishing environmental AFP surveillance to complement the AFP surveillance. The table below illustrates the Key performance of AFP surveillance trend by province and national level. It is noted that at sub national level the performance was sub optimal where both key indicators were below standard in the three years though improveemt is noted in 2018.

Table 5. Performance of AFP surveillance by province, 2016-2018

Provinces	2018 Annualised Non-polio AFP rate*	2018 AFP cases with 2 stools within 14 days of onset*	2017 Annualised Non-polio AFP rate*	2017 AFP cases with 2 stools within 14 days of onset*	2016 Annualised Non-polio AFP rate*	2016 AFP cases with 2 stools within 14 days of onset*
Cabo Delgado	3.2	82%	2.6	78%	1.9	70%
Cidade De Maputo	3.9	82%	2.1	77%	2.1	93%
Gaza	4.7	84%	3.7	79%	3.5	81%
Inhambane	2.9	71%	4.4	87%	1.4	43%
Manica	5.6	96%	5.4	92%	7.8	87%
Maputo	3.0	85%	2.9	73%	1.6	63%
Nampula	3.9	88%	2.2	87%	2.9	82%
Niassa	3.8	91%	4.4	92%	3.5	79%
Sofala	3.5	76%	3.5	76%	3.1	54%
Tete	2.7	94%	3.2	100%	3.2	98%
Zambezia	3.9	92%	2.6	81%	4.0	91%
National	3.7	**88%**	3.1	**85%**	3.1	**81%**

Source; WHO, AFP surveillance database

2.1.4.b) Progress towards Measles/Congenital Rubella Elimination

Mozambique has-been implementing the accelerated control of measles strategy since 2005 that included strengthening MCV1 coverage, providing 2nd opportunity through catch up and periodic Measles SIAs, establishing the Case based measles surveillance since 2005. All suspected measles cases are investigated, and laboratory confirmation done using IgM testing in the national laboratory that is accredited by WHO. The first catch up measles SIAs was in 2005 with periodic measles SIAs conducted in 2008, 2011, 2013 and the latest in 2018 that was used as catch up SIAs targeting under 15 years children with introduction of Rubella using MR vaccine. The latest measles outbreak was in 2009 & 2010 with 2,321 reported cases and 8 deaths that could have been prevented by vaccination

There is significant progress in measles control and country is working towards elimination of measles target through the routine EPI which provides two opportunities for vaccination against measles at 9 and 18 months of age. The second dose of measles was introduced in 2015 however the WHO UNICEF estimated coverage is only 36% and 45% in 2016 & 2017 indicating high drop out between MCV1 an MCV2.

The country has attained the main measles surveillance performance indicators; the Non-measles febrile rash illness rate has been above 2/100,000 population, the % district notifying a suspected case with blood specimen was between 91%-98% above 80% from 2016-2018. It is to be noted that the national measles laboratory has been facing stock out of reagents to confirm the notified suspected cases of measles hence ending up in clinically confirmed cases of measles.

Figure 7. Trend in reported cases and coverage of Measles 1990-2018

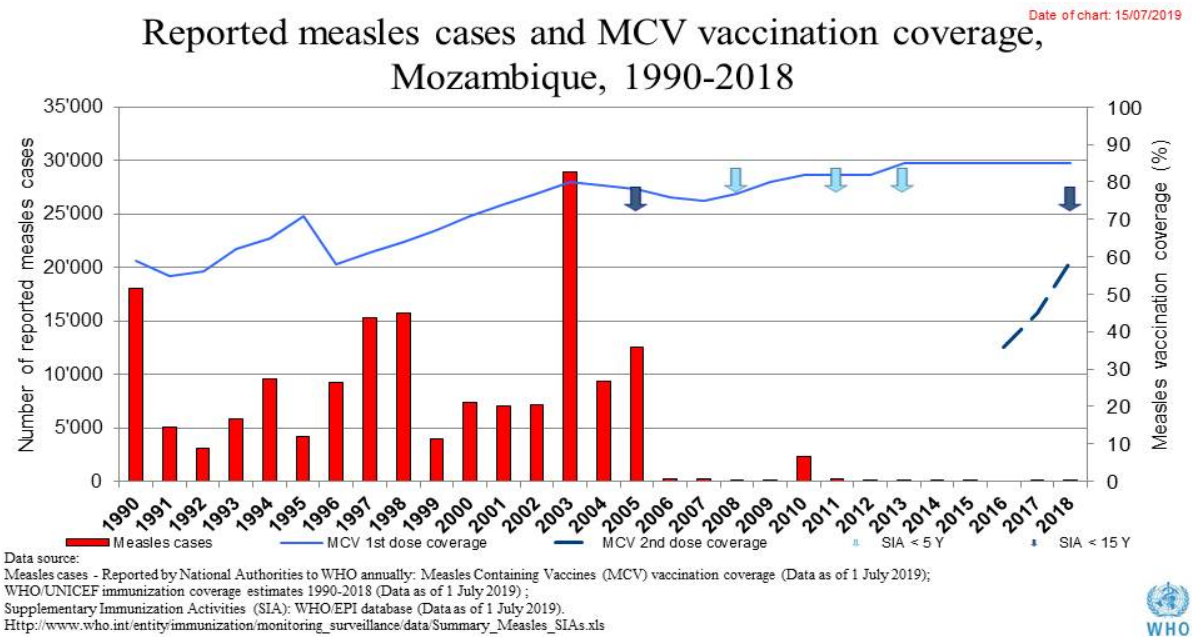
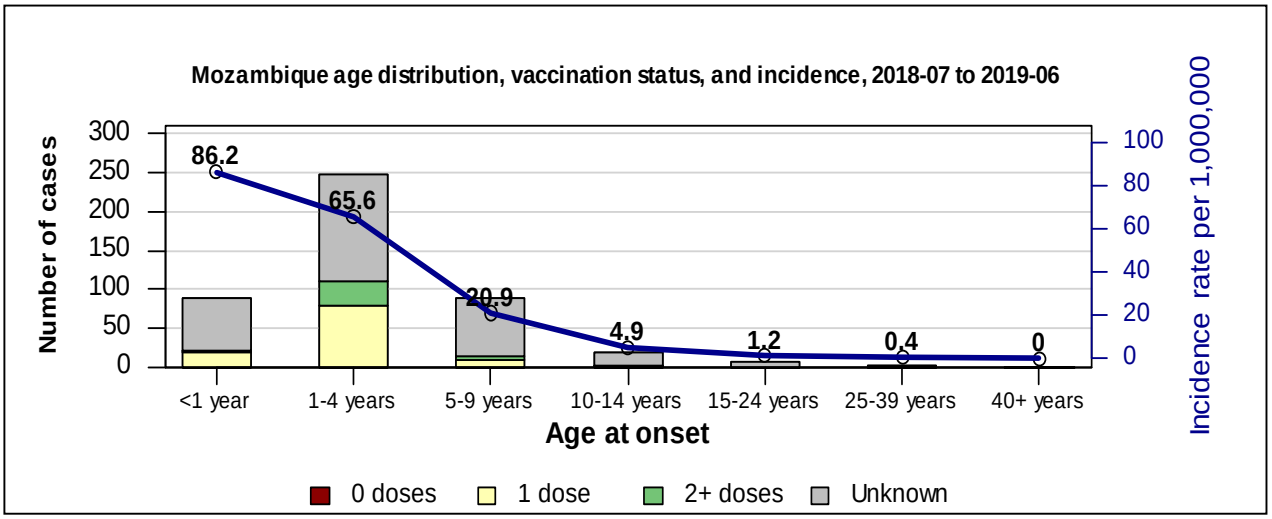


Figure 8. Age distribution, vaccination status & confirmed incidence of measels July 2018 to June 2019



The figure above illustrates that among the clinically confirmed cases of measles, the highest confirmed incidence is below 5 years. Most cases have no history of vaccination despite 2 doses schedulebeing followed from 2015 and periodic Measles SIAs conducted latest in 2018 using MR. This requires efforts to close immunity gaps if outbreak is to be prevented. For the year 2018 and Jan-June 2019 respectively the annual confirmed incidence of measles was 13 and 15 per million population. It is to be noted that the confirmed cases were not by lab but clinically indicating the limitation of laboratory confirmation for the suspected cases due to the shortage of laboratory reagents and incomplete information on the suspected cases.

2.1.4.c) Sustaining Maternal Neonatal Tetanus Elimination (MNTe)

Mozambique has achieved Neonatal tetanus elimination as validated by the World Health Organisation and UNICEF in 2010 using the standard WHO process. The achievement was attained through the implementation of the high-risk approach. Addressing the challenge of maintaining the elimination status remains a priority for the country through the development and implementation of a plan that focuses in achieving high ANC coverage, clean delivery, revising the TT containing vaccine schedule to 6 doses, sustaining NT surveillance & Response and promoting school vaccination.
The Neonatal Tetanus (NT) surveillance in Mozabmbique is currently limited where notified cases are not investigated nor provided with the required response that needs to be improved. The TT2+ coverage reported ranges from 80 to 85% at national level between 2015-2018 and countries that have attained minimum of 80% should monitor the Protected at Birth instead of the TT2+ to provide real estimates. The 2018 WHO Unicef Joint Reporting form illustrated total of 160 NT and total tetanus cases reported where none were investigated or responded to.

2.1.4.d) Other Key VPDs of importance & other key VPDs of importance and AEFI

Mozambique has established Sentinel surveillance for new and underutilized vaccines specifically to assess the background disease burden and monitoring the impact post introduction. As such it is conducting sentinel surveillance for Rotavirus diarrhea, Pediatric bacterial meningitis and seasonal influenza. The functions of the sentinel surveillance have indicated dramatic reduction in diarrhea due to Rotavirus, meningitis due to Hib and Pneumococcus while the seasonal influenza surveillance provides data to monitor the trend as part of the global WHO network. The sentinel surveillance sites information has been used to assess disease burden pre-introduction and impact post introduction.

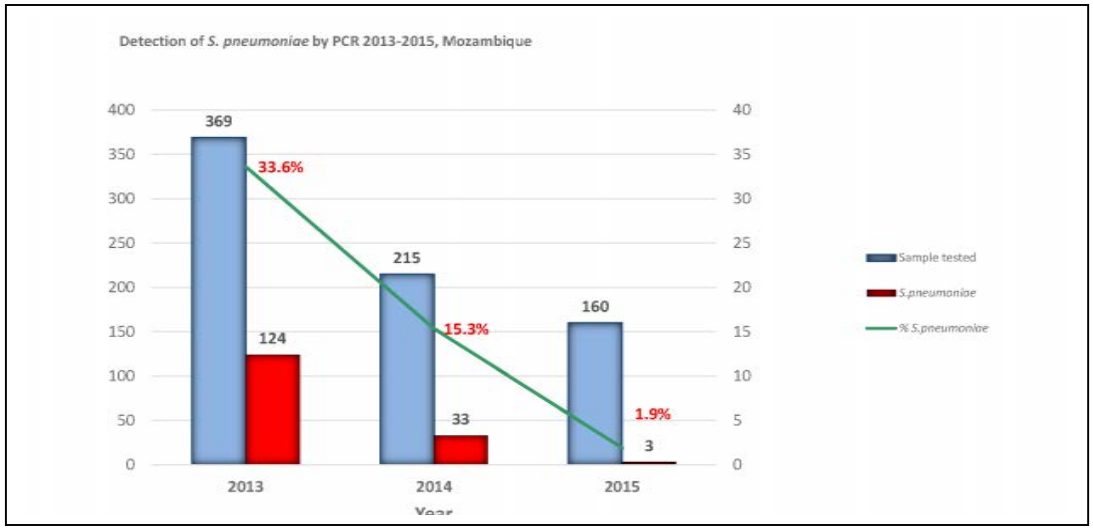
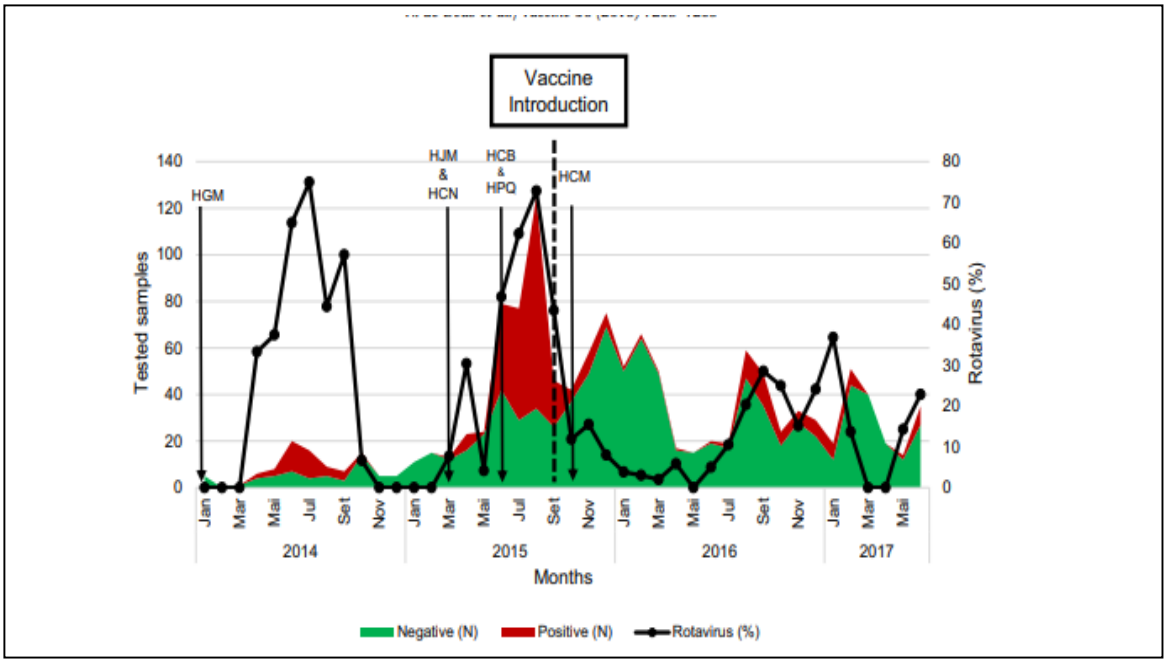


Figure 9. Detection of S.Pneumonia by PCV 2013-2015, Mozambqiue [ii]

The figure above illustrates the assessment conducted after the 10-valent conjugate vaccine (PCV-10) was introduced in the program in March 2013. The impact of PCV10 on the burden of pneumococcal meningitis in children less than 5 years of age at the three largest hospitals in Mozambique indicates significant decline from 2013 to 2015. The proportion of cases of pneumococcal meningitis decreased from 33.6% (124 of 369) in 2013 to 1.9% (3 of 160) in 2015 ($p < 0.001$). The relative frequency of PCV10 serotype cases also decreased from 84.2% (48 of 57) in 2013 to 0% (0 of 3) in 2015 ($p = 0.006$). Between 2013 and 2015, serotype coverage of PCV-10 and PCV13 vaccine formulations was 66.7% and 81.2%, respectively.
This study further assessed the sero types responsible and identified that there were common serotypes that will not be covered by PCV10 and recommened for the swtich from using PCV10 to PCV13 that is followed by the program currently. Such information has been a great value in influencing and guiding policies.

Figure 10. Monthly cases of negative and positive samples for rotavirus and percentage of positive cases during the four years period in six ViNaDiA sentinel sites 2014-2017[iii]



Mozambique introduced rotavirus vaccine (Rotarix, GSK Biologicals) in the National Immunization Program in September 2015 to reduce the burden of total diarrheal disease and specifically severe rotavirus disease. This study aimed to evaluate the early impact of rotavirus vaccine in reducing all-cause diarrhea and rotavirus-specific hospitalizations and result illustrated that a reduction in rotavirus positivity and in the number of all-cause diarrhea hospitalizations after vaccine introduction. The data suggest rotavirus vaccine is having a positive impact on the control of rotavirus diarrheal disease in Mozambique

Vaccine Safety Surveillance /AEFI

The National Adverse Events following Immunization (AEFI) committee was established in 2015 with objective of reviewing and assessing the notified AEFI cases to guide management as per the standard WHO Protocol.The committee is now composed of new members nominated in December 2018 and require capacity building to enable them to perform their tasks. The National Regulatory Authority that hosts the Pharmacovigilance unit is responsible for the AEFI case classification to support the EPI program. Risk communication will be part of the communication strategic plan that will be developed/updated.
There are trained AEFI focal persons at national, province and district levels. The AEFI protocol, notification forms are updated however, the targets for AEFI notification is below the national target and the planned capacity building of health workers at service delivery level is not yet conducted.

2.1.5 Vaccine Supply, Quality, Cold chain and logistics

2.1.5.a) Cold Chain

The latest cold chain inventory was conducted in 2017 and the result that identified serious gaps in cold chain with number, non-functionality due to several factors was used to develop the cold chain improvement plan that is benefiting from the Gavi Support through the Cold Chain Equipment Expansion and Optimization. There are cold rooms at national level and in 11 provinces with capacity projected to last 10 years

2.1.5.b) Vaccine management and forecasting
Further, the EPI program has conducted in 2012, 2015 and 2019 Effective Vaccine management assessments that has identified the limitations for the improvement plan of vaccine management that is being developed for investment. The findings indicate that there is not much improvement between the 2015 and 2019 where the recommendaitons are not implemented. The composite scores of the EVMA 2012, 21015 and 2019 were 57%, 68% and 71% respectively while details are illustrated in the figure and summarised below.

EVM Criteria Indicator	Req. 80% Vaccine Supply Chain Level							
	PS 2015	PS 2019	SN 2015	SN 2019	LD 2015	LD 2019	HF 2015	HF 2019
E1: Vaccine arrival	75%	64%						
E2: Temperature	72%	77%	66%	75%	64%	69%	62%	60%
E3: Storage capacity	95%	67%	89%	86%	80%	80%	81%	75%
E4: Buildings, Equipment & Transport	92%	93%	77%	89%	64%	68%	66%	60%
E5: Maintenance	59%	83%	72%	81%	67%	59%	63%	57%
E6: Stock management	74%	93%	74%	78%	52%	60%	44%	47%
E7: Distribution	49%	52%	69%	63%	53%	60%	75%	62%
E8: Vaccine management	85%	96%	84%	86%	84%	85%	74%	71%
E9: IMS & Supportive functions	46%	53%	60%	69%	44%	62%		53%

Figure 11. Comparison of EVMA results 2015 Vs 2019

The vaccine arrival is below standard at national level and decline observed in 2019 from level in 2015. Further, the 2019 findings indicated that in summary, Temperature, Supply distribution and Management information system and supportive functions are low in all levels assessed. The storage capacity is limited at the Province level; Building, Equipment and transport are limited mainly at district and Health facilitiy level; Stock management is limited at province, districts and Health facilities while vaccine management is limited at Health facility level mainly. This has implications in the Immunization program considering that practices failing short of recommended standards will result in continued immunity gaps.

The EPI program forecasts vaccine needs with assistance from WHO and UNICEF on annual basis. Then the Central de Medicamentos e Artigos Médicos CMAM (Centre for Drugs and Medical Supplies) does the procurement for traditional vaccines, while for all new and underutilized vaccines, the procurement is through UNICEF mechanisms, also on annual basis. The reception of the procured vaccine at central level is split in 4 consignments per year. Regional and provincial vaccine stores also order the requirements from the national level quarterly. Districts and Health Facilities make monthly orders.

During the year 2018, there were stock out of vaccine, vaccination material and recording tools, where the longest recorded period was about 2, 3 and 5 months respectively. There were several reasons for these stocks out, with the origin at the central level, the lack of timely financing for acquisition, and the bureaucracy in the processes and practices of the responsible institutions (CMAM / UNICEF) for the purchase of vaccines and the other materials for the country.

The EVMA 2019 has indicated the following findings due to sub standard vaccine forecasting, distribution and management that need to be attended to

- At national level, "There was a stock out of PCV13 vaccine for 47 days in 2018; DTP-HepB-Hib for 29 days in 2019. There was also an overstock of several vaccines ranging from 128 days for MR to 245 days for PCV 10 in 2018, and OPV for 15 days to PCV13 for 50 days in 2019" (EVMA 2019).
- At provincial level, "BCG and MR vaccine quantities did not match their diluents in 58% of the provinces assessed. A monthly internal review of temperatures was not being conducted in 54% of the PVS" (EVMA 2019).
- At provincial level, "Minimum and maximum stock levels though set had been breached by all stores at one point or the other during the review period" (EVMA 2019).
- At provincial level, "There was a mismatch of freeze-dried vaccines and their diluents at most facilities. Critical stock levels were not established in 36% of the districts, and staff in these districts did not know the concepts of setting these levels in stock management" (EVMA 2019).
- At health facility level, "Vaccines and supplies were being delivered to the health facilities, but the stock recording was not consistent with stock management principles. 60% of facilities did not maintain stock records for diluents. About 42% of the facilities did not have daily vaccine stock movement records, and almost all facilities did not keep records for dry materials. 25% of the stock records did not have space for recording all the standard details required for vaccines. Freeze dried vaccines did not match their diluents in 33% of the facilities. No internal reviews were being conducted for vaccine losses at least once every 6 months" (EVMA 2019).
- Sub national: BCG and MR vaccine quantities did not match their diluents in 58% of the provinces assessed. A monthly internal review of temperatures was not being conducted in 54% of the PVS.
- Timely, monthly visibility of vaccine stock and other supply chain information from national to health facility level, allowing analysis, monitoring, follow-up and decision-making.

The practical response to these inefficiencies is critical to the availability of these inputs to the Program, however, we believe that not only the timely availability of funding, but also advocacy and awareness of the importance to be given to this matter is necessary in the next five years (2020-2024).

2.1.5.c) Injection safety and waste management

Mozambique uses WHO pre-qualified auto-disable syringes for all injectable vaccines since 2001, both for new vaccines GAVI funded and procured through UNICEF and for self-procured traditional vaccines.

Since 2003 Mozambique has regulated bio-medical waste (BMW) management through Provincial Injection Safety Committees, functioning in each province. Staff in each district and health facility is assigned responsibility for BMW management by the provincial committees. In each hospital or health facility, the head nurse is responsible for BMW management. This role includes ensuring all staff involved in BMW management are trained in waste segregation at the point of production, guaranteeing staff have the necessary material and equipment to manage waste safely and ensuring compliance. In the cities and municipalities, BMW is incinerated at the Central, Provincial and General Hospitals or other health facilities with incineration capability. Those health facilities without incineration capability, store waste temporarily in designated sites; this is later collected for destruction at hospitals / health facilities with incinerators. Rural areas have a limited number of incinerators in some Rural and District Hospitals. Most of facilities have no incinerators, and the open pit burning remains the main waste destruction mechanism.

2.1.6 Demand generation, communication, Advocacy

At national level, the post of EPI communication/social mobilisation officer was filled in 2012 but became vacant again in 2013. The communication plan developed in 2018 however the risk communication plan needs to be strengthened. It is noted that in Manica province there are hesitant groups that belong to a religious sect John Marange similar to Zimbabwe that needs targeted approach of communication. There are opportunites to maximize the benefit towards immunization services demand using the community heatlh agents that are present at the community level and the network of community health and co-management committees at district level that support primary health care services at the community level including Immuization.

Several community platforms such as Religious leaders, community theatre, Community Health Committee, Community radio and traditional healers are promoting integrated Facts for Life Messages including immunization and health seeking behaviours.

- Community radios in Nampula, Zambézia, Tete and Cabo Delgado are receiving support from partners to produce a weekly programms on Facts for Life, including immunization, with participation of service providers, community and religious leaders and other influencers.
- Religious leaders are also engaged in a initiative for promotion of Health, Education and Child Protection using the religious leaders guide, which contains passages from the holy Bible and Koran to support key messages on immunization, hygiene and sanitation, nutrition, pregnant care, education and birth registration and prevention of violence. This initiative needs to be expanded and strengthened the coordination with health facilities.
- Community Health Committees are implementing in Zambezia and Nampula an innovative initiative called “Model Family”, which are families that met selected criteria related to sanitation, hygiene, child health card, pre-natal care, family planning, education and birth registration. Families that met the criteria are certified as Model family in a public ceremony chaired by the Chief of the locality. This integrated initiative can be very useful to support defaulter tracing as one of the indicators is to check the child health card is updated (Vaccines, Vitamine A, Deworming and weight). An operational research will be conducted soon with the objective 1) To understand factors that lead to adoption or not adoption of

healthy behaviors and practices; 2) to Understand the role of certification process as a "booster" or reinforcer of adopted good practices.
3) Capture the community perceptions and awareness of the current initiative; 4) The research results will guide the adjustments needed to improve intervention.
- Community theatre groups, using the methodology of theatre of the oppressed, are performing weekly theatre plays in some districts of Zambézia and Nampula. Under the theatre of oppressed methodology, a local problem is identified, and community members are invited to replace the actors and provide solution to the problem; followed by debates on the issues presented including related believes and social norms. This platform can be expanded to improve community participation, particularly to districts with low immunization coverage.
There are community radios in the largest districts of the country that can be used to strengthen the communication means beyond the annual multi-media plan that can increase services for immunization a The EPI news letter can be further directed to advocate for immunization from District Governers and District Administrators.The lack of systemataic and targeted multisectoral involvement for health promotion for immunization, the inssfucient monitoring and evaluation of generating demand for Immunization services need to be targetd to benefit the program. In few areas the insecurity creasts instability affecting and limiting the service availabity and the demand for services.

For vaccination campaigns such as the Measles Rubella and the response to the vaccine derived polio outbreak, various channels of communication such as community radios, ICS Multimedia Mobile Units, Social media platforms, social mobilizers, and religious and community leaders were used for mobilisation of parents and caregivers.

The 2013 Knowledge Attitude and Practice study conducted found that among the Communities under study, the weak interpersonal communication capacity of health technicians and the mistreatment perceived by the women interviewed are the main causes for failure to a full adherence to vaccination. The health education sessions on vaccination carried on at the health posts do not reach the whole target group, as they only reach those caregivers who go to the health centre and who arrive before the service begins. The care givers do not participate as the information is provided from the heatlh worker means means that child carers are unable to address their doubts or misconceptions contributing to the persistence of myths about vaccination. The study provided recommendations from to improve the communication messages and the method of disseminating them.

2.1.7 Immunization Financing Sustainability

Since 2001, there has been an increase in funding to immunisation both from the government and from partners. Gavi has been the largest donor, providing over US$238 million in cash and non-cash support to the programme in the same period, averaging $29million per year in the period 2014 – 2018. Government expenditure on vaccines as a percentage of total expenditure on vaccines has been in the region of 20% while government expenditure as a percentage of total expenditure on routine immunization has equally been below 30% (Fig 12& 13below).

Figure 12. Government expenditure on Vaccines used in Routine Immunizaiton as % of total expenditure on Vaccines

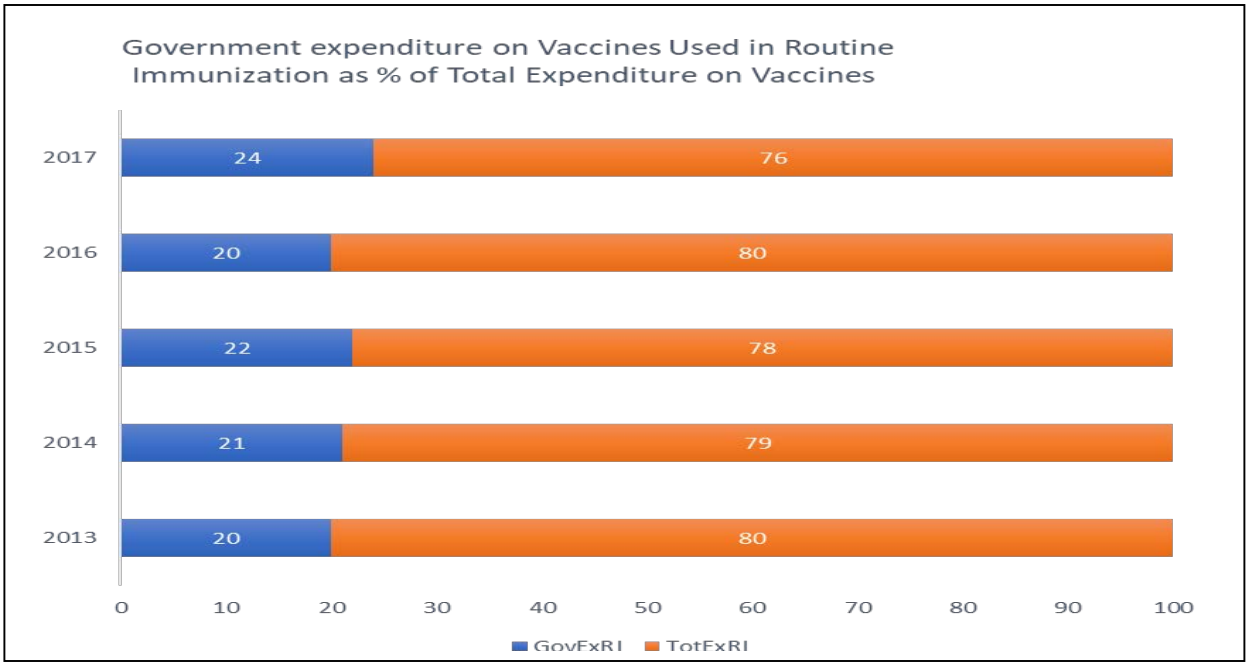
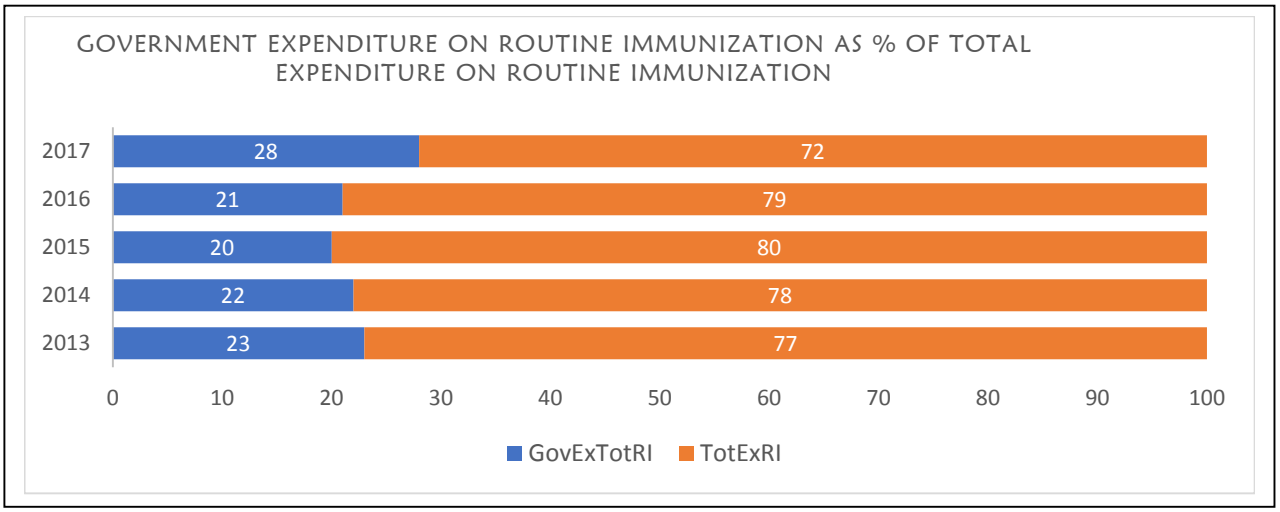


Figure 13. Governemtn expenditure on Routine Immunizaton as % of total expenditure on Routine Immunization



Tracking and reporting immunization expenditure has been a challenge as evident in the JRF. Generally, reported expenditures do not cover expenditures at provincial and district levels. Efforts will be made to align with NHA using the Systems of health Account (SHA2). In line with GVAP and ADI commitments, the desire of government is to see increasing trend in government expenditure per person targeted with immunization as a measure of sustainability over time.

Although in the last decade, the Health Sector spending share of total Government budget in Mozambique averaged 8.9 percent (less than the Abuja target of 15%), health budget is under great strain, with several programmes competing for the dwindling envelop. In

situations of constricting health budget, immunization programme managers often struggle to obtain the necessary funding to strengthen immunization, meet operational cost and introduce new vaccines as the general belief is that the programme has better appeal for external funding and partner support. In such circumstances even protecting current budgets can be a great challenge. Consequently, efforts to obtain or strengthen the support of key stakeholders and influence the public and media agenda with the goal of ensuring long-term and sustainable funding of the immunization programme should be optimized.

2.1.8 Immunization & Surveillance Data quality & monitoring

The quality of Immunization and surveillance data and the limited district capacity to manage and analyse data affects the ability to take decisions timely to address the performance coverage gaps and equitable service provision and promotion of utilisation. The MOH recognised and has developed a Data quality improvement plan with support from the Gavi alliance partners that is being impleneted among which the Data quality self assessemnts periodic use at sub national level and building the platform for use of DHIS2. The Data quality self-assessments (DQS) have been rolled out for quarterly implementation by central and provincial EPI staff to determine limitations and address them at the root level for the improvement of the quality. The Data from the DQS evaluation, conducted in Nampula province in November 2018, point to a discrepancy of data between the Child's Register Book and the monthly summary in the order of 46%, and between the monthly summary and SIS-MA summary in the order of 10%. During this evaluation was considered a sampling period from January to June 2018 for the Penta3 component at Rapale's health center in Nampula province.

The MoH uses DHIS2 as platform of robust and efficient data collection directly input from district level while the Health facility data is aggregated and inputed into DHIS2 at district leve. This has allowed prompt data availability at provincial and central level and quality of reporting has improved since its introduction. The DHIS2 includes an immunisation and DIS is developing additional modules for the platform. The DIS also plans to review all indicators captured (for all programmes) in DHIS2 with a view to reducing them to those that are essential to reduce the burden on those reporting. Indicators removed will include those which would be more appropriately gathered periodically through surveys. The currently ongoing different information systems will also be harmonised (SMT, SELV etc.) with a view to their integration in DHIS2.
To address the challenge of unreliable denominator, a 2018 MSCP review2 proposed using province/district-appropriate coefficient estimates for target populations and, following NITAG endorsement and ministerial approval, EPI adopted this method from 2019 where by end 2019 all provinces will be complying to use it. The 2017 population census data is available, this target population estimation methodology requires updating and the country can use the WHO standard denominator guide to standardise the use of denominators for the programme in addition, WHO UNICEF sub national estimates could help curb address aiming reliable coverage estimate for the programme. In 2019 EPI will use HSS funds to implement province-led surveys in Nampula, Zambézia, Tete, Manica and Maputo provinces. This sub national survey will generate district level immunisation coverage estimates which can be used for planning and the WHO standard guide for coverage survey can benefit the program.

[2]MCSP Mozambique Program Brief: Addressing the Denominator Conundrum for Maternal and Child Health Programs: A New Methodology

The Institute of National Statstics (INS) is implementing surveillance for vaccine preventable diseases using the M-Alert surveillance system in Inhambane, Maputo & Manica provinces and being rolled out in Cabo Delgado province. INS is exploring its include integration M-Alert into their broader surveillance tool.
In summary the key challenges in Data are, administrative data indicating coverage figures over 100% with recognised issues of both denominators (estimates based on outdated / incorrect population data) & numerators (over/under reporting of the numbers of children vaccinated). The reported coverage has more than 10% difference between the WHO UNICEF natonal estimated coverage. The 2017 census data indicates the birth cohort has reduced from the current approximate of 1.4 million new-borns. Other factors include data discrepancy between the different registers in use, loss of registers and poor registration practices / capability. As a result, the usefulness of administrative data is limited for both decision-making and reporting, where sub national survey data is required. Data quality, although improving, remains an issue, particularly at health facility level where registers and monthly summaries are of poor standard.

3. Key Problems and Root Causes

As part of the situational analysis; identification of the primary problems preceded followed by the application of the root cause analysis methodology to identify the main underlying factors that lead to that root problem. The problem is presented in a hierarchical format with labels indicating high order to root causes. The identified key problems are the 1. Low vaccination coverage, high drop-out rate & 2. Suboptimal coordination and management of the EPI and surveillance programs.
The Key problems and Root causes with the hierarchal tree is indicated in Annex 1. Sheet 2

Table 6. Summary SWOT analysis of the development of CMYP 2020-2024

Strengths	Weaknesses

• Government commitment to finance NIP and increase allocations to finance traditional vaccines and outreach services • Strong working relationships between EPI and traditional EPI partners • Integration of immunization activities integrated with MCH, and Nutrition services in fixe and outreach sites. • Immunization coverage increase over the course of last five • Use of local evidences for introduction of new and underused vaccines • Immunization a high-profile issue on political agenda • Existence of a multi annual plan for social communication and demand for EPI services •	• Existing inequities and disparities in vaccination coverage across the country; gaps between reported and surveyed coverage rates • Insufficient coordination and communication between EPI and local authorities and weak tracking systems to address immunization needs for population at high risk areas; • Uneven distribution of immunization staff across the country with staff shortages in the rural areas; Low capacity of human resource and skills of the health workforce hinder the effective and quality of the health system and health services. • Weak micro-planning skills among the frontline service providers; • Communication gaps between providers and rural communities, especially in ethnic minority and hard-to-reach communities; • Delays in disbursement of domestic and external funds • The health information system is in need for improvement in all aspects – quality, completeness, frequency and accuracy. • Funding for health in Mozambique is still very low, especially from domestic sources. The external funds still cover most of the health service and operational costs. • Surveillance poor data quality, analysis with vaccination coverage, disease out breaks, AEFI and risk communication; community participation in passive surveillance. • Not enough appropriate transport for vaccines, vaccination materials and service delivery at all levels. Weak IPC skills of health staff, which has impact on the quality of the services and demand. Weak Monitoring of interventions implemented at community level Low engagement of provincial and local government on mobilization of the communities •
Opportunities	Threats
• Governments commitment to achieve health related MDGs/SDGs and to invest in improved service provision and increase the allocation of domestic funding • Availability of technical assistance and readiness of implementing partners to provide support. • Operational opportunity of Strengthened District Health System Strengthening; integration of community participation (planning, C4D, service delivery, surveillance, monitoring and evaluation). • Resources available for introduction of new vaccines to improve immunization program	• Insufficient funding of EPI due to financial/budget crisis (internal or external shocks) and/or unexpected decrease of external funding • Emergency situations, outbreaks of vaccine preventable diseases requiring additional human resource and financing • National Immunization policy not updated • Weak Linkage of National Health Strategy with cMYP and Annual EPI plans in terms of National goals, results; with • priories not based on disease burden and cost-effective strategies

• Existence of a national health development plan 2014-2025 • Social norms favorable to vaccination	

4. The current situation, objectives, strategies and key activities

The current situation of performance by category, planned strategies, objectives to be attained and key activities are outlined in Table x.

4.1 Service delivery

The health sector strategy for 2015-2019, aims to increase the DPT3 coverage to more than 95% to contribute in the reduction of child mortality below 5 years of age due to VPDs. According to WHO, Mozambique achieved a DTP3 national coverage of 90% by 2018. This illustrates that performance is moving towards achieving the global objectives which established a global coverage of 90% by 2020.

The national surveys conducted such as the IDS, 2003 (63%) IDS, 2011 (64%), IMASIDA, 2015 (66%) indicated that the coverage of Fully Immunized children have been increasing over the years. However, these coverages remain below the WHO recommended levels (90% or above). According to the 2018 IPI report, MR 2 coverage was 76%, well below the ideal reference point of 95% as recommended by WHO.

Despite the growing trend in coverage, the country continues to record cases of children who do not complete the vaccines in schedule, resulting in high dropout rates for DTP1-DTP3 above 10% in 11% of the districts in the country and around 90% of the districts with drop-out rates of over 10% for MR1-MR2.

To address these concerns, a set of objectives were developed to improve the performance of the program, with emphasis on the following:

- ✓ Achieve a minimum coverage rate of 90% for all vaccines in all districts by 2024;
  - o Increase the minimum Fully Immunized coverage from 85% in 2018 to 90% in 2024 in all Districts;
  - o Achieve a minimum coverage rate of 95% in all districts with measles and Rubella second dose by 2024;
- ✓ Reduce the difference in vaccination coverage between social classes from 32% to 20% by 2024:
- ✓ Reduce the dropout rate between DTP 1 – DTP3 and MR1 – MR1-MR2 to less than 10% in all district by the end of 2024;

To achieve the above-mentioned objectives strategies to improve vaccination coverages in various environments (urban/rural) and reduce drop-out rates in the communities were developed.

- ✓ Provision of vaccination services in various platforms (outreach, routine vaccinations, African week of vaccination; child heatlh week, supplemental Immunizaiton activities and use the opportunity of introduction of new antigens to promote immunization services)
- ✓ Scale up of the implementation of the full components of RED/REC strategy.

To achieve these objectives, several activities will be implemented, including:

- ✓ Actively tracking children that do not complete their vaccination schedule including engagement of community structures;
- ✓ Expand RED/REC strategy micro-planning to all districts, observing criteria for prioritization;
    - o Map out the communities in all districts to identify special strategies to reach all eligible population with vaccination
    - ✓ Perform vaccinations through outreach and or mobile strategy as per the Micro plans; Celebrate African Week for immunization.
    - o Create a data base of all the children with uncompleted vaccines and ensure that they complete the vaccine cycle;
    - o Ensure all eligible targeted population that are identified as not completing as per the schedule is vaccinated;

Condcut supportive supervision

- ✓ Implement supervision and training visits at all levels (province, district, medical facilities and communities);

Build capacity of health Immunization focal person's/health workers

- ✓ Deliver on the job training about understanding of vaccine calendar;
- ✓ Train technicians at Health facility level in vaccine management, vaccine supply logistics, cold chain and management of data related to vaccine logistics information
- ✓ Train District managers of EPI in program management and in the use of instruments for the management of the program and vaccine data;
- ✓ Train Health facility technicians in RED/REC strategy;
- ✓ Provide training to all health professionals at Health facilities about the understanding and the importance of complying with the vaccination calendar, vaccine contra-indications, including the control mechanism for all children below the age of 2 who report to the Health facilities for Fully Immunized

  Monitoring for action
    - ✓ Hold quarterly review meetings at district level to assess performance (involve EPI focal points in the medical facilities);
    - ✓ Perform vaccination coverage surveys to validate performance;

4.2 Introduction of New Vaccines

Despite progress in the introduction of new vaccines, and their impact in the reduction of infant-child morbidity and mortality over the last few years, the EPI has identified the need to introduce more vaccines, with the aim of reducing the burden of Vaccine preventable infectious diseases through vaccines, such as cervical cancer, hepatis B infection, diphtheria & Tetanus, with high prevalence rates in the country

The cervical cancer, which affects half a million women every year, is the third more common cancer amongst women globally and the main cause of death by cancer in women across the globe. In Mozambique, cancer of the cervix is responsible for 1/3 of cancer cases amongst adult women and is responsible for 64 deaths per 100 women (INS, 2018). The infection by the human papilloma (HPV) is most important risk factor associated with the cervical cancer.

Given the need to align with WHO Global Strategies in reinforcing the protection against Diphtheria and Tetanus, and considering that there will be no more production of the TT vaccine formulation from 2020, there is a need to implement the change from TT to Td, due to the decrease in the immunity of diphtheria after the first vaccine doses containing DTP in its routine as well as providing protection against Tetanus.

Vaccination at birth with Hepatitis B (HB) is one of the mechanisms used and recommended globally for the prevention of the Chronic liver disease and Hepatoma cellular carcinoma. Despite limited evidence on the magnitude of virus infection by the HB virus in the country, it is estimated that 90% of HB infection cases at birth are transmitted during delivery. Because Mozambique is in a Viral Hepatits B (VHB) endemic region (<8% prevalence), EPI plans to introduce the vaccine in 2022, with the aim of preventing vertical transmission and escalation to disease.

To continue the reduction in the burden of vaccine preventable diseases (uterus cervical cancer, Hepatitis B and Tetanus /diphtheria), the following strategies will be developed / implemented:

- ✓ Introduction of HPV vaccine, Hepatitis B Birth dose vaccine by 2024;
- ✓ Change from TT to Td by 2020;

Both the introduction of HPV and the switch from TT to Td will be guided by periodic readiness assessment to guide prompt action.

4.3 Supply Chain, Vaccine supply Quality, Logistics & Transport

4.3.1 Transport and Mobility

In 2018 only 22.5% of medical facilities in the country had at least 1 working motorbike for executing the outreach strategy. About 77.5% of medical facilities are without transport means to execute this strategy. To ensure higher coverage, there is a plan to acquire 1,000 motorbikes in the period the period 2020 – 2024, to cover around 60% of medical facilities.

For the distribution of vaccines and vaccine supply materials, in 2018 only 30% of Health Provincial Directorates had, on a regular basis, a means of transport. In addition, over the last few years, the program has faced challenges in terms of vehicles at district level for the execution of supervisions / monitoring and community services (integrated outreach programs, active search and social mobilization). To revert this scenario, there are plans to acquire 81 or 18 vehicles (Land Cruiser Pick-Up) during the period 2020 – 2024, for the same number of districts, specifically to be used for these activities. Similarly, to address the needs for means of transport, this plan has incorporated the acquisition of vehicles that will be dedicated to the distribution of vaccines from the Health Provincial Directorate to

neighboring medical facilities, as well as the acquisition of motorbikes for the supervision and maintenance of the cold chain at central and provincial levels.

It is noted that the lack of preventative regular maintenance results in transport means being nonoperational. To address this problem, it is expected that a budget line will be created to ensure the maintenance and the acquisition of spare parts for all means of transport that are allocated to the program and its activities.

4.3.2 Cold Chain Equipment

The maintenance of the vaccine storage chambers, that is currently secured by an outsourced company by a Partner for this purpose, is expected to shift to MISAU during the next five-year period (2020-2024), where MISAU will appropriate the contracts corresponding to maintenance of cold rooms of Central, Provincial and Intermediate Depos.

The 2017 inventory of cold chain equipment identified that about 70% of health units did not have adequate cold chain equipment. To address this, the Cold Chain Equipment Optimization plan (CCEOP) consisted of the acquisition of 1413 Prequalified Refrigerators and Freezers for the conservation of vaccines and 612 remote temperature monitoring instruments for various levels. The CCEOP, which is expected to begin implementation by the end of 2019, represents a major investment in the rehabilitation and settlement of the cold chain at HF level. And it is expected that with the proper maintenance of this equipment this will last to support the needs of the country in the next 10 years (life time of the equipment). During the implementation of the CCEOP, it is expected that all the cold chain maintenance technicians will be trained at the national and provincial levels to ensure the maintenance of this equipment.
The districts were also devoid of cold chain maintenance technicians, which contributes to the delay in the response of faults of the equipment, so during the 2020-2024 period, it is expected that 163 technicians will be trained in short courses, in coordination with the INEFP, so each district must identify an employee to be trained and then respond for the maintenance of the cold chain at the local level.

To keep up with the dynamics (introduction of new vaccines and / or new formulations) of the EPI, it is expected during the five-year period the purchase and installation of 2 Cold Rooms at the Central Vaccine Depot

4.3.3 Vaccine supply, Vaccination and registration material

The Effective Vaccine management assessment (EVMA)conducted by July 2019, identified as areas of strengths at national and provincial levels adequate storage capacity in terms of building within which vaccines and supplies were kept, and adequate cold chain capacity; availability of remote temperature monitoring system; satisfactory vaccine management systems and adequate transport capacity for moving vaccines and supplies down the supply chain. The district level also registered adequate capacity of building and cold chain equipment.

Major weaknesses noted included the unavailability of EVM standard operating procedures and inadequate supportive supervision at all levels; none standardization data collection tools such as stock recording tools and temperature recording charts, and inconsistent use of these

tools where other used the tools religiously while others did not; lack of basic knowledge of vaccine management including the new technologies in use such as Vaccine Vial Monitors (VVMs); and the use conditioned ice packs in the absence of freeze monitors. The unavailability of planned preventive maintenance plans for buildings and Cold Chain Equipments (CCE) and absence of stock records for diluents and injection safety materials prominently noted at district and service delivery levels were found as weaknesses.

The following are the key recommendations of the 2019 EVM assessment;

- The country to consider changing policy on use of conditioned icepacks to using coolant packs stored at 2°C to 8°C starting with the National Vaccine Store and Provicial Vaccine Store and then rolling it out District Vaccine Store and Lower Divisions (Health facilities). This is to avoid possible damage to freeze sensitive vaccines arising from use of conditioned icepacks during transportation.
- Preventive maintenance plans for building and CCE should be developed to guide on necessary PPM to be carried out.
- The MOH should consider creation of new post for the NVS.
- The country should develop, print and issue out the following;
    - EVM standard operating procedures for use by all levels of the iSC in the country. The SOPs should be designed along the lines of WHO generic EVM SOPs.
    - Standard stock recording tool that meets EVM requirements for use by all levels.
    - Standard temperature recording chart that meets EVM requirement for use by all levels.
- Regular supportive supervisory visits should be conducted at NVS, PVS and DVS and these visits documented for follow up action and proof that they have been conducted. The National EPI to design a check list for vaccine stores supervision.
- Personnel managing vaccines at all levels should be trained on EVM to address the identified gap in knowledge. The trainings should be followed by purposeful supportive supervision to ensure implementation of the gained knowledge.

The implementation of optimized (cost-effective) vaccine delivery systems to the health units is a priority not only for the EPI, as is evident in the PELF and is currently implemented in 9 of the country's 11 provinces through Direct Distribution to the HF, from of DPS and Intermediate Depot. The HF Direct Delivery System, as patented in the PELF-CMAM, is allied to Integrated and outsourced distributions whenever financial conditions and technical capabilities are created at different levels.

4.3.4 Visibility of Data using Electronic Tools for Logistics Management

There is poor visibility of vaccine logistics data and vaccination material at all levels; therefore, to respond to these challenges. VIVA (Visibility for Vaccines) from UNICEF was installed and is used at the National Vaccine Store to monitor vaccine stock arrivals and stock management to avert stock outs or surplus of each antigen. However, the problem still persits at provincial, district and health facility levels due to lack of proper systems and lack of use of current systems such as SMT. It is intended that during the five-year period 2020-2024 to expand the implementation of SELV as the tool for the management and registration of stock of vaccines

at the provincial and district levels. It is intended to expand in a standardized way at the country level. The tool, besides performing stock management, including the requisitions, being OpenLMIS will be integrated with SIGLUS and the communication and future integration with the DHIS (SISMA). On the other hand, a major HF-level investment in data capture and registration is foreseen through the introduction in 2019/2020 of the web based electronic platform OpenSRP (Smart Regist Platform), a tool for daily vaccination, including the use and management of vaccines, allowing real-time / usable visualization of vaccine intakes at US levels. This platform is also designed for future communication and integration with other tools such as DHIS (SISMA), SIGLUS, and with other programmatic management platforms such as the Upscale of the APEs (community health workers) facilitating for example notification and active case search.

With regard to the acquisition of equipment to meet the operation of technologies in the management of EPI, by 2018 there were 40 functional tablets for use in SELV to ensure the implementation and / or expansion of standardized electronic tools (SELV, ODK- Integrated Supportive Supervision, OpenSRP and DHIS 2) it is intended that in the next 5 years the purchase of 1770 tablets for PAV and logistics managers, National and Provincial Epidemiological Surveillance, District PAV and Health Units for the implementation of these tools will be carried out.

4.3.5 Waste management

The National Biomedical Waste Management Plan states that there are only 17 Health Facilities in country that have high-temperature and conventional incinerators. Some Health Facilities have low temperature incinerators made of bricks, drums or incinerators of the Montfort type. However, most HF, located mainly in rural areas, the medical waste is burned in the open air within the HF. Biomedical waste treatment options should be effective, environmentally friendly, safe and accessible to protect the health of the public. Thus, during the five-year 2020-2024 period, 1375 low-cost incinerators are expected to be built for the peripheries HF, 161 conventional (high-temperature) incinerators, and shredders for the HF in district headquarters. These investments should be allied to the technical training of district supervisors and waste handlers at the US level.

4.4 Vaccine Preventable Diseases Surveillance

Problem 1: Poor Data Quality of VPD Surveillance

Objective 1: To ensure the quality of the indicators of surveillance systems for all notifiable diseases by 2024.

Activity 1.1: Human resource training & monitoring in the detection, reporting and reporting of all notifiable diseases.
The surveillance system established for all notifiable diseases have been implemented to monitor the burden of these diseases and to assess the impact of vaccines. Thus, for quality performance output, it is important that the human resources involved are well trained on the importance of identifying, reporting, collection and processing samples of eligible VPDs and AEFI cases. In previous years the Surveillance System has organized annual training for some surveillance such as rotavirus, meningitis (pneumococcus, meningococcus and Hib) and

active surveillance, as well as AEFI where the beneficiaries were the staff of some sentinel posts in the provinces and districts and it was not possible to cover all country due to lack of funds.

In this context, there is an urgent need for all surveillance systems to carry out training at all levels to: 1) improve indicators and quality of surveillance, such as: completing the information collection form, identifying cases, collecting and storing correctly the samples before sending to the laboratory; 2) to detect, diagnose, identify and evaluate the causality assessment events following immunization; 3) improve the laboratory diagnosis of VPD; 4) introduction of new laboratory techniques for better diagnosis of VPD; and 5) better reporting of results.

Activity 1.2. Strengthening and expansion of the surveillance system for all notifiable diseases, EAPV and rapid outbreak detection

Mozambique implemented active surveillance and sentinel/laboratory surveillance of rotavirus, meningitis (pneumococcus, Hib and meningococcus), Influenza virus and Measles/Rubella. Rotavirus surveillance works in six sites in the three regions of the country; meningitis in three sentinel posts in the three regions of the country and influenza virus in three sentinel posts all in the city of Maputo

Unlike active surveillance and Measles/Rubella surveillance, other sentinel surveillance and AEFI are not representative at the national level, which results in only one region or some provinces in the country, thus requiring an expansion of activities primarily at the regional level (South, Center and North of the country) and then to all provinces of the country.

For all VPD it is crucial to have country representative data since one of the objective is to evaluate the impact and efficacy of the newly introduced vaccine (rotavirus, meningitis and measles/rubella) and generate baseline and actual data for introduction of new vaccines (influenza virus). In relation to AEFI, we are still in a primary phase where we are still in the process of implementing the AEFI, as a first step we have already been trained at central level and later we will move from the provincial, district level to the community.

Activity 1.3. Monitoring and Evaluation of VPD Surveillance Indicators

Rationale: The INS in coordination with MoH and WHO has implemented activities to implement and strengthen surveillance of all notifiable diseases (Hib, pneumococcus, meningococcus, Rotavirus, Measles / Rubella, influenza virus and PFA). Thus, in order to assess the performance of VPD surveillance activities as well as the quality assessment of surveillance indicators, there is a need to carry out surveillance and monitoring activities in order to monitor the implementation process and performance of surveillance indicators, or either to verify the way the activities are being implemented, in order to make it possible to review the implemented strategy, making adjustments whenever necessary. It will also allow monitoring of active search activities in silent districts and those with poor performance of surveillance indicators

The evaluation of the surveillance indicators will help to verify if the established goals have been reached, the quality of the samples collected and sent to the laboratory were of quality and sent in a timely manner. This activity will also allow to verify and evaluate the

degree of complete and correct completion of the Cases investigation files, clinical histories and control at 60 days.

Activity 1.4. Acquisition of reagents, laboratory equipment and computer equipment

a) Reagents and laboratory equipment

The INS in coordination with MISAU has been developing activities to implement and strengthen VPD surveillance activities in sentinel posts at the level of reference hospitals in the southern, central and northern regions of the country. This activity includes securing consumables and reagents for primary testing at the sentinel level and confirmatory testing (by molecular techniques) at the level of the INS National Reference Laboratories. However, there has been a stock out (reagents/consumables) of the laboratory due to the high flow of samples, occurrence of outbreaks (emergency activities), on the other hand due to the expansion of surveillance activities, contributing to the technical activities (laboratory processing of biological samples) and, consequently, making it impossible to comply with the laboratory response timely as well as the quality indicators of the surveillance. In this way, there is a need for funds to guarantee sufficient stock to meet the demand of the laboratory and to ensure the continuous diagnosis of the clinical analyzes of the laboratory.

In addition, the laboratories are equipped with uncalibrated equipment and lack of maintenance and others are faulty. Thus, there is a need to acquire equipment for the laboratories including funds to ensure its calibration and periodic maintenance. The maintenance or calibration of the equipment will ensure the proper functioning of the equipment and prevent possible malfunctions, on the other hand will ensure that the results of the clinical analyzes are within the established parameters. The acquisition of new equipment will ensure the strengthening and expansion of surveillance activities, improve diagnosis and the introduction of new diagnostic technologies.

b) IT equipment

To date, the system for notifying pre-existing VPDs and based on traditional surveillance methods (case notification forms) with its delays in transferring reports depends on the availability of funds for transportation and therefore, the delay in the analysis and timely detection and investigation of outbreaks. Thus, the INS in coordination with MoH and DNF has been developing activities to implement an electronic platform for notification and reporting of all vaccines preventable diseases in all sentinel sites at the level of the reference hospitals in the southern, central and northern regions of the country including AEFI to improve the nationwide reporting and reporting system. In addition, surveillance does not have sufficient computer hardware to reproduce case notification sheets, print reports and communicate with sentinel points; however, the acquisition of computer hardware (computers, printers and modems) will be used to improve communication at different levels (Central, Provincial and District), on the other hand, will also be used to reproduce the patient records, issue results, send reports and share the respective database.

Activity 1.5. Recruitment of Human Resource to support strengthening activities

At present, sentinel surveillance (laboratory-based) works with more than half of the technicians hired and paid their salaries by other projects with a defined period, one of the projects will end in August of this year (2019) will adversely affect the quality of surveillance data. Hence, the hiring and maintenance of 9 senior technicians and 2 drivers is incorporated to ensure the strengthening of surveillance activities for rotavirus, meningitis and influenza viruses. In a gradual manner, the same contracted technicians will be absorbed into the Framework by the Mozambican state.

Activity 1.6. Dissemination of activities, participation in congresses and publication of scientific articles

The INS, in coordination with MoH and EPI, has developed activities for the dissemination of surveillance and research data in the Health Days, Open Days of Research, lectures at the level of Health Facilities and participation in national and international congresses. In addition, in the past years the results of surveillance systems such as impact assessment of the introduction of rotavirus and PCV10 vaccines and circulation data of different strains of influenza virus have been published in scientific journals such as PLOSONE, Vaccine and presented at different national and countries. On the other hand, surveillance of influenza virus that commenced since 2013 lacks visibility in the country despite three articles already published. The dissemination of these activities should be intensified with MISAU for better decision-making regarding the introduction of the influenza virus vaccine. There is still little dissemination and knowledge of the importance of the AEFI, not only at the community level but also at the clinical staff level, thus necessitating the creation of leaflets, advertising spots in coordination with the communication team and presentations in health units and brigades' structure. Thus, to continue with this activity of dissemination and publication of scientific articles, exchange of experience in the congresses in the country and across borders has financing needs for this activity.

Problem 2: Low Quality of AEFI Data

Objective 2: Ensure the quality of the indicators of VPD surveillance

Activities 2.1. Vaccine Quality Control laboratory assembly

Rationale: The National Directorate of Pharmacies has a National Laboratory for Quality Control of Medicines and Vaccines, but this laboratory is not functional due to the lack of equipment, reagents and human resources trained to ensure its functionality. Thus, there is a need for funds for the procurement of reagents and equipment including human resource training to respond to any adverse vaccine-related adverse events.

Activity 2.2. Train and strengthen the National Pharmacovigilance Committee of AEFI

Justification: Currently, the Ministry of Health in coordination with the National Directorate of Pharmacy has created the National Committee for Pharmacovigilance of AEFI to establish systems that allow the effective functioning of the committee, rigorously review recent information in all fields ranging from basic sciences to epidemiology national, regional or global vaccine safety. Funds are needed to hold quarterly meetings to strengthen the National Pharmacovigilance Committee at all levels (basic sciences to epidemiology) regarding vaccine safety.

Problem 3: Lack of evidence for introduction of new vaccines

Objective 3. Document the burden of vaccine-preventable diseases

Activity 3.1 Introducing new technologies for the diagnosis of vaccine-preventable diseases

Rationale: In Mozambique, INS, in coordination with the Ministry of Health and the National Directorate of Pharmacies, has implemented and strengthened the surveillance system for all notifiable diseases (Hib, pneumococcus, meningococcus, Rotavirus, measles/rubella, influenza virus and PFA) and all based on laboratory tests of specimens received from hospitals. However, several issues have been identified, including poor quality of biological samples, delayed delivery of laboratory results to clinicians. In addition, the use of conventional techniques for laboratory diagnosis also influences the quality of detection and reporting of diseases that can be prevented by vaccines due to their low performance. Thus, the introduction of state-of-the-art technologies in national reference laboratories can improve the diagnosis of all diseases that can be prevented by vaccines.

Activity 3.2 Develop research protocols for new vaccines (HPV, typhoid fever, meningococcus) and to assess the impact and efficacy of the new vaccines (rotavirus, PCV, measles/rubella)

Rationale: In Mozambique, vaccines against rotavirus, measles/rubella, PCVs, Hib, Polio, were introduced in the national vaccination calendar, however, information on the epidemiology of vaccine-preventable diseases in Mozambique is little known. Generating evidence on the epidemiology of vaccine-preventable diseases in Mozambique is crucial to monitoring the impact of introducing vaccines and guiding public health decision-making. The involvement of NITAG will continue to add value to reinforce evidence-based decision.

4.5: Data Quality

The quality of health program data has been one of MISAU's (MOH of Mozambique) priorities and specifically for the Expanded Immunization Program. As a way of responding to data quality problems, the program has been conducting periodic data quality assessments at district and health unit level using the DQS analysis tool.
Based on the assessments carried out at the district and health units of some provinces, there is a consistent discrepancy between registries at the unit level, especially between the monthly summary and the Child's Register Book. On the other hand, there is also a discrepancy between the monthly summary of the health unit and the data found in the Information System for Health-Monitoring and Evaluation (SIS-MA)

The program aims to improve the quality of data through several actions to respond to the current situation and to anticipate future needs in relation to improving data quality and the data management system.

In this context, among several problems identified in data quality, the program considered the following actions:

Objective 4.1 Reduce the discrepancy between the data reporting tools in the program at the health unit level from 46% to 5% and the monthly summary of the health units to SIS-MA from 10% to 0%

To achieve the above goal, the program has designed strategies to improve the quality of data in general, and to anticipate and respond to future needs in the scope of information system management for the program, highlighting the following:

Activity 4.1.1 Training of EPI technical staff in the management and analysis of data for decision-making.
Activity 4.1.2 Conduct Periodic evaluation of the data quality of the Immuiztion program at all levels (Central, Provincial, District)

To reach the objectives, several activities will be developed, considering the activities below:

- ✓ Train the technical EPI staff at provincial and district level in data management (VAN, DQS and DQR);
- ✓ To carry out supervision and technical support in the field of data quality to EPI technical staff in the provinces, districts and health units;
- ✓ Conduct monthly and quarterly data review and harmonization and conduct performance evaluation at all levels (VAN);
- ✓ Conduct the annual data quality evaluation of the SIS-MA at central level; through DQR (internal data consistency, outliers, simultaneity of vaccination doses);
- ✓ Computerization of the EPI registration system for vaccination at the health unit level (OpenSRP);
- ✓ Harmonize target groups based on new coefficients used to calculate coverage at all levels;
- ✓ Carry out the review and update of the registration tools including the child's health card to accommodate new indicators on the introduction of new vaccines;

Innovations for the Immunization program

- Computerization of the EPI registration system at the health unit level;
  - o Acquisition of Tablets / Computers;
  - o Hiring a consultant for System Development;
  - o Testing/Piloting the system;
  - o Training of the technicians of the health unit in use of the electronic registration tool;
- Acquisition of bicycles for the community focal points to strengthen the system of active searches of children with missing vaccination in the community.
- Acquisition of Data show for the EPI at the provincial and district-level to reinforce the data review meetings;
- Acquisition of video conference system at the provincial level;

- Acquisition of video conference for the EPI room in the MOH (MISAU) for Video conferences and to show/visualization of the main indicators (a kind of automatic dashboard);
- Use of mobile phones (cellphones) to improve communication between the health unit and the community regarding the performance of mobile brigades for the areas of difficult access (IVR -interactable Voice Recorder); it communicates with the health unit and the community, it is a way to monitor the health unit-level mobile brigades;
- Sending messages to the community through local languages notifying fully vaccinated children and remembering vaccination at 18 months;
- Acquisition of sea transportation (boats) for use as transport in districts that are bathed by huge rivers, lakes or oceans and that have a larger population for Mobile Brigades;
- Acquisition of mobile units (Columns, microphones, megaphones, amplifier, generator) for provincial health directory as well the district health directory. Using the EPI / HSS vehicle and local language to mobilize the community for mobile brigades' activities (Including theater groups);
- Construction of sheds for vaccination services.

5.1 JUSTIFICATION FOR SOME INNOVATIONS

5.1.1 MOBILE UNIT FOR SOCIAL MOBILIZATION IN VACCINATION ACTIVITIES

Mobile units for EPI will have a major impact on the dissemination of key messages regarding the importance or fulfillment of the vaccination schedule. This will allow the program to approach methodological aspects of dissemination of information in a more comprehensive way and to raise the attention of the community. With this mobile unit that will be allocated at the level of DPS and Districts (SDSMAS), in addition to being used to carry out massive activities of the EPI and can bring impact to other programs such as MCH (SMI), nutrition and Surveillance.

It is also intended that the units will be used to conduct lectures in the communities through local theater groups and in addition to being used for specific social mobilization activities as well integrated mobile brigades.

5.1.2 ACQUISITION OF BOATS TO INTENSIFY COMMUNITY MOBILIZATION ACTIVITIES

In the months of November to March of following year, it is considering the rainy season in Mozambique. Thus, this directly influencing the access in some communities for the development of vaccination activities for the communities living in the lacustrine (swamps) zones and in the islands, whose distances to the health units are not favorable, needing a health team to move to those points. Areas with the above characteristics constitute a considerable percentage, necessitating a specific means of transport (Boats).

To increase access to the specific population residing in the zones mentioned, there are efforts of expansion of some health centers, needing a regular vaccine supply & service delivery. Currently, to provide services in such areas, the program is dependent on third parties, which requires a lot of bureaucracy (contracts services for rental). On the other hand, high costs are involved in the end.

With all the mentioned aspects, the program intends to acquire boats to some parts of the country, which will be based on the provision of funds for the maintenance of these transportation resources.

5.2.3 STAMP WITH IMAGE OF A HAPPY CHILD FOR HAVING Completed the VACCINES in schedule.

The program in the past had stamps for child that had completed the vaccination schedule. As the number of health units expanded at the country level, a considerable number of health centers left without the stamps, and the habit of using and controlling children completely vaccinated through stamps was lost. As it was noted that this was one of the methods of encouraging mothers to get their children to complete all vaccines in the vaccination schedule. It is believed that the same motivation could prevail for the caregivers if stamps are placed in all health units for the identification of children who have taken MR2 dose, as the last vaccine in the vaccination calendar targeting children under two years. On the other hand, it constitutes additional effort and major challenge for reaching the coverage of MR second dose.

6.0 Description of Vaccine Preventable Epidemiological Surveillance monitoring the Accelerated Immunization Initiatives

6.1 Polio Eradication (Acute Flaccid Paralysis Surveillance)

Regarding surveillance of AFP, which is a surveillance to monitor polio virus transmission targeted for eradication. The detection rate in 2017 was 3.2 / 1000,000 in children under 15 years of age, a rate higher than that recommended by WHO for surveillance, which is 3.0 / 100,000 children < 15 years old.
Following the re-occurrence of the VDPV2 event in 2017 and cVDPV2 outbreak in 2018, both in Zambézia province, the surveillance department at MoH recommended increasing the detection rate countrywide of AFP surveillance to 4 / 100,000 children under the age of 15 by 2024, to demonstrate that wild polio virus does not circulate in the country. Monitoring of the environmental surveillance in addition to the AFP surveillance will be focused.

6.2 Measles/Rubella case-based surveillance

The measles surveillance, subject to monitor elimination, indicated detection rate in 2017 of 5.2 / 100,000, a rate higher than that recommended by the WHO for surveillance purposes, which is 2.0 / 100,000 inhabitants. The rate registered in 2017 was due to the intensification of the active search in the communities. In the meantime, the Department recommends increasing the detection rate by 2024 to 3 / 100,000.

6.3 Neonatal tetanus surveillance

Mozambique is sustaining MNT elimination and monitoring through neonatal tetanus surveillance, the incidence rate in 2017 was 0.05 / 1000 live births, a rate that is within the WHO recommended standard of < 1/1000 live births. The department also recommends increasing the sensitivity rate by 2024 and achieve with at least 90% completeness of reporting districts with standard NT surveillance of < 1/1000 live births. The 2017completeness of the data reporting was 80% that was achieved through focused on job

training performed for the technicians in terms of filling the Case Investigation Form (. The Department recommends increasing the proportion of Fully completed case investigation forms by 2024 to 90%. The country needs to monitor protection at birth to provide reliable estimate of protection against Tetanus during the 1st contact of DPT1 containing vaccine visit.

6.4 Improved data management of laboratory-based surveillance system.

With regards to data management improvement of the laboratory-based surveillance system, the 2018 data quality was assessed at approximately 70%; which is an average below the expected or recommended by WHO (90%). To obtain this percentage the program used an indicator of the complete completion of the clinical data collection form. Based on this rate, the program aims to achieve 90% by 2024, for which was outlined some key activities such as:

- Training of focal points in case identification and recruitment,
- Conducting supervision and technical support in the field of laboratory-based surveillance,
- Review, updating and distribution of tools to sentinel stations, training of human resources in reporting and data management (data cleaning and management), and organizing a workshop for data analysis and reporting.

7.0 Communication, Demand Creation and Sustenance

Problem: Weak Involvement of Governors and Managers in the Social Mobilization of Communities
Objective 1; Involve 70% of Governors and administrators to increase demand for vaccination services.

The Current Situation: The poor involvement of Governors and administrators in the health sector in the mobilizing the communities resulted in a weak commitment to the dissemination of routine vaccination information that could contribute to immunization service demand

To curb the situation, the program intends to carry out the following activities:

- Meeting with governors, administrators to sensitize communities to take their children <2 years of vaccinations sessions or mobile brigades;
- Distribution of newsletters to governors and administrators to be informed about the vaccination situation in their area of jurisdiction;
- Monitor meetings held in Governor-Administered Communities and Administrators through quarterly PAV reports.

Objective 2: Ensure that at least 90% of mothers and caregivers take their children <2 years of age to comply with the vaccination schedule.

The current situation: The dropout rate between MR1 to MR2 is 35% that has resulted due to poor dissemination of the new vaccination schedule combined with poor interpersonal communication, missed opportunity of health visits not benefiting immunization, poor follow-up of the planned activities in the immunization services provided.

Activities:

- Train at least 70% of health professionals in interpersonal communication skills (CIP), using the available packages for communication and in the field of adverse events for vaccination (EAPV) and risk management to improve the quality and service delivery of vaccination;
- Reinforce MR (dose 1 and dose 2) information to health professionals;
- Produce and distribute IEC material (posters, leaflets, brochures, banders, rollovers, tea drops, stickers, outdoor) in routine vaccination;
- Identify and involve champion mothers to promote adherence and compliance with vaccination;
- Disseminate messages across channels on vaccine benefits including new vaccines and community mobilization to adhere to better compliance with the vaccination schedule.
- Disseminate messages about vaccination through mobile networks using existing platforms (SMS, buzy generation, alo vida, PENSA, facebock, twitter, Instagram) for greater coverage in the communication;
- Train community leaders, practitioners of traditional medicine and health committees on the importance of compliance with the vaccination schedule and the benefit of the vaccine; Expand the Model Family initiative, at least to districts with low immuization coverage.
- Carry out two KAP surveys in three regions (North, Center and South), one in 2020 and another in 2024, to evaluate the population's perception and knowledge regarding the benefits of the vaccine.
- Disclose in advance in coordination with local leaders the dates of the views of the mobile brigade,
- Acquisition of vests to identify community focal points (Red Network),
- Acquisition of mobile units in 161 District to promote communication,
- Positive exchange of experiences between communities.

Objective 3: Ensure that at least 80% of girls (9-14 years old) in and out of school and the general population have information on the benefits of the HPV vaccine

Current situation: In the case of a new vaccine that will be introduced at the country level in 2021, the level of knowledge about HPV vaccine by the general population is low. Further mechanisms will be put in place for effective demand creation of TT to Td switch and introduction of birth dose of Hep B as well as Typhoid vaccine introduction.

Activities:

- Conduct a formative research prior to the development of communication plan, with the objective of: 1) Explore community knowledge about cervical cancer and the vaccine against it; 2) Explores barriers / beliefs and taboos relating to vaccination, particularly vaccination against HPV;
  3) Identifies the fears and rumours about HPV vaccine; 4) Identifies influential people and potential allies who can support with awareness raising and mobilisation of families to take up the HPV vaccine; 5) Collect inputs for the design of the communication plan.

- Conduct training research in three regions (North, Central and South) prior to the introduction of the HPV vaccine
- Develop the Communication Plan on the introduction of the HPV vaccine.
- Promote the inclusion of the HPV vaccine, Td, in the school health package.
- Produce at least one radio and television spot on the HPV vaccine
- Establishment of partnerships with mobile phones to disseminate SMS
- Enable at least 1625 health committees to sensitize communities about the benefits of the HPV vaccine and new vaccines.
- Training of all levels of religious leaders on the importance of the HPV vaccine and its involvement in mobilizing communities.
- Conduct training in ZIP and journalists on knowledge about the HPV vaccine and its benefits to raise awareness of adolescent compliance
- Disclose key messages linked to the introduction of the HPV vaccine including the routine phase once per semester through platforms (SMS, WhatsApp, Facebook, among others) and life for clarification of doubts.

Objective 4: Establish a monitoring system incorporated in the SIS-MA to capture information in communication and mobilization.

Current Situation: There are activities that happen at the level of the communities that do not always reach the central level, there is no specific monitoring instrument that captures the information of the land in communication and mobilization. Activities:

- Create a monitoring tool and incorporate into the SIS-MA to capture communication information
- Train health professionals in skills to use the monitoring tool and its reporting
- Monitor introduction of vaccines through Readiness assessment

8. Immunization Financing Sustainbility

Objective: achieve year on year (compared to baseline 2019) increase in expenditure per person targeted for immunization financed from domestic resources
The objective is to position Mozambique on the path to immunization financing sustainability by which government will utilize domestic resources with external funding only as supplementary in funding immunization programme. Specifically, efforts will be made to strengthen program management capacities at all levels for effective and efficient use of resources.
At national level, effort will be to improve government understanding of risks/ opportunities to sustain financing for immunization within UHC and improved government understanding of opportunities to more efficient resource allocation. Actions will include building health workers understanding of optimal planning and budgeting for immunization among all at all levels (National, Provinces, Districts and health facilities). The cMYP will be updated to include new investments based on new vaccines and technology introduction, while annual plans will be developed, and activities well costed to influence government budget allocation.
Immunization expenditure tracking and reporting will be instituted. This will in the long run align with the National Health Account processes using the Systems of Health Account

(SHA2). In order to increase domestic resources for immunization, a resource mobilization framework will be developed. Within the framework, activities will include:

- Advocacy and continuous lobbying with key government stakeholders for increasing government budget for immunization;
- Quantify resource needs and determine gaps, paying attention to efficiency gains in operations;
- Develop/convert the investment requirements/gaps into resource mobilization/advocacy brief;
- Strengthen/Establish effective partnership with all stakeholders including private sector players and Convene resource mobilization forum/roundtables.

Chapter 9.

Table 7. Activity timeline for cMYP 2020-2024 by strategy

Activity Service delivery	2020	2021	2022	2023	2024
Conduct Active searches of missing and non-vaccinated children at community level	X	X	X	X	X
Carry out vaccination at the fixed vaccination posts, in mobile brigades and outreach	X	X	X	X	X
Realizar visitas de supervisão formativa de forma integradas a todos os niveis (Provincia, distrito, Unidade Sanitaria e comunidade) Conduct integrated supportive supervision visits at all levels (Province, district, Health Unit and community)	X	X	X	X	X
Carry out vaccination campaigns in districts with low vaccination coverage	X	X	X	X	X
Conduct vaccination coverage surveys	X			X	
Train the health workers on EPI program management (logistics of vaccines and other supplies, cold chain, data management)	X	X	X	X	X
Expand RED / REC Strategy implementation to more Districts Countrywide, as per established priority	X	X	X	X	X
Carry out mapping of communities;	X	X	X	X	X
Train focal points on RED materials (community actors);	X	X	X	X	X
Hold quarterly review meetings at the district level	X	X	X	X	X
Realizar encontros de balancos trimestrais ao nível da USs (envolvendo pontos focais das comunidade); Conduct quarterly review meetings at the health catchement area (involving community focal points)	X	X	X	X	X
Carry out in services training for health facility level professionals in the field on the importance of compliance with the vaccination schedule, contraindications to vaccines, including the control mechanism for all children less than 2 years of age that visit the health facility for any reason (unique door)	X	X	X	X	X
Carry out mobile brigades in distant communities and Integrate recovery activities for defaulters at the immunization sessions at the African Immunization Week	X	X	X	X	X
Celebrate African vaccination week	X	X	X	X	X
Introduce new vaccines		X	X		
Develop and produce monitoring material for the introduction of new vaccines		X	X	X	
Train health professionals at all levels in the introduction of new vaccines		X	X	X	
Implement HPV Vaccination Campaign to vaccinate adolescents		X			
Advocacy communication and Demand creation					
Meeting with governors, administrators to sensitize communities to take their children <2 years for vaccination	X	X	X	X	X

Activity	2020	2021	2022	2023	2024
Debates in the Media.					
Design, print, and distribute quarterly bulletins to provincial governors and district administrators	X	X	X	X	X
Hold quarterly meetings with religious leaders, PMTs and other influential people in the community to explain the benefits of vaccination and the introduction of new vaccines	X	X	X	X	X
Disseminacao das mensagens sobre a vacinacao atraves das redes de telefonia móvel usando plataformas existentes (sms, geracao buzy ,alo vida ,PENSA, facebock, twiter, instagram)	X	X	X	X	X
Implement the Minimum Package of integrated essential health interventions at Health Units as well as in mobile brigades	X	X	X	X	X
Promover a inclusao da vacina contra HPV, TD, no pacote de saude escolar junto aos encarregados Promote the inclusion of the HPV vaccine, Td, in the school health package	X	X	X	X	X
Production of at least four radio and television spots on the new vaccines (HPV, TD, Typhoid Fever and Hepatitis B at birth)	X	X	X	X	X
Establishment of partnerships with mobile phones to disseminate SMS					
Disseminate messages on vaccine benefits and mobilization of communities to adhere to the 2nd MR dose	X	X	X	X	X
Produce and distribute IEC material (posters, leaflets, brochures, banders, rollovers, tea drops, stickers, dispensers) to introduce new vaccines at all levels	X	X	X	X	
To train 2500 members of health committees to sensitize communities in the approach to new vaccines and their benefits	X	X	X		
Elaborate at least two sensitization messages aimed at men (husband) to authorize / remind their women of the importance of taking their children <2 years to the vaccinations or mobile brigade	X	X	X	X	X
Sensitize local leaders to identify missing children and refer them to US or BM	X	X	X	X	X
Conduct training research acceptability studies in three regions (North, Central and South) prior to the introduction of HPV vaccine	X				
Develop the Communication Plan on the introduction of the HPV vaccine.	X				
Conduct Training in each ZIP for teachers about HPV vaccine and its benefits tin order for them to sensitize adolescents to adhere to HPV vaccination	X	X	X		

Activity	2020	2021	2022	2023	2024
Disseminate key messages linked to HPV vaccination including routine vaccination once per semester through platforms (SMS, WhatsApp, Facebook, among others) and life for clarification of doubts	X	X	X	X	X
To train at least 70% of health professionals in interpersonal communication skills (CIP), using the available packages for communication and in matters of AFI	X	X	X	X	X
Create a monitoring tool and incorporate into the SIS-MA to capture communication information	X				
Intensify social mobilization activities in the African vaccination week	X	X	X	X	X
Surveillance					
Train and refresh surveillance focal points					
Sensitize community health agents, leaders, religious, traditional midwives, traditional healers and involve them in active surveillance	X	X	X	X	X
Oversee and monitor regularly the activities and performance of the surveillance system at all levels	X	X	X	X	X
Follow WHO guidelines for eradication control / disease elimination???	X	X	X	X	X
Send monthly feedback on the performance of each province / district	X	X	X	X	X
Conduct a regular quality control evaluation of the national measles / rubella laboratory, influenza virus, rotavirus, meningitis (pneumococcus, meningococcus and Hib)	X	X	X	X	X
Train / update lab technicians on recent technology and knowledge	X		X		X
Active case Search in Communities	X	X	X	X	X
Reactivation of multisectoral cholera steering committees	X	X	X	X	X
Intensify treatment cholera cases and OCV vaccination in high-risk areas	X	X	X	X	X
Daily monitoring of cases of diarrhea	X	X	X	X	X
Provide rapid tests and complementary reagents for cholera diagnosis	X	X	X	X	X
Massify Td vaccination in MIFS (WCBA)	X	X	X	X	X
Promote Safe and Institutional Births	X	X	X	X	X
Carry out active case search (neonatal tetanus)	X	X	X	X	X
Improve reporting at sentinel,	X	X	X	X	X
Improve sample collection and transport,	X	X	X	X	X
Improve laboratory diagnosis of VPD and timely laboratory response and feedback	X	X	X	X	X
Improve the instruments of data collection tools, print and distribute to sentinel posts	X	X	X	X	X
Develop outbreak preparedness and response plans (meningitis (pneumococcus, meningococcus and Hib), measles / rubella, Polio and Influenza Virus)	X	X	X	X	X

Activity	2020	2021	2022	2023	2024
Accredit laboratory techniques for the diagnosis of influenza virus, meningitis (Pneumococcus, meningococcus and Hib), rotavirus, measles / rubella		X		X	
Participate in national and international pharmacovigilance forums of EAPV and Vaccine Preventable Diseases (DPV),	X	X	X	X	X
Participate in the VPD workshops and congresses at national and international level,	X	X	X	X	X
Participate in short and long term VPD courses at national and international level	X	X	X	X	X
Evaluate the capacity of the new sentinel stations,		X		X	
To provide materials, reagents, equipment for collection, transport and processing of samples for laboratory diagnostic (measles / rubella, route, meningitis (pneumococcus, Hib, meningococcus) and influenza virus and provide operational funds and technical support to laboratories	X	X	X	X	X
Train HR at all levels in the notification and detection (DPV and EAPV) and in the new technologies of diagnosis and reporting,					
Evaluate the capacity of the new sentinel sites		X		X	
Carry supportive supervision, and monitor and evaluate quality indicators	X	X	X	X	X
Develop research protocols on new vaccines and assess the impact and efficacy of new vaccines (HPV, Typhoid fever),	X	X	X	X	X
Train HR (new vaccines)		X		X	
Acquisition of equipment and reagents	X	X	X	X	X
Introduce new technologies for the diagnosis of vaccine-preventable diseases,	X	X	X	X	X
To develop research protocols on new vaccines and to evaluate the impact and efficacy of the new vaccines (rotavirus, PCV, measles / rubella),	X	X	X	X	X
Train HR in the use of new technologies,		X		X	
Acquisition of equipment and reagents,	X	X	X	X	X
Elaboracao e distribuicao dos POPs, fluxos, formulários Decvelop and distribute laboratory SOPs, flows, forms	X	X	X	X	X
Program management, leadership					
Elaborate Ministerial Diploma on quality control of vaccines		X			
Identify laboratory space for vaccine quality control laboratory			X		
Rehabilitate and equip the laboratory				X	
Acquisition of testing material					X
Training of personnel				X	
Peer learning abroad (Exchange experience abroad)				X	

Activity	2020	2021	2022	2023	2024
Development of quality control regulations for vaccines		X			
Develop a vaccine investment case.		X			
Identificar atividades sem cobertura de fundos Gavi e Coordenar e mobilizar dos fundos com novos parceiros (públicos o privados) Identify activities with funding gap and coordinate and mobilize funds with new partners (public or private)	X				
Develop national immunization policy	X				
Hire consulting / technical assistance to develop the national immunization policy		X			
Dissemination meetings			X		
Hire consulting / Technical Assistance to develop ToRs for mid-term program review		X			
Training workshop for field evaluators			X		
On-the-ground survey			X		
Dissemination plan				X	
Review / update and approve ICC ToRs	X				
Mapping existing human resources and workload	X				
Prepare the redeployment plan		X			
Implement and evaluate the redeployment plan		X			
Train the 83 District Officials on Program Management	X	X	X		
Develop indicators to measure performance after training	X				
Define the supervisor profile	X				
Build capacity of stakeholders on supportive supervision	X	X			
Cold Chain, Logistics vaccine supply					
Develop motorcycle acquisition plan	X				
Acquire 1000 motorcycles for mobile brigade's implementation and prepare the respective distribution plan	X	X	X	X	X
Distribute motorbikes to health facilities	X	X	X	X	X
Procure spare parts and cover the cost of respective maintenance services.	X	X	X	X	X
Elaborate plan for acquisition of specific vehicles for the distribution of vaccines to the US.	X				
Purchase 18 specific vehicles for the distribution of vaccines to the US.	X	X	X	X	X
Allocate financial resources for the maintenance and other operational costs of vehicles.	X	X	X	X	X
Make contracts with private companies and the DPSs to Outsource the services of distribution of vaccines to health facilities	X	X	X	X	X
Create terms of reference for outsourced maintenance of vaccine cold rooms	X				

Activity	2020	2021	2022	2023	2024
Train MoH Central level technicians in the management of outsourced contracts	X				
Hire 1 cold chain maintenance technician and deploy him at National level and elaborate specific TORs.	X				
To contract a private entity competent for the maintenance of the Vaccine Cold rooms at the central and provincial levels	X				
Implement the CCEOP Plan through the purchase of 1347 refrigerators and freezers, and 12 RTM for Central and Provincial levels, 600 RTM for distrtict and HF and 252 spare parts,	X	X	X		
Train DPS, district and HF technicians in RTM.	X	X			
Elaborate the CCE distribution plan according to the needs	X				
Indicate 1 focal point in each DPS to be responsible for the management and monitoring of the CCEOP implementation.	X				
Distribute and install the cold chain equipment in the HF	X	X	X		
Elaborate the Training Plan and the respective Terms of Reference for the CCE Maintenance Technicians at the provincial and district level	X				
In coordination with the INEFP, Train the CCE maintenance technicians of the districts in maintenance of the CCE, the SDD (solar direct drive). Elaboration of a specific CCE Handling Guide.	X X	X	X	X	X
Formative supervision of DPS and other levels of CCE maintenance.	X	X	X	X	X
Train / refresh the CECE maintenance technicians of the 11 DPS in maintenance of the CCE, the SDD (solar direct drive).	X	X	X	X	X
Produce / update and disseminate SOPs and CCE maintenance guidelines.	X	X			
Purchase spare parts for maintenance of cold chain equipment for refrigerators at sub-national levels.	X	X	X	X	X
Acquisition of 2 new cold rooms at the central level to respond to the demand for the introduction of new vaccines	X				
Install the 2 new cold rooms in the central vaccine store.	X				
Update the national CCE Comprehensive Inventory annually.	X	X	X	X	X
Implement SELV at the national level as an e-LMIS instrument for vaccine stock management.	X	X	X	X	X
Implement the DHS2 (vaccines module).	X	X	X	X	X
Train / recycle logistics technicians in the use of the tools.	X	X			
Purchase of 180 Tablets for DPS and Districts for the implementation of SELV and DHS2.	X	X			

Activity	2020	2021	2022	2023	2024
Supervision and technical support in the effective use of SELV and DHIS tools 2.	X	X	X	X	X
Estimate the needs for immunization reporting nationwide	X	X	X	X	X
Acquisition and distribution of the reporting forms according to the needs of the different levels.	X	X	X	X	X
Implement the electronic registration tool (OpenSRP) in the HF of 2 provinces.		X	X	X	X
Map the needs for construction / installation of incinerators.	X				
Build / install incinerators at HF.	X	X	X	X	X
Purchase and installation of Vaccine Bottle Crushers at H.	X	X	X	X	X
Disseminate guidelines on waste management (SOPs) Train technicians (district supervisors and HF).	X	X			
Provide technical assistance in waste management at HF.	X	X	X	X	X
Purchase of vaccines and vaccination material in pre-qualified manufacturing.	X	X	X	X	X
Develop the distribution plan for vaccines and vaccination material.	X	X	X	X	X
Distribution of vaccines from provinces straight to Health Facility.	X	X	X	X	X
Prepare an updated training plan and terms of reference for EPI logistic	X				
Train DPS and district technicians in logistics and vaccine management.	X		X		X
Train DPS and district technicians in supportive supervision for vaccine management. Train the US technicians in vaccine management.	X X		X X		X X
Hire 2 Tecs of Logistics for the Central Level / develop specific ToRs.	X	X			
Monitoring and supervision to DPS, SDSMAS and HF to ensure adherence to vaccine management guidelines.					
Update and dissemination of SOPs and guidelines for the management of vaccines and vaccination material at the HF and during transportation.	X	X			
Implement an electronic tool for route optimization of distribution of vaccines to HF	X	X	X	X	X
Monitor and report the rate of vaccine wastage at all levels.	X	X	X	X	X
Maintain and continuously build capacity of the NLWG	X	X	X	X	X

10. COSTING AND FINANCING OF MULTI YEAR PLAN

10.1 Funding immunization

Funding immunization has been from several sources, made of bilateral and multi-lateral agencies such as UNICEF and WHO, with Government proving the required payment for traditional vaccines apart from payment of salaries of health workers that is involved in vaccination. With the creation of the special vehicle for funding immunization, Gavi The Alliance, Mozambique has benefited to the tune of $247,058,943 in vaccine support ($217,105,212) and non-vaccine support ($29,953,731) since 2000 to May 2019.

The specific funding from government resources for vaccines per live birth overs around 20% of the total expenditure on vaccines in the seven-year period 2010 to 2016. In terms of funding immunizations defined as expenditure to include operational cost, the simple average in funding has been 25% for the seven years.

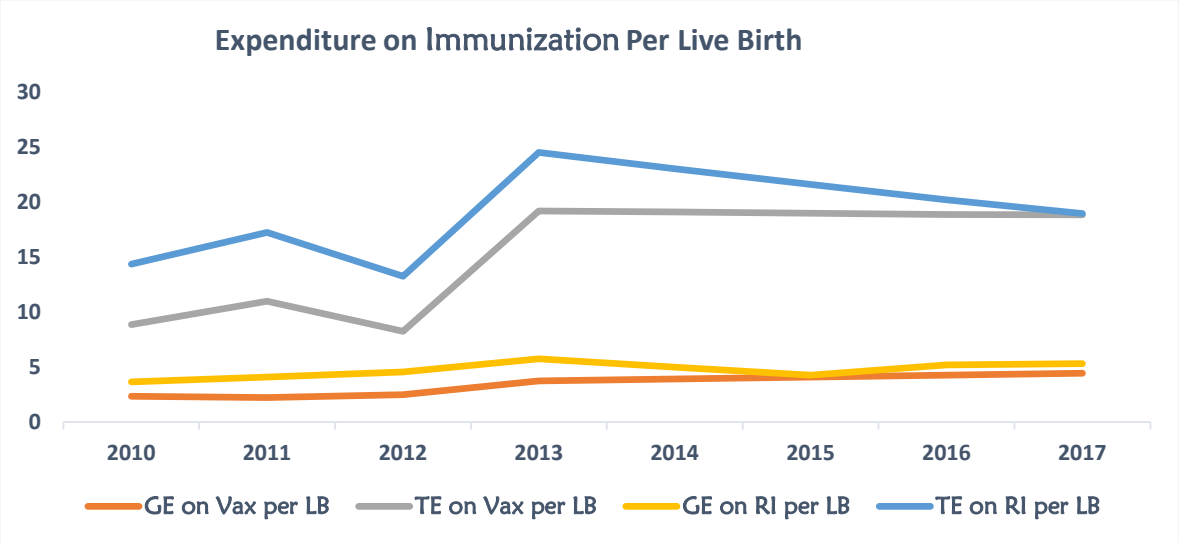


Figure 14 Expenditure on Immunization Per live Birth

Government expenditure on vaccine per live birth increased from $2.3 (2010) to $4.4 (2017). This is compared to total expenditure on vaccines that moved from $8.8 (2010) to $18.8 (2017) per live birth (figure 14).

10.2 Cost of Immunization 2020 – 2024

The projected cost for immunization in Mozambique for the period 2020 – 2024 stands at $316,289,134.

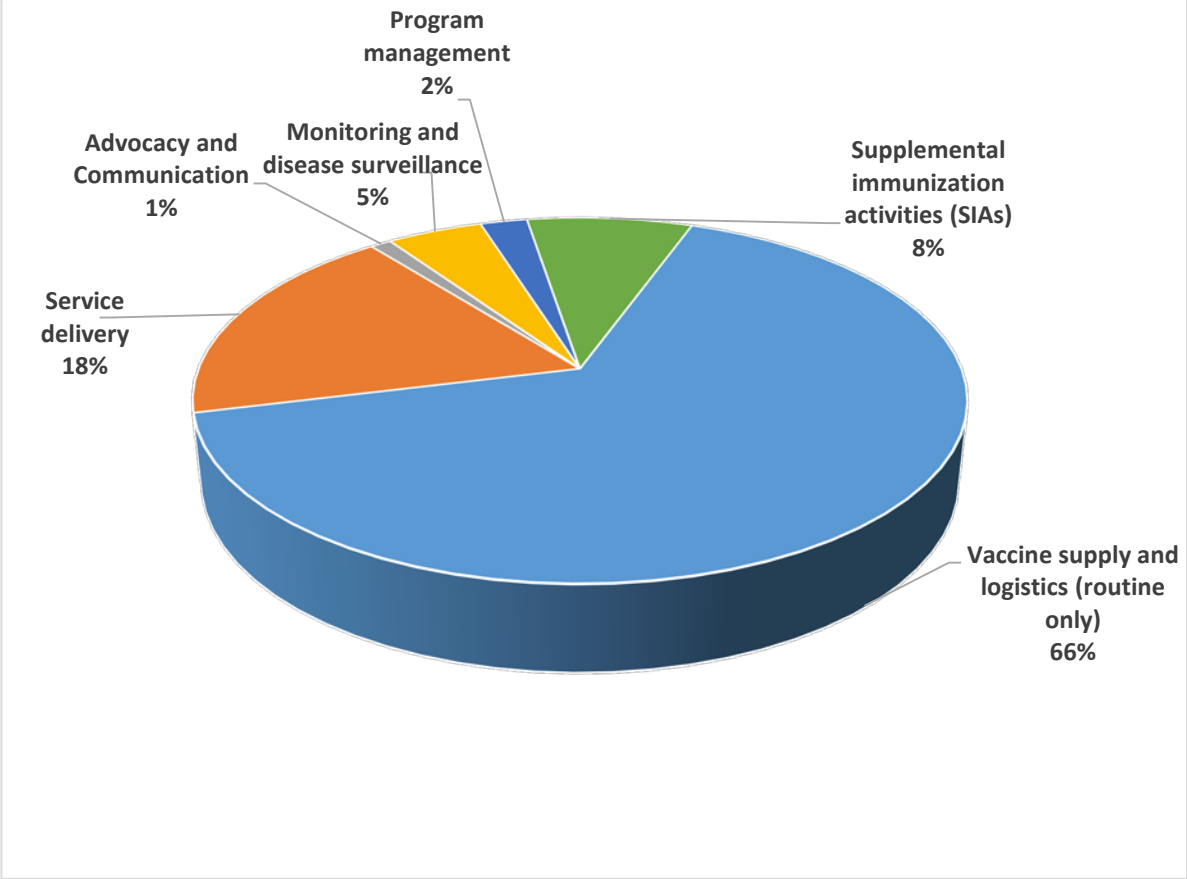


Figure 15. Projected cost for Immunization 2020-2024 by components

The indicative cost as in figure 15 shows that vaccine supply and logistics for Routine Immunization accounts for 66% of the expected cost, service deliver (18%), SIA (8%), Monitoring and disease surveillance (5%), Programme Management (2%) and Advocacy and communication (1%).

When shared costs are excluded, apart from 2021 when the HPV vaccination that will be conducted for Multi-Age Cohort will be done as campaign, Outreach and mobile strategy account for about 60% of the projected cost each year as indicated in Figure 16 below. The detail cost by component is presented in annex 1.

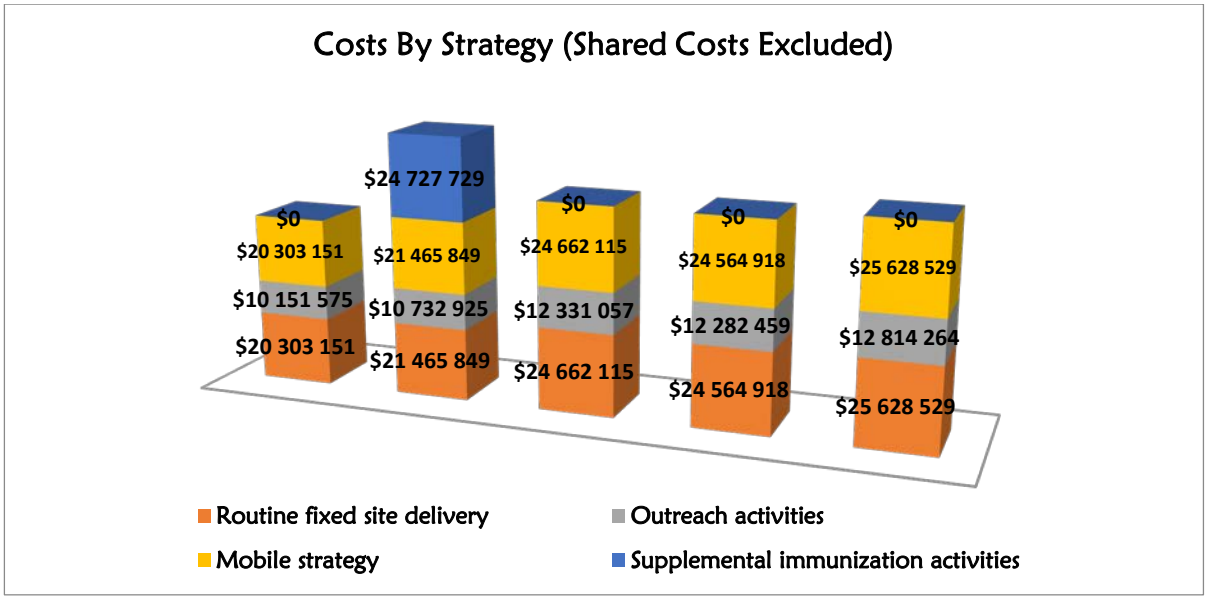


Figure 16. Cost by Strategy, 2020-2024

10.3 Prospective funding

The prospective funding for immunization is based on the principle that government will continue to fund traditional vaccines, meet the co-financing commitment to Gavi and fund salaries of health workers as well as the systems shared costs. It is also assumed that partners will continue to support government at the trend of previous support.

The projected fund is classified according to whether funding is secured, indicated with a situation of certainly of funding, or whether funding is probable or if the funding is outright unfunded and it is classified as gaps. The situation is presented in figure 17 All funding towards traditional vaccines are classified as secured, as it is being the practice of Government to fund all traditional vaccines. All funding for vaccines support from Gavi are equally classified as secured. It is noted that detailed quantification each year based on actual performance in previous year will determine the exact quantity of vaccine to be procured either by Government or Gavi. It is further noted that the actual Gavi supported vaccines and Government co-financing payment will be communicated through the annual Gavi decision letter. It is important to mention that all probable funds as well as possible funding gaps are funds expected to be mobilized to ensure achievement of Programme objective that has been in the current cMYP.

The analysis of the funding gap as presented in annex 4 shows that in 2020, out of the $7,929,661 that is a gap (probable and outright unfunded) activities and other recurrent cost represents 45%. Instructive is the fact that items such as peridium for outreach, supervision, IEC and Programme management stands the risk of being compromised because of this gap.

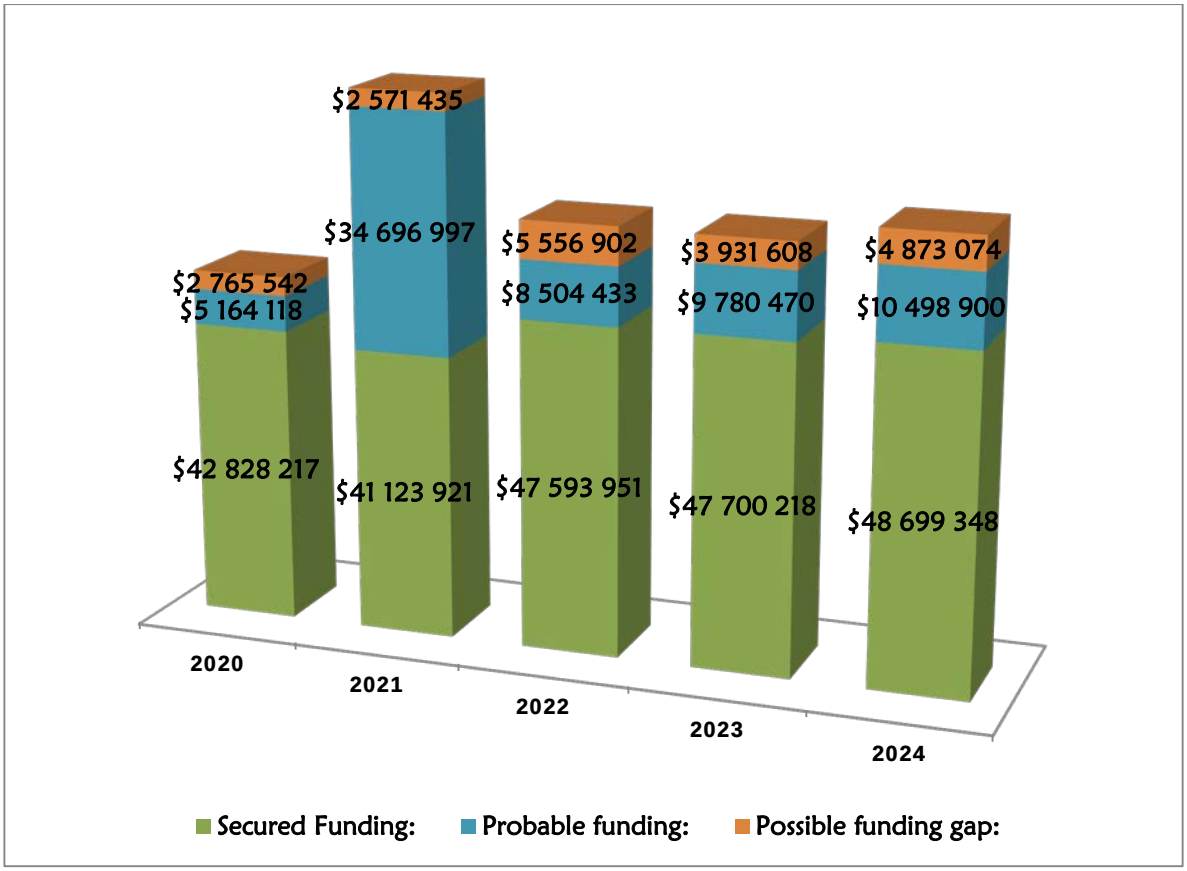


Figure 17. Secured and Probable funding 2020-2024

Detailed funding by sources is presented in annex 2 and annex 3.

10.4 Sustainability

Sustainability of Immunization based on the Programme objective is considered with overall economic parameters. From the analysis the projected funding gaps (with secured and probable funds) as a percentage of Government health expenditure is from 0.14% in 2020 to 0.57% in 2024. Furthermore, the per-capita resource requirement is less than $2 dollars in any of the projected years. It is anticipated that the reengineering of the economy based on government desires and policy as laid out the overall economic development policy will more than compensate for the gaps. Consequently, it is believed that the immunization Programme as projected is sustainable.

Table 8. Annexes of Tables 1-5 on Financing Immunization

Annex 1.

Projected Cost by Component							
Year	Vaccine supply and logistics (routine only)	Service delivery	Advocacy and Communication	Monitoring and disease surveillance	Program management	Supplemental immunization activities (SIAs)	Total direct costs
2018	$29,168,652	$9,001,641	$30,000	$1,964,813	$461,301	$0	$40,626,408
2020	$32,612,433	$9,635,760	$875,288	$2,467,446	$1,478,797	$0	$47,069,723
2021	$36,019,024	$10,285,192	$356,987	$2,590,757	$1,285,207	$23,433,524	$73,970,691
2022	$41,516,649	$10,944,596	$687,795	$3,265,570	$1,480,705	$0	$57,895,315
2023	$41,526,222	$11,640,188	$490,477	$2,889,018	$1,217,521	$0	$57,763,426
2024	$42,759,688	$12,369,667	$723,173	$3,102,487	$1,319,709	$0	$60,274,725
Total	$194,434,017	$54,875,403	$3,133,720	$14,315,278	$6,781,938	$23,433,524	$296,973,880

Annex 2

	Projected Resource Needs and Funding					
	2020	2021	2022	2023	2024	TOTAL 2020 -2024
Total resources needed:	$49,359,531	$76,657,899	$60,467,548	$60,454,165	$63,123,924	$310,063,068
Secured Funding:	$41,361,631	$39,492,362	$45,536,260	$45,657,713	$46,642,476	$218,690,441
Probable funding gap:	$7,997,901	$37,165,537	$14,931,288	$14,796,452	$16,481,448	$91,372,626
Probable funding:	$5,445,158	$33,492,740	$8,504,433	$9,977,804	$10,459,316	$67,879,451
Possible funding gap:	$2,552,743	$3,672,797	$6,426,855	$4,818,648	$6,022,132	$23,493,175
Probable Funding gap% of Required	16%	48%	25%	24%	26%	29%

Annex 3

Projected Secured and Probable Funding by Sources					
	2020	2021	2022	2023	2024
Government	$17,082,688	$18,901,432	$17,445,401	$18,343,233	$19,569,531
Gov. co-financing of gavi vaccine	$2,835,969	$2,914,824	$3,565,329	$3,665,159	$3,767,783
Gavi vaccine support	$21,299,046	$45,338,640	$28,646,946	$28,109,411	$28,896,634
Gavi HSS	$1,359,525	$3,331,976	$2,100,000	$2,500,000	$3,000,000
Gavi CCEOP	$1,969,999	$1,200,000	$800,000	$1,700,000	$500,000
WHO	$920,000	$800,000	$600,000	$600,000	$600,000
UNICEF	$729,192	$448,230	$583,017	$317,714	$567,844
JSI	$100,000	0	0	0	0
Village Reach	$10,370	0	0	0	0
USAID	$300,000	0	0	0	0
CHAI	0	0	0	0	0
CDC	$200,000	$50,000	$300,000	$400,000	$200,000
Total secure funding	$46,806,789	$72,985,102	$54,040,693	$55,635,517	$57,101,792
Total resources needed:	$49,359,531	$76,657,899	$60,467,548	$60,454,165	$63,123,924
Funding gap	$2,552,743	$3,672,797	$6,426,855	$4,818,648	$6,022,132

Annex 4

Composition of Funding Gaps by Component						
Composition of the funding gap	2020	2021	2022	2023	2024	TOTAL 2020 - 2024
Personnel	$2,275,867	$3,056,396	$3,239,779	$3,434,165	$3,640,216	$15,646,422
Transport	$129,192	$208,230	$263,017	$317,714	$367,844	$1,285,996
Activities and other recurrent costs	$3,580,514	$6,375,414	$7,118,078	$6,533,447	$7,394,364	$31,001,816
Logistics (vehicles, cold chain and other equipment	$1,944,089	$2,900,664	$868,228	$736,014	$1,196,445	$7,645,440
Supplemental immunization activities	$0	$24,727,729	$0	$0	$0	$24,727,729
Total funding gap	$7,929,661	$37,268,432	$11,489,102	$11,021,339	$12,598,869	$80,307,402

Annex 5

Macroeconomic and sustainability indicators	2020	2021	2022	2023	2024
Per capita GDP ($)	$434	$443	$452	$461	$470
Total Health Expenditures (THE) per capita	$22	$24	$26	$28	$30
Population	31,354,776	32,232,710	33,135,226	34,063,012	35,016,776
GDP ($)	$13,607,972,858	$14,279,090,487	$14,977,122,052	$15,703,048,579	$16,457,884,927
Total Health Expenditures (THE $)	$689,805,076	$773,585,038	$861,515,870	$953,764,339	$1,050,503,293
Government Health Expenditures (GHE $)	$372,494,741	$425,471,771	$482,448,887	$543,645,673	$609,291,910
Resource requirementsPer DTP3 immunized child	$42.73	$39.85	$45.34	$44.24	$45.22
Resource requirements % Of Total Health Expenditures (THE)					
Routine and SIAS (Campaigns) includesvaccines and operational costs)	6.93%	9.65%	6.95%	6.30%	6.01%
Routine only (includes vaccines and operational costs)	6.93%	6.62%	6.95%	6.30%	6.01%
Funding gap (with secured funds only) % Government Health Expenditur	0.93%	4.54%	1.67%	1.51%	1.57%
Funding gap (with secured & probable funds) % Government Health Exp	0.14%	0.22%	0.68%	0.47%	0.57%
Funding gap (with secured funds only) % GDP	1.73%	8.26%	2.98%	2.65%	2.71%
Funding gap (with secured & probable funds) % GDP	0.27%	0.39%	1.21%	0.82%	0.99%
Per capita	2020	2021	2022	2023	2024
Resource requirements for immunization					
Routine and SIAS (Campaigns) includesvaccines and operational costs)	$1.52	$2.32	$1.81	$1.76	$1.80
Routine only (includes vaccines and operational costs)	$1.52	$1.59	$1.81	$1.76	$1.80

[i] Republic of Mozambique. Ministry of Health. Health Sector Strategic Plan (PESS 2014-2019). Mozambique, 2013.

11. The Monitoring and Evaluation of the cMYP 2020-2024

This cMYP will be monitored as per the targeted objectives planned in each of the strategic areas. The monitoring frame work is summarized in table below with details of each of the strategic components of the plan and will be updated on annual basis if realistic adjustments must be made. The 2016 Comprehensive review Recommendations will be monitored by the ICC on annual basis and the outstanding actions should be included in the annual plan for the Immunization program improvement while the follow up Comprehensive review is planned after 5 years in 2022.

Table 9 Monitoring frame work of the cMYP 2020-2024

Goal	Impact Indicators	Baseline result	Year	Source	Targets	Means of Verification
Contribute to the reduction of Child mortality	Under 5 mortality rate reduced	55.4 per-1000 live birth (	2018	UN Inter Agency Group for Child Mortality estimate)	By 2024 45/1,000 live birth	DHS & UNIAG
Objective	Outcome	Result	Year		By 2024	
To sustain 90% coverage every year until 2024	90% coverage of DPTCV3, MR2	90% DPTCV3 MR2 76%	2018	JRF	By 2024 90% for DPT3CV &MR2	Coverage Survey in 2023
Objective	OUTPUT INDICATORS					
Introduce HPV, Hep B birth dose and Swicth from TT to TD	Smooth introduction of new antigens guided by NITAG recommendations; use of readiness asssement providing at least >80% prepration by each periodic assessment and level	HPV in only phase I trial districts No Birth dose of Hep B Use of TT and no Td formulation in use	2019 /2020 2020/2021 2021/2023	cMYP 2020-2024	B 2020, switch to using Td repalcing TT By 2021 HPV nation wide for school age group introduced; by 2022 Hep B introduced	Program report, JRF, PIE report
Resource mobliztion frame work developed to Sustain increased Government funding of Immunization systems	100% Programme requirement reflected in annual budget & cMYP usd to secure funds from Govt & partners and realized on time	7%	2018	JRF	By 2024 all traditional vaccines purchased by Govt; Co-financing realized	Program report, JRF, Annual reports, Program review report
Immunization Expenditure tracking	Financial resources mapping for timely allocation of funds	None at sub natonal level			Immunization expenditure tracked	System of Health Account including

						Immunization expenditure
Updated Cmyp with forecast shared / Procurement request submitted on time to ensure timely procurement of vaccines and supplies;	100% Forecasted vaccine and supplies purchased with Govt resources and on time	Stock out of IPV, BCG	2018	JRF	By 2024 no stock out of vaccine more than 30 days	Program report, JRF, Annual reports,
Improved supply distribution using improved transport	Transport available with prompt supply of vaccines	Stock out of vaccines and supplies	2018	JRF	By 2024 transport imporved	Annual program report
Expansion & upgrading of cold chain	CCEOP implemented with upgraded cold chain standards	Cold chain inventory	2017	Cold chain inventory	By 2024 updated cold chain inventory	Report on cold chain inventory
Vacine management practices improved	EVMA improvement plan implemented	EVMA 2019 recommendations	2019	EVMA report	Bu 2023 improved EVM indicators at all levels	EVMA report by 2023
Meet surveillance targets with proof of absences of major outbreaks of VPDs targeted for Eradication and Elimination	Polio free certification sustained,	cVPDV, risk of, risk of NT at sub national level	2018	AFP surveillane, Annual polio certification report JRF	Annually attaining surveillance targets	Annual Polio certification documentation
	Progress towards measles elimination	High risk for measles outbreaks	2018	Measles & Rubella case-based surveillance standards met	Annual report on Measels elimination	JRF Measles elimination progress report
	Sustained elimination of NT	Low TT2+ No Protection at birth monitoring Not using 6 TT containing vaccine schedule	2019	MNT elimination sustain plan developed & implemented	By 2020 switch from TT to Td Use 6 TT schedule Monitor PAB	JRF Report on switch Updated schedule on TTCV
	AEFI surveillance targets met	AEFI surveillance below the target	2018	JRF	By 2021 AEFI indicators attained and sustained	JRF, AEFI surveillance reports
Improved data quality; validated	Data quality indicators met	Verification report from DQR DHIS2 scaling up	2018	Programme review report DQIP report DHIS2 data visibility for action Coverage survey to validate		Coverage survey, DQR report
100% Completeness of surveillance reports	Sensitivity of surveillance sustained	85%	2018	Surveillance reports		
Immunization policy updated to include mandatory vaccination	100% acceptance for vaccination	KAP study	2013	KAP report & annual data	Reduced drop out & Increased coverage due to	Post Introduction evalution or Program review reports
Program Evaluation	Improved quality of program indicators as per the GVAP	Program review report	2016	Conduct Program review by 2023	Improved performance indicators	Program review by 2023
Program coordination improved	ICC revitalization	ICC TORs not respected	2018	ICC re-vitalised by 2020	ICC TORs adhered to	JRF report Report on ICC funcationality

	NITAG functionality	NITAG functional	2018	6 core indicators attained	NITAG TOR adhered to	NITAG minutes
	Improved partner coordination	Partner mapping	2018	Capacity transfer from supporting partenrs by 2023	Minutes from Technical sub committee of ICC	EPI review report

12. CONCLUSION AND RECOMMENDATION

The process of producing this 4th cMYP has been beneficial to the management of EPI in highlighting key areas where sustained effort is needed from 2020 and beyond to further improve the EPI Programme in line with National priorities and Global targets. The EPI through the Directorate of Family Health and Nutrition will submit this plan to the Senior Management of MoH Mozambique to secure the additional resources needed for the smooth functioning of the EPI in general including the required verification surveillance information to provide evidence for elimination of targeted diseases that are due.

It seeks commitments from supporting partners to support the efforts to enhance the effectiveness of the EPI, School Health, National Surveillance unit, national Laboratory, Child health, Maternal Health and other relevant support units like Human Resources which impacts directly, on the reduction of child mortality, and improvement of the health of the target population.

The management of EPI is committed to the improvement of the service delivery to provide equitable immunization services while it aims to reduce under and unvaccinated children. This single aim is reflected in the efforts of all our personnel daily. We will strive to achieve the goals set. We thank the Senior Management for their past support and we look forward to their continued support in the achievement of the objectives set out in the cMYP of Mozambique 2020-2024.

References for studies quoted

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[iii] Early impact of rotavirus vaccination in children less than five years of age in Mozambique; Vaccine 36 (2018) 7205–7209