Inactivated Polio vaccine (IPV) Introduction Plan
Republic of Angola

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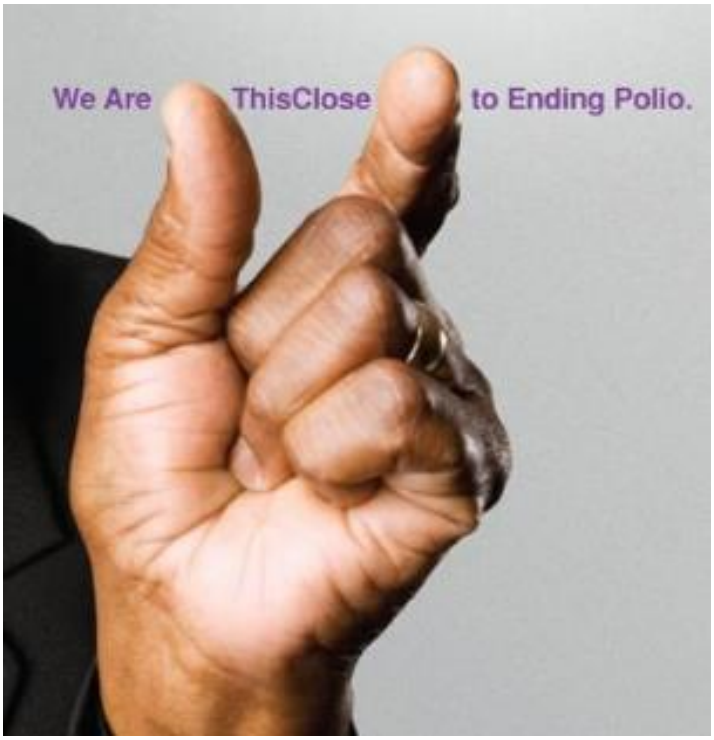
Ministry of Health of Angola
National EPI Program



Annex A. IPV introduction plan

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Executive Summary

Angola stopped polio transmission and the last confirmed wild polio virus case was in July 2011. Angola Government is committed to maintain polio free status by strengthening immunization system and support global polio end game initiatives.

In May 2012, the World Health Assembly (WHA) endorsed the new Polio Eradication and Endgame Strategic Plan 2013-2018 which outlined a comprehensive approach for complete Polio eradication.
One of the four major objectives of the Polio Eradication and Endgame Strategic Plan 2013-2018, seeks to hasten the interruption of all poliovirus transmission and to strengthen EPI systems for the delivery of all lifesaving vaccines. This objective engages all 124 countries (including Angola) that currently use OPV in their routine immunization programs, to introduce at least one dose of affordable IPV into the routine immunization schedule globally (before the end of 2015) and then replacing the trivalent OPV with bivalent OPV (2016) in all OPV-using countries – prior to completely withdrawal of all OPV vaccines in use by 2019-2020.

The introduction of at least 1 dose of IPV has 4 major benefits:
– reduce the risk of paralytic polio if exposed to a type 2 virus after OPV2 withdrawal
– improve response to the future use of a monovalent type 2 polio vaccine in the case of an outbreak
– reduce transmission of a reintroduced type 2 virus
– boost immunity to the remaining wild poliovirus serotypes 1 & 3.

Angola is one of the graduating countries that will cease to receive GAVI support in future and has successfully utilized previous GAVI supports for strengthening of its immunization Program including introduction of the new vaccines. However for IPV introduction GAVI has opened a window to support the introduction of IPV, which does not require to be co-financed by countries. MoH of Angola plans to support this initiative reinforcing the commitment towards implementation of Polio Eradication and Endgame Strategic Plan 2013-2018.

The current cMYP of EPI for the period 2011-2015 will be updated to include IPV after receiving the main findings and recommendations of the last External EPI review performed in Angola (July 2014).

The planned introduction of IPV will be in April 2015 and it will be nation-wide. One dose IPV will be provided to children at the age of 4 months (16 weeks) jointly with 2nddose of OPV, PENTA, PCV13 and Rotavirus with no disruption of usual immunization schedule. The preferred presentation of IPV chosen is 10 vial doses to ensure storage cold chain capacity.

Preparatory activities have already started and are being planned (annex c – Timeline):
- Support from partners has been received, so far receiving technical support from WHO, UNICEF
- Assessment of cold storage capacity has been undertaken and cold chain expansion is ongoing countrywide.
- Advocacy among decision makers already started at national and provincial level
- Presentation of IPV Introduction plan and approval by ICC members in September
- Confirm the registration of the IPV vaccine in the National Directorate of Medicines.
- Process of submitting of this proposal to GAVI
- Updating the development of training guidelines, data collection tools and revision of prints materials of communication and social mobilization planned to start early December 2014. Cascade training is planned to commence from February to March 2015.
- Social mobilization activities will start in December 2014 and will continue over 2015.
- Microplanning activities at all levels will be conducted in January and February and will end by vaccines distribution in mid-March and April at all levels.

Inactivated Polio vaccine (IPV) Introduction Plan

The country expects that after submission of GAVI application in September, that the Vaccine Introduction Grant (VIG) from GAVI will be available in January 2015.

The capacity of the EPI programme in Angola to introduce new vaccines has been shown progressively increase with the latest introduction of PCV 13 (2013) and Rotavirus (2014). Angola conducted EVM in July 2014 along with a comprehensive EPI review. There were some issues identified that will be addressed in the implementation of EVM improvement plan and the EPI review recommendations. There is a window of opportunity to use the new vaccine introduction to reinforce the ongoing strengthening of routine immunization services in Angola.

The cold chain net capacity at national level was expanded and has 390.000 liters of positive storage and 290.000 liters negative storage, sufficient to cover all vaccines; with the introduction of IPV (10 dose vial) it was estimated that the cold chain capacity at provincial and lower levels need to be increased.
At provincial level the gap is: 20.151 nº liters mainly in Huambo and Uige. It is planned to acquire 10 solar refrigerators and 2 cold rooms.

The existing Health workforce will be trained in EPI guidelines including IPV, using cascade training with new audiovisual material that will be produced to ensure the quality of the training at all levels.

Angola will continue to procure new vaccines (rotavirus AND PCV13), including IPV vaccine through UNICEF supply system. The National Regulatory Authority in the country is part of the National Directorate of Medicines. The Country accepts the Expedited Procedure for national registration of WHO prequalified vaccines. IPV vaccine will be distributed 4 weeks before launching date.

Total required cost for IPV introduction in Angola is estimated to be 2.141.932 USD. Based on the number of birth cohort in 2015, year of introduction of IPV, an amount of US$ 785,500 (37%) VIG is expected to be received from GAVI and the rest will be covered by National government (40%), and partners - UNICEF and WHO (23%). The total amount will be estimated to be spent cold chain equipments (11%), microplanning and document production (34%); training (26%); communication and social mobilization (13%) and supervision (13%). The country is committed to sustain the costs of new vaccines in the future with the Government State Budget (OGE).

The introduction of IPV vaccine will have some challenges that should be considered and addressed properly during the planning phase, such as:

- Financial challenge: Angola is in transition of graduating from GAVI support, the Government needs to finance the vaccines through the State Budget (OGE) to ensure sustainability.
- Mobilization of communities: mothers or the caregivers of children may not always like three injections in one day. A strong communication strategy will be developed for involving community leaders (CHW) and health workers to give counseling prior vaccination. To mitigate the concerns of health workers over giving multiple injections at one time, a quick formative research will be conducted to understand the perception of both health workers and caregivers about multiple injections. Health workers will be trained in interpersonal communication so that they acquire appropriate skills to communicate to and reassure parents about the benefit and safety of IPV.

- Programmatic issues:
  - Ensure strengthening of immunization system including: policies; organization; human resources capacity; cold chain maintenance; information system and data quality, Supervision and M&E activities
  - High dropout rates in PENTA3/PENTA2 in some areas might compromise the access to the first dose of IPV in that population – a strategy to decrease dropout rates will be developed
  - The vaccinators may be hesitant to provide three injections to a child on the same day; should be informed appropriately during training.

- Increase of AEFI if not addressed properly; necessary to increase awareness of AEFI and its surveillance, management and prevention; and the communication aspect of AEFI.
- The decentralized budget given for health at district level – needs to ensure the compromise of acquisition of cold chain equipment needed at lower level (HF) through centralized procurement procedures to ensure better compliance with WHO guidelines.
- Adequate monitoring, supervision and evaluation of IPV introduction.

1. Justification for introduction of IPV and national decision-making process

Angola stopped polio transmission and the last confirmed wild polio virus case was in July 2011. The country currently uses only OPV in its vaccination schedule. The last reported aVDPV case in Angola was in October 2013 (Huila). Angola Government is committed to maintain polio free status by strengthening immunization system and support global polio end game initiatives.

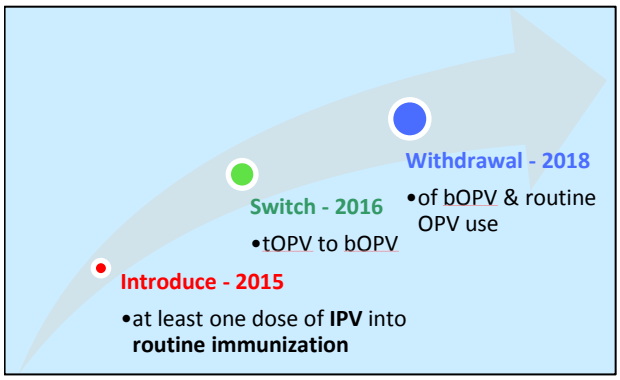
In May 2012, the World Health Assembly (WHA) endorsed the new Polio Eradication and Endgame Strategic Plan 2013-2018 which outlined a comprehensive approach for complete Polio eradication.

The End game Plan calls for all countries to strengthen routine immunization programs and replace trivalent Oral Polio Vaccine (tOPV) with bivalent OPV (bOPV) in 2016.

SAGE recommended that all countries should introduce at least 1 dose of IPV in their routine immunization programs to mitigate the risks associated with the withdrawal of type 2 component of OPV before the end of 2015.

The IPV dose should be administered at or after 14 weeks of age, in Angola with PENTA 2 contact at 16 weeks – in the right thigh (3 cm apart from PCV13 injection). The IPV dose should be given in addition to existing OPV doses.

Figure 1. End Game Plan



enefits:
– reduce the risk of paralytic polio if exposed to a type 2 virus after OPV2 withdrawal
– improve response to the future use of a monovalent type 2 polio vaccine in the case of an outbreak
– reduce transmission of a reintroduced type 2 virus
– boost immunity to the remaining wild poliovirus serotypes 1 & 3.

Given the tight timelines of the Polio Endgame, SAGE has recommended that by mid-2014 all polio endemic and high-risk countries develop plans for IPV introduction; all other countries which currently use only OPV should have an IPV introduction plan in place by the end of 2014.

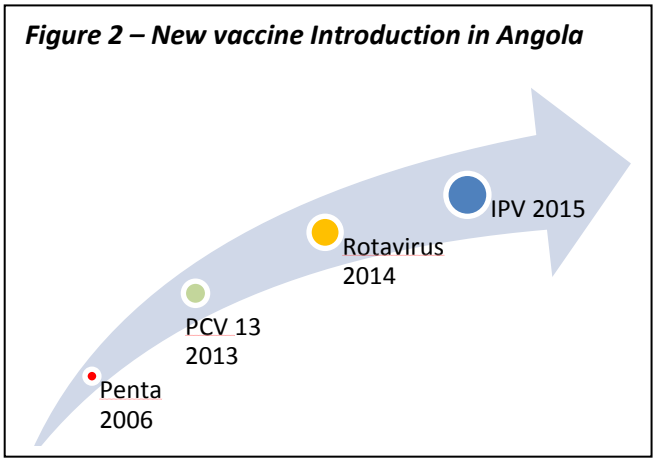
As part of the process of advocacy all key decision-makers Ministry of Health and relevant agencies (WHO, UNICEF) have been participating in discussions on the introduction of the IPV vaccine. An ICC meeting was held on September 2nd, 2014 with MOH, MOF and key partners to present the IPV introduction plan, introduction timeline, and introduction costs (budget) was endorsed and recommended to apply to GAVI

for IPV vaccine support and for the vaccine introduction grant (VIG). After that meeting the Government of Angola has decided to introduce IPV in its routine immunization program.

During last years the Country has introduced new vaccines such as PENTA (2006), PCV13 (2013) and Rotavirus (2014) with GAVI support. Due to these new vaccines introduction the EPI programme has been partially strengthen in some areas at different levels: increase of cold chain capacity; extensive training of Health workers in EPI guidelines; improving information system; more channels of communication involved, and others.

A post vaccination introduction assessment was conducted earlier this year after PCV 13 introduction and results show that: all districts received cascade training about the new vaccine; vaccination demand was increased and there was good acceptance from HW and community about PCV 13.
However some challenges were detected with PCV13 introduction: insufficient capacity building due to high rotation of Health Workers; lack of good trainers in some districts; lack of storage capacity at HF level (1 dose vial); lack of Health Workers to use properly the information system; lack of instruments to report AEFI; weak interpersonal communication with the caregivers. These weaknesses were early identified and addressed.

Figure 2 – New vaccine Introduction in Angola



The routine immunization schedule in Angola expanded in the last years, with the introduction of new vaccines. Presently the national immunization schedule provides the following vaccines:

Figure 3 -National immunization and Vit.A schedule for Children - Angola, 2006 -2015

Age	2006-2012	2015 -2018
At birth	BCG Pólio 0	BCG Pólio 0
2 months (8 weeks)	Pentavalente1 (DTP+Hep B + Hib) Pólio 1	Pentavalente1 (DTP+Hep B + Hib) Pólio 1 Pneumo-1(*) Rota-1 (**)
4 months (16 weeks)	Pentavalente2 (DTP+Hep B + Hib) Pólio 2	Pentavalente 2 (DTP+Hep B + Hib) Pólio 2 Pneumo-2(*) Rota-2 (**) IPV (***)
6 months (24 weeks)	Pentavalente3 (DTP+Hep B + Hib) Pólio 3 Vitamin A-1	Pentavalente3 (DTP+Hep B + Hib) Pólio 3 Pneumo-3(*) Vitamin A-1
9 months (36 weeks)	Yellow Fever Measles Vitamin A-2	Yellow Fever Measles 1 Vitamin A-2
15 months	-	Measles 2

(*) It was introduced nationally in 2013; (**) It was introduced nationally in 2014;(***) To be introduced in 2015

The Administrative Immunization Coverage of PENTA 3 in the recent years has been improving. The major achievement is the decrease of nº of districts with Penta3 below 50%. The drop-out rate of PENTA is still a challenge to overcome.

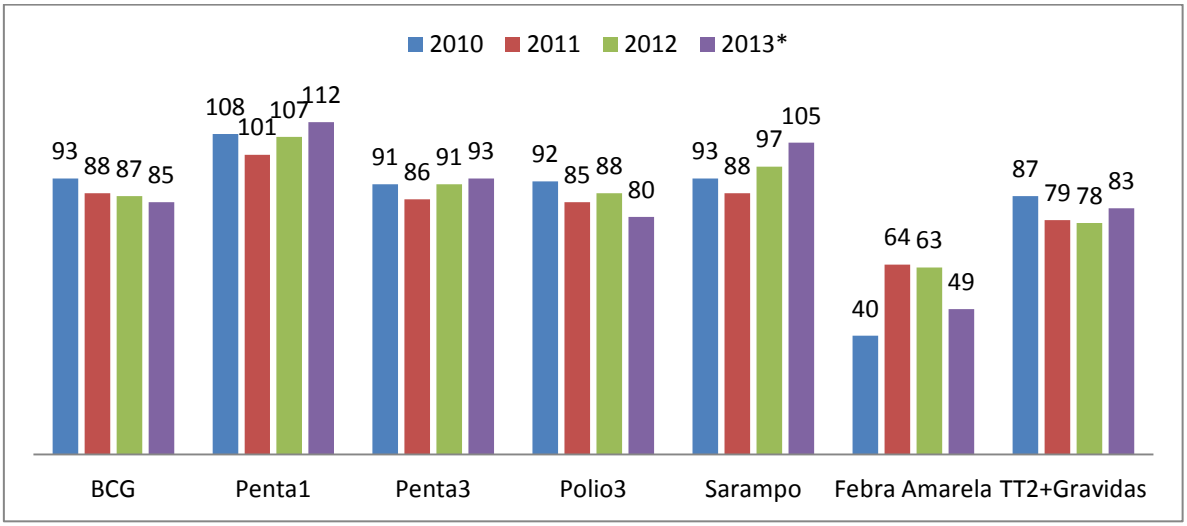
Figure 4 - Routine immunization performance indicators. Angola, 2010 -2013

Year	Access Penta-1	Coverage Penta-3	Drop-outPenta 1 – Penta 3	Coverage Measles	% Municípalities (Districts) Penta-3 <50%
2010	108	91	16	93	16
2011	101	86	15	88	22
2012	107	91	16	97	24
2013	112	93	19	105	9

Source: JRF WHO-UNICEF 2009 - 2013

The evolution of national immunization coverage by antigen during the past four years can be seen in the following chart:

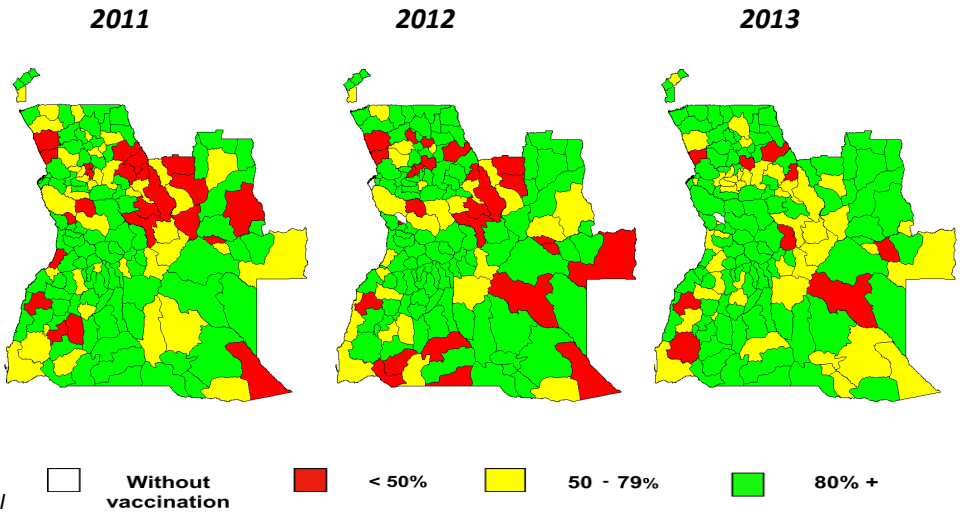
Figure 5 - National administrative coverage of routine immunization by antigens. Angola, 2010 -2013



Source: JRF WHO-UNICEF 2010 - 2013

The data reported show that an effort to increase coverage of all antigens have been made. Except for yellow fever that had stock outs at national level. The coverage of PENTA 3 by municipalities have been in improved in the last three years (view map below).

Figure 6 - Coverage Penta-3 by Municipalities. Angola, 2011-2013



Source: MoH EPI

The introduction of Pneumo-13 and rotavirus in the last couple of years provided an opportunity to increase the cold chain capacity at all levels. The new central level cold room has positive net storage capacity of 169 m3 and negative cold room 75m3, enough for the next decade.

Cold rooms and new warehouses were built in 5 provinces that had very low storage capacity. Municipal Administrators used decentralized resources and procured cold chain equipment from private providers based in Luanda. Some cold chain equipment has already arrived in the country (approximately 70 refrigerators) and others equipment's are still in the process of procurement; with the introduction of Pneumo-13 vaccine 27 electric and gas refrigerators, 40 solar refrigerators and 1 cold room were procured with GAVI Grant.

In order to improve the management of the cold chain was conducted intensive training on cold chain and vaccine management and maintenance of equipment's with the participation of 23 provincial technicians, 4 national logisticians and 2 technicians of Central of Purchasing (CECOMA) that has the responsibility and control of vaccine distribution to 18 provinces.

With the introduction of IPV (10 dose vial) it was estimated that the cold chain capacity will need to increase only at lower level (district and HF level). The IPV plan and budget will include additional requirement of storage capacity to include IPV vaccine.

Overall the results were very positive, and the experience gained in the introduction of new vaccines gave major advances in the last 3 years including: the rehabilitation and replacement of cold chain equipment; repair and maintenance of buildings; revision of EPI guidelines; extensive training of vaccinators.Taking the above into consideration, it is technically and operationally feasible to introduce IPV in the national immunization program of Angola if the estimated needs are met.

2. Overview of IPV

2.1 Vaccine preference

Following the SAGE recommendation and ICC endorsement Angola has agreed to introduce IPV nationwide in its routine vaccination program in April 2015. Considering the potential availability of IPV vaccine presentation and cold chain capacity at central, provincial, district and health center level, country prefers to choose 10 dose IPV vial presentation for routine immunization program.

Table B1. IPV vaccine preferences and estimated date of introduction

Preferred IPV vaccine	Month and year of first vaccination	Preferred second presentation	Preferred third presentation
10 dose vial	April 2015	5 dose vial	1 dose vial

The 10 dose presentation (Sanofi) of the vaccine is preferred because:
- Less storage capacity of cold chain needed
- Sufficient production capacity
- Prequalified by WHO

2.2 Country licensure status

The NRA in the country is developing but not fully functional. Advocacy at high level will be done to reinforce NRA capacity. However, the Country accepts the Expedited Procedure for national registration of WHO prequalified vaccines. Therefore, inactivated polio vaccine can be brought into the country irrespective of the preferred presentation and of any alternative presentations (single dose, two dose, five dose or ten dose presentations).

Angola will receive the IPV vaccine through UNICEF supply procurement services, as is the modality for others new vaccines. In the case of WHO pre-qualified vaccines, the vaccine will have to pass through MOH and Drug Department for clearance, and then forward to National EPI (with certificate of origin, lot release certificate, packing list and invoice). EPI Program will work closely with UNICEF for IPV forecasting, procurement, timely delivery of IPV.
International airport authority is well aware of importance of vaccine shipment. The MoH and National EPI and EPI logistics receive a pre invoice from UNICEF with the date of arrival of vaccines. The MoH contact directly a private transit company for clearance (costumes are free of charge). Then the vaccine shipment is released directly to National EPI cold rooms at central level within twenty four hours of vaccine arrival. The national logistics does a Vaccine Arrival Report and forward to UNICEF. This process is working well so far.

2.3 Target population and vaccine supply

Inactivated polio vaccine will be introduced as a single dose injection to children at the age of 4 months (16 weeks) during the 2nd doses of PENTA 2; PNEUMO 2 and OPV 2 (to avoid increase of susceptible population). All children who are behind on their schedule (>4 months) should receive one dose of the IPV at the first immunization contact after 4 months of age. For children starting the PENTA schedule late (> 4 months), the IPV dose should be administered with the second or third PENTA dose.

The introduction of IPV will be nation-wide and the planned date for introduction in immunization services is April 2015.Target population will therefore be number of surviving children at the age of 4months (16weeks). Target population is an estimation based on SIA´s data and National statistics of Angola. This year the national population census was done in May (since 1975 all data is based in estimations). After results of census population 2014, data from EPI should be updated. Target population is surviving infants, below are estimated for the target population by year through 2018 (growth rate of 2.8 per year):

Figure 8 – Target population – IPV (2014 -2018)

Year	Number in birth cohort	Number of surviving	Number in target population for IPV
2014	1,135,727	976,726	976,726
2015	1,167,528	1,004,074	1,004,074
2016	1,200,219	1,032,188	1,032,188
2017	1,233,825	1,061,089	1,061,089
2018	1,268,372	1,090,800	1,090,800
TOTAL	**6,005,671**	**5,164,877**	**5,164,877**

Source: MOH – EPI_Log_forecasting_tool_2014

Taking into account the estimated target population for IPV, the IPV vaccine requirement for the next years was calculatedusing the formula: Yearly total vaccine requirement= *(Target number of children to be*

immunized) + Wastage + Buffer stock (25% of total dose required). For the year 2015 the calculation take into account that the IPV will be introduce in April 2015.

Figure 9. Requirement of vaccines (doses), 2015 – 2018

Year	Target Children	Estimated coverage	Nº doses per person	Estimated wastage (10 doses vial)	Estimated wastage Factor (for 10 doses vial)	Total doses	Buffer (25%) - doses	Total doses requirement
2015	1,004,074	65%	1	50%	2	1,305,296	326,324	1,631,620
2016	1,032,188	95%	1	50%	2	1,961,157	490,289	2,451,447
2017	1,061,089	95%	1	50%	2	2,016,069	504,017	2,520,086
2018	1,090,800	95%	1	50%	2	2,072,520	518,130	2,590,650
TOTAL	**4,188,151**	**95%**	**1**	**50%**	**2**	**7,355,043**	**1,838,761**	**9,193,803**

Angola is requesting GAVI to provide IPV vaccines through UNICEF procurement procedures.

3. Introduction and implementation considerations

3.1 Policy development

For introduction of IPV there is no need to change the national immunization schedule andnot anticipating any impact on the existing vaccination contact. The present cMYP was developed in 2010 and IPV was not included at that time. IPV will be included during the revision of the cMYP later this year.

Immunization practices revision was done and it was decided IPV will be administered intramuscularly on the *Right Vastus Lateralis* muscle of the right thigh more than 3 centimeters from the PCV injection sites but in the same contact.

Figure 10 - New National immunization Schedule for Children with IPV Introduction.

Angola,2015

Age	Vaccines	Route of Administration	Injection site
At birth	BCG Pólio 0	ID ORAL	Left arm Mouth
2 months	Pentavalente1 (DTP+Hep B + Hib) Pólio 1 Pneumo-1(*) Rota-1 (**)	IM ORAL IM ORAL	Left thigh Lateral side Mouth Right thigh Lateral side Mouth
4 months	Pentavalente 2 (DTP+Hep B + Hib) Pólio 2 Pneumo-2(*) Rota-2 (**) IPV (***)	IM ORAL IM ORAL IM	Left thigh Lateral side Mouth Right thigh Lateral side Mouth Right thigh Lateral side (3cm apart)
6 months	Pentavalente3 (DTP+Hep B + Hib) Pólio 3 Pneumo-3(*) Vitamin A-1	IM ORAL IM ORAL	Left thigh Lateral side Mouth Right thigh Lateral side Mouth
9 months	Yellow Fever Measles 1 Vitamin A-2	SC SC ORAL	Right arm Back Mouth
15 months	Measles 2	SC	Left arm

(*) It was introduced nationally in 2012; (**) It was introduced nationally in 2013; (***) To be introduced in 2015

In Angola the EPI program uses three strategies for access: fixed HF, outreach teams (motorcycle until 10 km) and mobile teams (with cars, more than 10km distance from a HF). Both teams outreach and mobile offer moreover vaccination, vitamin A and Albendazol and eventually when available distribute mosquito nets.

Activities related to IPV introduction have already started in May 2014 with advocacy at high level and will continue to April 2015, when the launching of IPV into routine immunization will occur through an official ceremony. Followingthe launching ceremony the supervisory and monitoring activities will continue and a post-introductionevaluation is planned to be held in October 2015.

3.2 National coordination mechanism to ensure the successful introduction

Coordination at central level is made by the Interagency Coordination Committee (ICC), which meets every two weeks to monitor the implementation of EPI activities, set priorities and approve plans and budgets. At the national level the IPV introduction process will be overseen by the National EPI programme and IPV technical group which will prepare the IPV introduction plan, operationalize it with realistic timeline and budget.

This IPV technical working group will oversee preparation of revised guidelines for health workers, FAQs, fact sheets; supervise development of training and communication materials on IPV introduction and adverse events following immunization (AEFI). It will draw out a schedule for training of EPI managers and health workers, support and supervise its implementation, monitoring quality of the training rendered. The IPV technical working group will prepare a IPV distribution plan and monitor its timely implementation. It will organize IPV introduction launching ceremony, with wide media coverage. Furthermore the team will conduct the monitoring and evaluation of activities after the introduction is complete in terms of coverage, data quality and AEFI surveillance. The National EPI Program and IPV working group will also undertake supervision visits and facilitate implementation at all levels.

IPV introduction timeline of activities from July 2014 to December 2015 was developed in consultation with development partners and endorsed by the technical working group and ICC.
The main activities for IPV introduction were distributed in the following areas:

- Preparatory activities: update cMYP; ICC meeting; submission to application to GAVI
- Resource Mobilization: meeting with donors and other partners;
- Microplanning – operational: Revise EPI forms/tools; micro planning at all levels
- Capacity Building: develop training plan; review materials; training at all levels
- Logistics and procurement management: cold chain assessment; acquisition new cold chain equipment and incinerators; reception of IPV – transport and distribution at all levels;
- Supervision, monitoring and evaluation: creation AEFI committee; update information system SMT and DVD-MT; conduct supportive supervision at all levels: conduct post-introduction evaluation
- Advocacy, communication and social mobilization: operational research; develop communication plan and crisis plan; develop IEC materials; training; launch.

The detailed timeline of activities are attached as Annex-C (Timeline of Activities).

3.3 Affordability and financial sustainability

The estimated budget and financing for smooth introduction of IPV in routine immunizationservices was developed in consultation with partners and it is summarized andpresented in Annex D. During the development of the budget previously new vaccines introduction experience was considered and used.

A total of USD 2.141.932 USD is the estimated budget for introduction of IPV of in Angola. Based on the number of birth cohort in 2015, year of introduction of IPV, an amount of US$ 785,500 (37%) VIG is expected to be

received from GAVI and the rest will be covered by National government (40%), and partners - UNICEF and WHO (23%). Sharing costs (table below).

Angola Government	GAVI	Partners : OMS/UNICEF	TOTAL
855. 302 USD (40%)	785.500 USD (37%)	501130 USD (23%)	2.141.932 USD

The total budget cost to be spent for cold chain equipments (11%), microplanning and document production (34%); training (26%); communication and social mobilization (13%) and supervision, monitoring and evaluation (13%). The country is committed to sustaining the costs of new vaccines in the near future with the Government State Budget (OGE). The vaccine cost is not reflected in the attached budget.

The financing of vaccines and vaccination materials is guaranteed with funds from the State Budget (OGE), supplemented with funds from external cooperation. The cost of traditional vaccines and vaccination of their materials, from 2007 to the present are being covered entirely with GSB funds.

The proportion of public expenditure in the health sector since the year 2002 to 2009 remained at about 4-5% and it was increased up to 8.4% in 2009 but drop to 5.3% in 2013. Moreover about 50% of public sector spending on health is followed to the payment of personal expenses for purchase of medicines equipment, other goods and services.

The Pentavalent vaccine was financed with funds from GAVI 2010, from 2011 until 2015 will be co-financed with increasing GSB funds supplemented with GAVI funds. Is expected that from 2015 the Pentavalent vaccine and from 2016 Pneumo and Rotavirus will be funded entirely with funds from GSB. For IPV vaccine similar efforts are expected after 2018.

Financial sustainability will be given by the national government. To cover the costs of new vaccines introduction these estimated costs should be added to the budget line of vaccines and supplies in the budget of the MoH.

3.4 Overview of cold chain capacity at district, regional and central levels

In Angola vaccines are stored at 4 levels (central, province, district and health centers).

The cold chain capacity at national level improved last years due to the larger volume occupied by vaccines Pneumo-13 and rotavirus, was necessary to increase the storage volume of the cold chain at all levels; was built the central level cold room with positive net storage capacity of 150 m3 enough for the next future needs. Cold rooms and new warehouses were built in 5 provinces that had very low storage capacity. Municipal Administrators used decentralized resources and procured cold chain equipment from private providers based in Luanda.

The introduction of new vaccines implies the need to increase the storage capacity of vaccines and injection supplies at all levels, and greater responsibility in their management due to its high cost and vulnerability. The planned preparatory activities include the improvement of vaccine management and strengthen the vaccine and injection supplies storage and distribution system.

The standard effective vaccine management assessment (EVM) was conducted between May-June 2011 and an Action Plan Improving EVM was developed (2011 – 2015). This year a new EVM assessment was conducted in July 2014, and theEVM improvement plan updated will be attached.

The main recommendations after the last EVM assessment were:
-To conduct a study monitoring the temperature throughout the all cold chain network;

- To purchase and distribute continuous monitoring temperature devices to use in refrigeration equipment (provincial and district level);
- Conduct a general inventory of the cold chain (at all levels), followed by a multi-year rehabilitation plan;
- New indicator: nº of HF with sufficient cold chain capacity for all vaccines estimated during 1 month
- Develop basic standards for maintenance of cold chain equipment and conduct training;
- Conduct training in vaccine management/logistics for all levels of the cold chain – EPI supervisors;
- Perform supervisory visits and technical support at all levels;
- Introduce the computerized stock management system in all provincial stock/cold rooms (SMT-Stock Management Tool).
- Establishment of vaccine arrival reporting system for periphery levels
- Introduction of the data management system of vaccines at district level (DVDMT)
- Introduce a control system of vaccine wastage (open vials)
- Organize folders to archive important documents of the EPI program at district and HF level (temperature record; stock record; coverage graphs; monthly reports…)
- Improvement of Injection safety system – acquisition of incinerators at district level and HF level

The volume per child full immunized will increase with IPV introduction. Currently a FIC (Full Immunized Child) with all schedule vaccines given has a volume (cold chain) of 440cm3. The IPV vaccine in 10-dose vial in boxes of 10: 2.46cm3/dose (none). Cold chain capacity assessment was based on the previous EVM assessment, cold chain inventory last updates and EPI forecasting tool – UNICEF (view figure below).

Figure 11 - Positive storage capacity available and additional needs. Angola. 2014-2018 (in liters)

Province	Availability cold storage litters 2014	GAP (red) or excess (black) of storage in litters				
		2014	2015	2016	2017	2018
Bengo	640	0	0	0	0	0
Benguela	40000	0	0	0	0	0
Bie	25000	0	0	0	0	0
Cabinda	30000	0	0	0	0	0
Cunene	640	0	0	0	0	0
Huambo	900	2141	7240	7153	7056	6969
Huila	30000	0	0	0	0	0
KuandoKubango	640	110	144	168	189	209
KuanzaNorte	480	183	215	239	258	277
KuanzaSul	15000	0	0	0	0	0
Luanda	120000	0	0	0	0	0
LundaNorte	30000	0	0	0	0	0
LundaSul	30000	0	0	0	0	0
Malange	30000	0	0	0	0	0
Moxico	480	766	824	861	897	935
Namibe	480	7	32	43	58	75
Uige	480	2162	2298	2381	2471	2568
Zaire	480	0	0	0	0	0
TOTAL	355700	7383	12768	12861	12946	13051

Source: MoH EPI_Log_forecasting_tool_2014 - unicef

This plan contribute to improvement of vaccine management, expansion of cold chain in the health services, procurement of spare parts of cold chain equipments, maintenance as well as increase storage capacity of vaccines and injection supplies at redistribution levels (provincial and municipal) in some provinces with cold chain capacity gaps. The introduction of IPV (10 dose vial) will require additional 20.151 liters (2014/2015) at provincial level. This corresponds to the acquisition of 10 solar refrigerators (169 liters) and 2 cold rooms for Huambo (40.000 liters) and Uige (30.000 liters) Provinces. This cost is reflected in the attached budget, total of 315.858 USD, which GAVI will contribute 123.472USD. At municipal and HF level the equipment will be acquired with the municipal budget for Primary Health care through centralized procurement procedures for easy compliance with WHO standards. Additional fund (Rapid Response Fund) will be requested from GAVI/IMG to support expansion of cold chain at lower level.

3.5 Waste management and injection safety

The National Immunization Safety Plan define the use of syringes for administration of auto disable syringes for administration of all injectable vaccines, and the use of disposable syringes for reconstituting lyophilized vaccines, also specifies the use of safety boxes for disposal of used syringes, the plan proposes the gradual purchasing of incinerators to provide this equipment to all provinces of the country. Availability of proper incinerators in all municipalities and HF will be part of the activities to strength the injection safety at all levels, this activity is integrated with environment minister.

Further training will be done on the surveillance of adverse events following immunization (AEFI), registration forms and investigation guides will be updated. The adverse events following immunization are already included in the national list of mandatory notifiable diseases and events. A committee for AEFI will be created at central level to follow up the AEFI cases and reporting.

Vaccine Regulatory Authority (NRA) exists and is based on the Drug and Equipment Directorate or the National Institute of Public Health for the purpose of recommending vaccine provider qualified laboratories, authorize the registration of new vaccines, receive and investigate reports of adverse events following immunization.

3.6 Health workers training and supervision

The IPV technical working group will oversee preparation of revised guidelines, updated EPI manual for health workers, FAQs, fact sheets; supervisedevelopment of training and communication materials on IPV introduction and on adverse events following immunization (AEFI); and update of the EPI information system to include IPV vaccine.

A schedule for training of the EPI managers and health workers will be developed. Job aid and training materials for introduction of IPV will be developed pre-tested and printed (with WHO and UNICEF technical support). The materials that will be developed are: update of EPI manual; health workers guide book for IPV, process of vaccination at vaccination sites, record tools and reporting forms, training videos, IEC and communication materials, community participation and planning, implementation, monitoring of immunization activities. A detailed training/orientation plan will be developed.

The main topics to be covered in IPV introduction training will be:

- Importance and Role of IPV in polio eradication and for protection of children;
- Programmatic implications and adjustment of vaccination schedule (provision of single dose of IPV along with 2nddose of PCV13 /PENTA vaccine at the age of 4 months at left thigh as intramuscular injection);
- Reminder of immunization schedule for all other vaccines;
- Adjustments in recording and reporting formats in relation to IPV;
- Counseling of mothers and caregivers;

- AEFI- early detection and response, reporting, prevention and communication;
- Strategy with CHW involvement to catch up missing children– use of nominal record; mapping and plotting of children in arias difficult to access including nomadic population;
- Monitoring vaccination coverage, monitoring dropouts;
- Communication and social mobilization with communities; inter-personal communication; use of IEC material and mass media communication;
- Other community based media such as theater, communication dialogues from community leaders, interventions including school staff;
- Adherence to injection safety practices by health workers;
- Vaccine wastage, ethics and cost implication on overall immunization programme.

A supervision plan will also be developed to increase supervision activities before, during and after the introduction of IPV. These supervision activities will be implemented with semester visits from central level to provinces and trimester from provinces to districts. At district level with monthly supportive supervision visits to Health Facilities. Supervision EPI guide will be used during supervisions at all levels and feedback with recommendations will be given to responsible to improve performance.

3.7 Risks and challenges

The introduction of any new vaccines always have some risks and challenges that should be considered and addressed properly during the planning phase, such as:

- Financial challenge: Angola is in transition of graduating from GAVI support, the Government needs to finance the vaccines through the State Budget (OGE) to ensure sustainability. The financing of vaccines and vaccination materials is guaranteed with funds from the State Budget (OGE), supplemented with funds from external cooperation. Resource mobilization at all levels will continue.

- Mobilization of communities: mothers or the caregivers of children may not always like three injections in one day. A strong communication strategy will be developed for involving community leaders (CHW) and health workers to give counseling prior vaccination. To mitigate the concerns of health workers over giving multiple injections at one time, a quick formative research will be conducted to understand the perception of both health workers and caregivers about multiple injections. Health workers will be trained in interpersonal communication so that they acquire appropriate skills to communicate to and reassure parents about the benefit and safety of IPV.

- Programmatic issues:
  - Ensure strengthening of immunization system including: policies; organization and sufficient vaccination space at site; human resources capacity and management; cold chain maintenance; Supervision and M&E activities;
  - High dropout rates in PENTA3/PENTA2 in some areas might compromise the access to the first dose of IPV in that population – a strategy to decrease dropout rates will be developed
  - Coordination between child health and reproductive sections, health promotion department with EPI programme for production and distribution of child health booklet;
  - The vaccinators may be hesitant to provide three injections to a child on the same day; should be informed appropriately during training.
  - Increase of AEFI if not addressed properly; necessary to increase awareness of AEFI and its surveillance, management and prevention; and the communication aspect of AEFI.
  - The decentralized budget given for health at district level – needs to ensure the compromise of acquisition of cold chain equipment needed at lower level (HF) through centralized procurement procedures to ensure better compliance with WHO guidelines.
  - Adequate monitoring, supervision and evaluation of IPV introduction.

4. Situational analysis of the immunisation programme

4.1 General context of the country

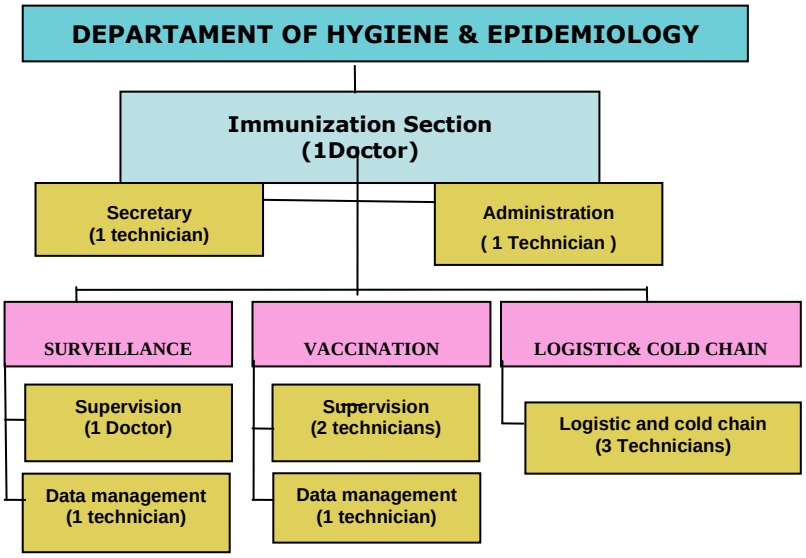
The Expanded Programme on Immunization (EPI) began in Angola in 1979, with an aim to vaccinate children under one year old against Poliomyelitis, Diphtheria, Tetanus, Whooping cough, Measles, tuberculosis and tetanus to pregnant women. Achieving this goal proved difficult, mainly due to the war factor that difficult for more than two decades the normal functioning of the health sector.

At the end of 2003, one year after the peace agreement, the country began implementing the "Reach Every District Strategy (RED) to accelerate the increasing of routine immunization coverage. To implement the strategy counted with the financial support of GAVI and other partners.

In the context of the Global Initiative to Eradicate Polio, Angola has conducted over 53 National Immunization Days of supplementary immunization against polio until 2014 Angola managed to stop polio transmission and the last case caused by wild polio virus was in July 2011. Angola Government is committed to maintainpolio free status by strengthening immunization system and support global polio end game initiatives.

The EPI structure or the National Directorate of Public Health Immunization Section depends on the Department of Hygiene and Epidemiology. It has the function of management and program evaluation, development of standards and technical procedures at national level, involves three areas: (a) Area Surveillance (b) Area of vaccination, (c) Area of logistics and cold chain.

Figure 11- Organogram of EPI at central level, Angola 2014



The current EPI programme structure is not yet expanded to meet up with the increasing programme management challenges for efficient service delivery. In the organogram we can observe human resources gaps related to monitoring and evaluation, management of new vaccines, training and planning…

In 2013, out of 2409 health facilities routine vaccination activities (51%) are conducted in 1207 health facilities. On the other hand, most of the 1841 health posts (76% of total health services) have only one or two staffs. Nevertheless, the government is making substantial efforts in contracting more and more health professional in order to improve the population health care.

Each of the 18 provinces has 3 provincial technicians (vaccination, surveillance and cold chain/logistic) and at the municipal level has one EPI supervisor and one surveillance technician. At Health facilities level

(hospitals and health centres) there are in general one or two technicians responsible specifically for immunization. In every health facility are nominated one or two clinicians as focal points for surveillance.

There is an increased number of health facilities offering EPI services (total of 1207). It is estimated a 19 of health workers/vaccinators per 10.000 population. A strong point is the existence of vaccination focal points at all provinces and municipalities. Although, there is shortage of health workers in some areas there is as well availability of willing health personnel to be trained.

4.2 Geographical, economic, policy, cultural, gender and social barriers to immunization

Geographically, Angola is the 7th African country in surface area (1,246,700 sq.km), divided in 18 provinces and 166 municipal areas. It has a varied topography and weather with high rainfall in the north and semi-arid in the south which is favourable for rearing cattle. The population is concentrated in the western half of the country with the eastern and southern part sparsely populated and hard to reach.

Angola has made a big progress in the economic field since 2002, becoming a mid-level income country. However, according to the Human Development Index (HDI - 2014), Angola is ranked in 149th place out of 187 countries. The Angolan economy is heavily dependent on oil revenues. However, the non-oil sector had a growth close to 6.3% in 2013. This trend is encouraging for the country's most pressing issues: employment and economic diversification.

After the civil war ended on 2002, the government gave high priority to re-construction and infrastructure vial, health, sport and education development: taking place having been achieved important progress in geographical access of populations to social services. Maternal and child mortality remains high, most children die from vaccine preventable diseases such as diarrhoea, pneumonia and other disease like malaria and neonatal complications.
There is no significant rejection to vaccines and vaccination in Angola. According to rapid assessments study conducted in 2011 in area of communication about main reasons for vaccination dropout were long distances to health facility, weak interpersonal communication of health staff, vaccination service delivery problems.

Angola EPI program has a successful history of achievements in this last decade and is widely regarded as one of the country's most successful public health programs. Immunization is one of the most cost-effective health interventions available today in the Country.

The MoH consider vaccines as a public good and therefore are provided free of cost to the targeted population. The financing of vaccines and vaccination materials are guaranteed with the General State Budget (OGE) funds, supplemented with external cooperation resources.

The funding of traditional vaccines and vaccination materials are totally covered by GSB funds since 2007. The Pentavalent vaccine was financed with funds from GAVI until 2010, from 2011 to 2015 will be co-financed with GAVI and after 2015 will be financed entirely with government funds. For IPV vaccine similar efforts will be done to ensure sustainability.

The introduction of new vaccines are critical to accelerate the reduction of the inacceptable Angolan high rates of children mortality and requires external support by co-financing the costs of vaccines and supplies with donors interested to support the program.

In order to improve the reliability of data and facilitate recovery of vaccination defaulters and for obtain information about the sex of children vaccinated and consequently recognize gender inequities in vaccination was introduced logbook of nominal registration of immunization of children and women.

Table B2. Trends in national vaccine coverage

Trends of national vaccine coverage (percentage)				
Vaccine	**Vaccine Used**	**Target population 2013 (< 1year)**	**Coverage reported (JRF)**	
			Most recent year- 2013	**Previous year- 2012**
BCG	BacileCalmetteGuérin Vaccine- 10 dose vial	939.074	85 %	87%
OPV 3	Oral Polio Vaccine -20 dose vial	939.074	80%	88%
Penta 1	Diphteria + Tetanus + Pertussis + Hib + Hep B -10 dose vial	939.074	112%	107%
Penta 3	Diphteria + Tetanus + Pertussis + Hib + Hep B -10 dose vial	939.074	93%	91%
HPV 1	-	-	-	-
HPV 3	-	-	-	-
Measles 1	Measles Vaccine -10 dose vial	939.074	105%	97%
Measles 2	-	-	-	-
PCV 1	Pneumococcal Conjugate Vaccine 13 -1 dose vial	939.074	44%	-
PCV 3	Pneumococcal Conjugate Vaccine 13 -1 dose vial	939.074	9%	-
Rota 1	Rotavirus Vaccine -1 dose vial	939.074	-	-
Rota 2	Rotavirus Vaccine -1 dose vial	939.074	-	-

Source: JRF WHO-UNICEF 2012 - 2013

4.3 Findings from recent programme reviews

The EPI program of Angola has competencies at different levels that make it feasible to carry out IPV introduction:

- Experience in recent new vaccines introduction (PCV 13 and Rotavirus)
- Cold chain and logistics:
  - expansion of storage capacity at national level and provincial level
  - conducted intensive training on cold chain and vaccine management and maintenance of equipment's
  - EVM improvement plan has been implemented (since 2011)
- Training of health workers:
  - Extensive training in immunization basics and new vaccines (Rotavirus and Pneumo-13) has been performed at all levels (including vaccination techniques, injection safety, vaccine management, adverse events following immunization, cold chain, information system, IEC and micro-planning)
  - Updated of Immunization Manual and distributed to all provinces/ districts/HW
- Update information system (new vaccines)
  - Adjustment of all records, data consolidation, vaccination card, reporting tools of health facilities, municipalities and provinces,

  - Introduced logbook of nominal registration of immunization of children and women - to improve the reliability of data and facilitate recovery of vaccination defaulters
- Communication and social mobilization:
  - Rapid assessments in communities conducted – to guide production of IEC material
  - Exists a plan for communication and social mobilization to strengthen routine immunization, including different channels of communication radio and TV in national languages and Portuguese

Angola conducted in July 2014 along a comprehensive EPI review including EVM and DQS assessment. There were some issues identified that will be addressed in the implementation of EVM improvement plan and the EPI review recommendations (will be attached).

The main findings and recommendations from this EPI review were:
- Reinforce supportive supervision at all levels
- Improve data collection and regular feedback at all levels (use of DVDMT/ DQS at peripheral level),
- Reinforce cold chain capacity – at district and HF level (increase storage capacity/ use of monitoring temperature devices)
- Reinforce logistics/ stock management – use of SMT- Stock Management Tool
- ContinuousTraining health workforce – surveillance and EPI guidelines updated
- Reinforce financial availability at local level (outreach activities)
- Reinforce community mobilization – increase demand

There is a window of opportunity to use the new vaccine introduction to reinforce the ongoing strengthening of routine immunization services in Angola

4.4 Stock management

The current stock management system used in the country is mainly paper based and at central level is used an excel database.The quantity of vaccine to be procured is based on the number of birth as estimated by population projections from national level (EPI program, National Statistic Institute).

At central level exists a new cold room with positive net storage capacity of 150 m3 enough for the future new vaccines. This introduction plan will help to reinforce the cold chain capacity at provincial and district level.The vaccine requirements are calculated in the based on target population, number of doses, wastage rate, and buffer stock.

In Angola vaccines are stored at 4 levels (central, province, district and health centers).
There are two management systems vaccines working at central level:
- Traditional vaccines (BCG, OPV, measles, yellow fever). Purchased by CECOMA (Central Purchasing of Medicines – linked with MoH), preserved in a cold room of *Health Care - Viana*.
- New vaccines (DTP-HepB-Hib, PCV 13, Rotavirus). Purchased through the UNICEF procurement system, and kept in the cold room of the Central cold chain and *CONCENTRA - Viana.*

All new vaccines and devices are procured through *UNICEF.* The same procurement and delivery system will be used for IPV as for other new vaccines. IPV will be procured as per vaccines forecasting and delivery schedule. IPV will be distributed with other routine vaccines quarterly from central cold store to the provincial store. From provincial to district and district to health center will be delivered monthly basis.

However, planning and logistics for vaccine demand estimation and distribution at the province and district level needs further improvement with development of efficient feedback mechanism on utilization and future demand to national level.

Transportation of vaccines and other logistics from central level to provincial warehouses are done quarterly by a private company CECOMA. From province to district and below transportation is done monthly in cold boxes that are lined with water packs by car or motorbike.

Reports on usage and available stock are received every month and are paper-based. Electronic reporting system usingDVD-MT is installed at central and provincial level, however this is not yet fully functional and logistics at provincial and district level need IT training and a functional computer system in place.

There is lack of monitoring of cold chain equipment by Provincial level and the repairing status is a major area of concern. Standard operating procedures and a maintenance and replacement plan for cold chain management systems is a priority area.

The routine system for stock management and vaccine transportation will be used for IPV and future foreseen improvements will cover also IPV vaccine. In the budget some cost will be allocated to improve:

- DVD-MT use at Provincial and district levels
- Increase number of cold boxes for transportation
- Replacement of cold chain where is needed

5. Monitoring and evaluation

5.1 Updating of monitoring tools

The MoH-EPI has established a sub-information system for routine immunization to enable to collect monthly key performance indicators. The system consists of set of forms for data collection, vaccination forms, consolidation and monthly reports by level and simplified graph of the monthly monitoring access, coverage and dropout rate this chart is widely utilized at local level.

The IPV technical group will work together to update al monitoring tools to include IPV vaccine and maybe other foreseen new vaccines that might be introduced in the future (HPV).

Adding IPV will require updating all the immunization program documents (registers, Monthly reporting forms, tally sheets, immunization cards, vaccine stock ledgers, monitoring charts), these will be printed and distributed before launching the introduction. The National level in this initial phase should assume the responsibility of printing all new material, in the future this should be taken by Provincial level with district budget support. Training plan will include this updated information documents, timely reporting and regular feedback.

In addition, supportive supervision reports from routine immunization monitoring system will be used for on-site monitoring. In addition to this, data quality self-assessment surveys will be organized for selected areas to validate the administratively reported data and the consistency in reporting across different levels of health facilities.

The EPI supervision is carried out in cascade: the central level oversees the provincial level with support of partners because of the scarce national staff at central level.

Supervision from the province to municipalities is carried out by provincial teams for monitoring and making adjustments with monthly/bimonthly frequency. The supervision of health facilities is performed by municipal staff with a monthly frequency. During the supervisions are used checklists that cover all components of the vaccination system.

The supervision in general is not regular due to limitations of transportation and e per diem and for the high operating costs prevalent in the country.

The IPV introduction monitoring will be mainly madethrough:

- Monitoring the immunization coverage of the vaccine
- Drop-out rate (third dose of penta-valent vaccine and IPV)
- Wastage rate
- AEFI
- Post introduction evaluation (PIE) after 6-months from introduction to assess the programmatic effect of vaccine introduction on EPI
- Quarterly evaluation meetings at Provincial and Municipal levels to evaluate the plan implementation, coverage, revision and update of the plan.

5.2 Adverse Event Following Immunisation (AEFI) monitoring and reporting

Currently, the monthly EPI reports include immunization adverse events that are easily recognized as being abscesses after vaccination, accidents and death attributed to anaphylactic shock.

The adverse events following immunization are already included in the national list of mandatory notifiable diseases and events. Notification of AEFI are currently performed by health personnel and by the affected families. For the investigation of severe cases will be constituted ad hoc team constituted by surveillance officer, clinician and responsible evolved health facility. The reports will be put into consideration of the EPI program and a national committee on adverse events, which should be created. Further training will be done on the surveillance of adverse events following immunization (AEFI), registration forms and investigation guides will be updated.

6. Advocacy, communication, and social mobilisation

The strategic plan for communication and social mobilization strategies for 2011-2015 in Angola includes integrated activities for supporting preventable diseases eradication and control and to promote routine immunization.

Based on our experience in Angola, we will suggest to the Government to continue using a multimedia campaign through four main strategies: Advocacy, Social Mobilization, Interpersonal Communication and Mass Communication.

Advocacy at higher level

High level advocacy will continue with decision-makers authorities at all levels, and journalists at higher positions. An Advocacy plan for IPV, which will include resource mobilization, will be developed in order to involve all key decision-makers Ministry of Health, Ministry of Finance and relevant agencies (WHO, UNICEF) who have been participating in discussions on the introduction of the IPV vaccine. Subsequently at all levels, provincial and district levels advocacy meetings will be held to present IPV introduction, benefits to the population and global contribution to the Polio Endgame strategy. Fact sheets and FAQ about IPV vaccine will be distributed for these meetings. Advocacy activities will also include dialogues, sensitization meetings and round table discussions at sub-national and community level with community and religious leaders as they are the gatekeepers in the community and play important roles in terms of vaccine acceptance, especially in high risk areas.

Social mobilization:

Social mobilization efforts will target mobilization of professional associations such as medical professionals, religious associations and NGOs, CBOs and other networks. The structure of other relevant ministries such as Ministry of Education and ….will be mobilized to reach families/care-givers with key messages. School children will be mobilized to not only disseminate messages but also to track missed children

Communication strategies

A communication strategy will be developed with National Department of Health Promotion and UNICEF and other stakeholders. Key messages for IPV will be adapted and developed based on the already existing global resources on communication. Appropriate communication channels (TV, Radio etc, Group discussions) will be identified and community mobilization plan be defined. A quick qualitative study survey will be undertaken this year with UNICEF/WHO support to identify barriers to immunization and inform the communication strategy.

Development and dissemination/distribution of IEC material

All IEC materials will be updated to include IPV vaccine and will be informed by previous studies about communication strategies in Angola. Communication materials will be developed in a participatory manner involving community leaders as well as caretakers and will focus in each target group. In addition to IPV, communication materials will promote routine immunization, vaccine safety and the benefits of vaccination in general. Use of mass media such as radio and television; spots and mini-dramas will be broadcast in Portuguese and eight national languages by national and local public and private means, as well as through telephone messages (SMS) sent to users periodically by two telephone companies operating in the country.

National and Provincial Launch Ceremonies

The national launch ceremony will be planned for April 2015, with participation of the highest Governmental authorities, and with strong media coverage. Subsequently, each province will launch IPV, also with Governmental and Health authorities involved. The IPV launch will coincide with the Celebrations such as Immunization Weeks shall help promotion of planned activities.

Training: Health workers will be trained on IPC and risk communication. Social mobilizers and community health workers will also be trained on how to effectively communicate IPV messages to families/communities. Media orientations will be conducted to inform media about IPV introduction, its benefits and to emphasize the need to verify any information before publishing/broadcasting.