Government of Ghana

COMPREHENSIVE MULTI-YEAR PLAN FOR IMMUNIZATIONS (2015 – 2019)

"A PLAN TO REACH EVERY DISTRICT TO REACH EVERY CHILD"

January 2017

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EXECUTIVE SUMMARY

The comprehensive multi-year plan (cMYP) is the medium term planning tool with a costing component for the National Immunisation Programme in Ghana. The plan provides strategic direction for immunizations in the country. The plan was developed to meet global immunization targets, national policy priorities and available resources. This is the third multi-year plan for the EPI Programme following the successful implementation of the previous plans (2007 – 2011 and 2010 – 2014). The implementation period for this cMYP is 2015 – 2019. This plan is dubbed "A Plan to Reach Every District to Reach Every Child"

The development of this plan took a four (4) month period between June – September 2014. The following processes were undertaken to develop this plan:

- Situational analysis of immunization data using administrative coverage, data from WHO-UNICEF Joint Report and survey data
- Review of country level literature on immunization and health systems strengthening
- Review of global literature including GVAP
- Consultative workshops with stakeholders in the development of strategies, activities and costing
- Presentation of a draft plan for endorsement by ICC meeting
- Proof reading by internal and external consultants
- Plan finalization

The goal of the cMYP 2015 – 2019 is to reduce morbidity, mortality and disability associated with vaccine preventable diseases through the provision of high quality immunization services. The plan has five (5) key objectives.

1. Reach everyone targeted for immunization to achieve and sustain 95% coverage in all childhood immunizations and 85% for Tetanus-diphtheria (Td) for pregnant women by 2019
2. Improve communication, advocacy and information dissemination
3. Strengthen surveillance system
4. Improve programme management and integration with health systems
5. Ensure that the immunization Programme has sustainable access to predictable funding, quality supply and innovative technologies

In addition to these key objectives, there are specific objectives for each of the components of the immunization system.

The strategies in this plan are in line with the Global Vaccine Action Plan (GVAP) framework. There is also a strong link between the cMYP and the Health Sector Medium Term Development Plan 2014 - 2017. The plan also emphasis on integration of immunisation activities with other health interventions to maximize impact.

For the implementation period of this plan (2015 – 2019), the Global Alliance for Vaccines and Immunizations (GAVI) will continue to support the country with vaccines. The support from

GAVI for PCV 13, Rota and Measles Second Dose is also expected to be extended by to 2019. The GHS will continuously collaborate with health partners, particularly, WHO, UNICEF and CDC in the implementation of the plan.

Ghana will conduct Yellow Fever Preventive Campaign in selected districts in July 2018 as part of the high risk approach. In addition to this, the country will conduct another Yellow Fever Preventive Campaign as part of the Eliminate Yellow Fever Epidemics (EYE) Strategy. This campaign is scheduled for First Quarter 2018 and about 5,771,054 persons will be vaccinated.

Bivalent polio vaccine (bOPV) has been introduced to replace trivalent oral polio vaccine (tOPV). This was done in April 2016. Inactivated polio vaccine (IPV) will be introduced into routine immunization in the last quarter of 2018 or first quarter of 2019. This is in line with the Polio End Game Strategic Plan.

Meningitis Preventive Campaign was conducted in July 2016 and was subsequently introduced into routine immunization in November 2016.

The country was due to conduct measles-rubella (MR) Follow-Up Campaign in the last Quarter of 2017 for children 9 months - 5 years old. The Follow-Up Campaign has been rescheduled for 2018 as Ghana could not meet the Gavi Application Deadline. The Follow-Up Campaign is in line with the national and regional plans to eliminate measles and rubella by 2020. It is also expected to contribute in sustaining the gains made in Ghana's measles elimination efforts.

Other key activities within the implementation period include annual coverage surveys, periodic KABP study on immunization services among caregivers, expansion of cold chain at national, regional, district and health facility levels and financial sustainability and human resource development.

It is expected that this plan will serve as a guide and template for regional and district annual plans during the period. The plan is presented in five chapters as described briefly below:

Chapter 1: Country information: This describes the country profile and demographic information, administration and politics, the macroeconomic environment, the health status of children and mothers and finally an overview of the organization of the Expanded Programme on Immunization (EPI) in Ghana.

Chapter 2: Situation Analysis: This chapter gives an overview of the implementation of the 2010–2014 cMYP. It provides information on the past performance of the immunization programme, current issues as well as challenges. It further provides detailed description of the strengths and weaknesses of all the components of the immunization system in the country. It is also in this chapter that the introduction of new vaccines is discussed.

Chapter 3: Goals, Objectives, Strategies and Key Activities: This Chapter provides information on the goals and objectives of the cMYP, the strategies per component of the immunization system, key activities, indicators and milestones. There are also key indicators and activities in relation to Goals and Strategic Objectives. Targets and milestones relating to the components of the immunization system are also outlined

Chapter 4: Costing, Financing and financial sustainability: This Chapter gives information on the total cost of immunization services in the country for the duration of the cMYP as well as for each of the respective years. The cost is further broken down into routine immunization cost and supplemental immunization cost. The various strategies for service delivery are also costed. It further provides information on financing of immunization activities and plans to sustain immunization services in the country.

Chapter 5: Monitoring and evaluation: This is the final chapter that describes the monitoring and evaluation mechanisms put in place to ensure effective and efficient implementation of the plan. Key indicators for monitoring of the various components of the plan are all outlined in this chapter.

Total cost of immunization services including shared cost for immunization staff for the period 2015 to 2019 is about $317.8m. About 59.5% of this amount is for vaccines and logistics supplies for routine immunization. Supplemental immunization activities take about 24.2% whilst service delivery support and shared health system cost is 2.9% and 3.0% respectively. The government of Ghana will continue to provide for health services and still remain the major source of financing. The main sustainability strategies focus on national institutional strengthening, continued integration of EPI services with the health system and soliciting for support from local and internal partners.

LIST OF ABBREVIATIONS

AD	Auto-Disable
AEFI	Adverse Events Following Immunization
AFP	Acute Flaccid Paralysis
BCG	Bacille Calmette-Guerin vaccine
CHPS	Community Health Planning and Services
CHPW	Child Health Promotion Week
cMYP	Comprehensive Multi Year Plan
DHS	Demographic Health Survey
DQS	Data Quality Survey
DPT	Diphtheria, Pertussis and Tetanus toxoid vaccine
EPI	Expanded Programme on Immunization
GAVI	Global Alliance of Vaccine and Immunization
GHS	Ghana Health Service
GIVS	Global Immunization Mission & Strategies
GoG	Government of Ghana
GDP	Gross Domestic Product
HCW	Healthcare workers
HDI	Human Development Index
ICC	Inter-agency Coordination Committee
IDSR	Integrated Disease Surveillance Response
IEC	Information, Education and Communication
IMR	Information Mortality Rate
ISS	Institutional Strength Support
MDG	Millennium Development Goal
MNTE	Maternal and Neonatal Tetanus Elimination
MoH	Ministry of Health
MR	Measles-Rubella
MTEF	Medium-term Expenditure Framework
NGOs	Non-Governmental Organizations
NIDs	National Immunization Days
NT	Neonatal Tetanus
OPV	Oral Polio Vaccine
PHC	Primary Health Care
PPME	Policy, Planning, Monitoring and Evaluation
RED	Reaching Every District
SSA	Sub Saharan Africa
SNIDs	Sub-national Immunization Days
SOCMOB	Social Mobilization

Td	Tetanus diphtheria
TT	Tetanus Toxoid vaccine

CHAPTER ONE: COUNTRY INFORMATION

1.1 General Profile and Demography

Ghana is centrally located on the west coast of Africa, sharing borders with three French-speaking countries: Burkina Faso (548 km) to the north, Cote d'Ivoire (668 km) to the west and Togo (877 km) to the east. On the south are the Gulf of Guinea and the Atlantic Ocean, which form the coastline of Ghana. The country is stratified into three vegetative zones, coastal lands and semi-deciduous forest from the south towards the middle belt to savannah regions in the north towards Burkina Faso. Ghana has a tropical climate throughout the year with two major seasons – a dry (Harmattan) season and a wet (rainy) season.

Administratively, the country is divided into 10 regions and 216 decentralized districts, covering an estimated population of 29,066,313 (PPMED, 2017). The Ashanti and Greater Accra Regions are the most populated with 5,761,027 (19.8 percent) and 4,965,283 (17.1 percent) of the country population, respectively. The Upper East and Upper West Regions are the least populated with 1,137,817 (3.9%) and 800,747 (2.8%), respectively.

The average national population density is estimated to have increased from 79 per square kilometer (km2) in 2000 to 102 in 2010 and 114 in 2014. Greater Accra and Central Regions have the highest population density of 1236 persons per km^2 (2010) and 224 persons per km2, respectively. Northern Region has the lowest population density with 35 persons per km^2 (2010). Although 50.9 percent of the population lives in urban areas, the level of urbanization varies for each of the ten regions. Greater Accra has the highest proportion of urban population (90.5 percent), with Ashanti Region having the second highest (60.6 percent). The Upper West has the lowest proportion of urban population (16.3 percent).

Ghana has a youthful population consisting of a large proportion of children under-15 years and a small proportion of elderly persons (65 years and older). Life expectancy is estimated at 56 years for men and 57 years for women, while the adult literacy rate (age 15 and above) is estimated to be 65 percent. An estimated 97.6 percent of the population is Ghanaian while 2.4 percent is non-Ghanaian. The household structure is becoming more nuclear with the majority of households headed by males (65.3 percent).

Ghana has a predominant agricultural sector (small-scale peasant farming) absorbing 55.8 percent (GLSS 5) of the adult labour force, a small capital intensive mining sector and a growing informal sector (small traders and artisans, technicians and businessmen).

1.2 **Administration and Governance System**

Ghana operates a multi-party democracy. At the national level, is the head of State who is an elected President, assisted by a cabinet, an elected parliament and an independent judiciary. There are national institutions responsible for policy and strategy development consisting of Ministries, Departments and Agencies (MDAs). There are ten Regional Ministers who head their respective Regional Coordinating Councils (RCCs). The next administrative level is the district, which is headed by a politically appointed District Chief Executive (DCE), who is head of the District Assembly. This division of the country into regions, districts, unit committees and other units has implication for health administration and management in the country.

A traditional system of governance operates concurrently with the modern governmental structure. The traditional system consists of Kingdoms, Chiefdoms and Traditional Councils that play influential roles in socio-economic, political, health and developmental matters within their jurisdiction. These traditional systems are critical to the success of development programmes in the country. Together, both the modern government structure and traditional system constitute the governance in the country.

1.3 **Organization of Health System**

Ghana's health sector operates a decentralized system with established mechanisms that coordinate policy formulation, resource mobilization, policy implementation and monitoring and evaluation of activities. The health sector is split into a policy-making arm and a service delivery arm. The Ministry of Health (MoH) is the policy-making arm and maintains its role as the central decision-making body in health matters, and maintains the responsibility to recruit, train and manage staff postings and to remunerate health workers on government payroll. The training of health professionals for the health sector is by both public and private health-training institutions that have been accredited.

The health care system in Ghana is organized under four main categories of delivery systems and these are: the public, private-not-for-profit, private-for-profit, and traditional system (Medium-term Health Strategy 2014 - 2017). The Ghana Health Service, Faith-based institutions including the Christian Health Association of Ghana (CHAG) and Islamic Health, Quasi-Government Health Institutions (including universities and security services) Teaching hospitals, and private sector are responsible for health service delivery.

The Ghana Health Service is the largest service delivery agency and operates through the public-owned facilities. The faith-based institutions and private sector provide about 40 percent of service delivery. The health sector also recognizes the role of herbal doctors as alternative medical practitioners and has licensed the services to regulate their practice. Traditional birth attendants

(TBAs) and the traditional healers are also recognized as key players in community health and complement the work of the orthodox medical system to enhance health services.

Health service delivery is organized at three levels – national, regional and district. The district level is further divided into a number of sub-districts and incorporates a community-level health delivery system. Public health services are delivered through a hierarchy of hospitals, health centres, maternity homes and clinics including a Community-based Health Planning and Services (CHPS) strategy. Health services cover primary care through secondary to tertiary services organized at five levels: community, sub-district, district, regional and teaching hospitals (specialized). Community and sub-district levels provide primary care, with district and regional hospitals providing secondary health care.

The regulatory system of the health sector is coordinated by a number of agencies of the MOH including the Foods and Drugs Authority (FDA), Pharmacy Council and Professional Bodies. These ensure that health service provision and health care practice are within agreed quality and safety standards. Civil Societies Organizations (CSOs) and Non-Governmental Organizations (NGOs) also play a significant role in delivering health services especially in communities. They are effective medium for community mobilization for service delivery including immunization.

The procurement of key commodities for service delivery is done centrally and commodities and supplies are distributed via the Central Medical Store to the various Regional Medical Stores then to the district-level facilities and health facilities at the periphery. Financial management is decentralized down to the district level with sub-districts and CHPS zones with oversight from the District Health Management Teams (DHMTs).

1.4 **Macroeconomics of Ghana**

Provisional GDP estimates for 2016 showed a growth rate of 3.5 percent compared to 3.8 percent in 2015. The Services sector recorded the highest growth rate of 5.7 percent, followed by Agriculture (3.0%) and the Industry (-1.4%) sectors. Services remain the largest sector. Its share of GDP increased from 54.6 percent in 2015 to 56.5 percent in 2016. However, the sector's growth rate decreased from 6.3 percent in 2015 to 5.7 percent in 2016. Two of the subsectors in this sector recorded double-digit growth rates. These are the Information and Communication (21.7%) and the Health and Social Works (16.8%) subsectors

The Industry sector, the least growing sector with a GDP share of 24.3 percent, had its growth rate declining from -0.3 percent in 2015 to -1.4 percent in 2016. Of all the industrial activities the Electricity subsector recorded the highest growth of 11.7 percent in 2016

The Agriculture sector expanded marginally from a growth rate of 2.8 percent in 2015 to 3.0 percent in 2016. Its share of GDP, however, declined from 20.3 percent in 2015 to 19.1 percent in 2016. Crops remain the largest activity with a share of 14.6 percent of nominal GDP.

The Non-Oil annual GDP growth rate increased from 4.0 percent in 2015 to 4.9 percent in 2016. The 2015 Non-oil GDP for Industry grew by 3.6 percent compared with -0.7 percent in 2015.

Table 1.1 Trends in Macroeconomic Performance, Ghana

Economic Aggregate	2012	2013	2014	2015	2016*
Population estimate (million)	25.82	26.43	27.04	27.67	28.31
Exchange rate (¢/$)	1.81	1.92	2.94	3.78	3.92
GDP current (million Gh¢)	75,315	93,416	113,343	136,957	167,315
Non-Oil GDP current (million Gh¢)	69,666	85,974	105,550	131,647	164,090
GDP current (million US$)	41,656	48,654	38,612	36,264	42,676
Per capita GDP (Gh¢)	2,916	3,535	4,192	4,950	5,910
Per capita GDP (US$)	1,613	1,841	1,428	1,311	1,507
GDP at constant 2006 prices (million Gh¢)	30,040	32,237	33,522	34,808	36,016
Non-Oil GDP at constant 2006 prices (million Gh¢)	28,248	30,121	31,310	32,575	34,161
GDP at constant 2006 prices (million US$)	16,615	16,790	11,420	9,217	9,186
Growth Rates	**%**				
GDP at current market prices	25.9	24.0	21.3	20.8	22.2
GDP at constant 2006 prices	9.3	7.3	4.0	3.8	3.5
Non-Oil GDP at constant 2006 prices	8.6	6.6	3.9	4.0	4.9
Change in GDP deflator	15.2	15.6	16.7	16.4	18.1

*Provisional

Source: Ghana Statistical Service (GSS) National Accounts Statistics Gross Domestic Product 2016

1.5 **Health Status**

Ghana is making progressive improvements in the health status of the population. Notwithstanding, the country is confronted with the double burden of disease across all ages and sexes, with non-communicable diseases becoming the major cause of morbidity and mortality alongside the existing and emerging communicable diseases.

1.5.1 Child Health

Child health has significantly improved over the years, with the child survival rates increasing as a result of the high impact healthcare services and economic progress. Despite these efforts, one in seventeen children die before their fifth birthday, largely from preventable childhood diseases. In 2008, Ghana recorded an under-five mortality rate of 80 per 1000 live births that declined to 60 per 1000 live births in 2014, an estimated 25% decline (DHS 2014). This decline indicates that although Ghana is making progress, the country is still appearing off-track in achieving the MDG 4 target of 39.9 per 1000 live births, as the progress is slow.

Variations across the country show that under-five mortality rate (U5MR) is comparatively lower in urban areas than in rural areas. According to the 2014 Ghana DHS 2014, U5MR in rural areas is 75 deaths per 1000 live births compared to 64 deaths per 1000 live births in urban areas. Mortality is higher among male children than among female children. The U5MR for male and female children is 78 and 62 deaths per 1000 live births, respectively.

Mortality rates deferred among children in different wealth quintiles. The 2014 DHS reported U5MR of 92 per 1000 live births among children in the lowest wealth quintile compared to 64 per 1000 live birth among children in the highest wealth quintile. There were marked variations observed from regional results. Whereas Greater Accra Region recorded the lowest U5MR of 47 per 1000 live births, the Northern Region recorded the highest rate of 111 per 1000 live births. These are shown below;

Table 1.2 Under-five Mortality Rate (U5MR) by Region, Source and period of Computation

Region	2000 Census	DHS 2003	DHS 2008	2010 Census	2011 MICS	2014 DHS
Western	161	106	65	82	67	56
Central	163	102	106	94	88	69
Greater Accra	152	113	56	72	56	47
Volta	174	129	57	87	89	61
Eastern	144	94	88	75	61	68
Ashanti	146	116	79	80	86	80
Brong Ahafo	164	95	86	87	104	57
Northern	199	148	139	116	124	111
Upper West	226	191	142	117	108	72
Upper East	179	96	78	128	98	92
	Sources: Ghana Statistical Service, 2000 & 2010 Pop & Housing Censuses, 2000-2014 DHS, 2011 MICS					

1.5.1.1 Infant Mortality

The national Infant Mortality Rate (IMR) has also declined over time. The IMR dropped from 90 deaths per 1000 live births in 2000 to 59 deaths per 1000 live births (2010 PHC). In the GDHS (2008) report, however IMR was 50 per 1000 live births over the survey period. Again, although there has been substantial progress towards achieving the MDG target of 26 per 1000 live births by 2015, actually achieving this target remains a major challenge.

Wide geographical variations exist, with the probability of a child dying before the first birthday being higher in rural areas than in urban areas (60 deaths per 1000 live births compared with 55). The sex variation in mortality indicates that a male child is more likely to die before age one than their female counterparts. Among rural infants, IMR for males and females are 65 and 53 deaths per 1000 live births, respectively compared with IMR of males and females in urban areas that are 60 and 49 deaths per 1000 live births, respectively. It is estimated that there are over three times as many infants dying per 1,000 live births in the poorest wealth quintile compared to the richest (MICS 2011). There is also substantial variation in IMR among regions, with Greater Accra recording the lowest IMR of 48 deaths per 1000 live births, in comparison to the Upper West that recorded the highest IMR of 81 deaths per 1000 live births.

A number of contributory factors such as increased socio-economic development and immunization of children against vaccine-preventable diseases as outlined in the Child Health Policy account for much of the progress made in reducing morbidity and mortality. The country has not recorded any documented death from measles since 2003, and since November 2008 there has not been any report of wild poliovirus (WPV).

Immunization against vaccine-preventable diseases delineates the one key intervention to be scaled up alongside the continuum of care. This focuses on improving access and quality, as well as increasing the demand for essential services. This strategy identifies the recent new technologies such as low osmolarity oral rehydration solution (*ORS)* and zinc for the management of diarrhoea in children, the introduction of new vaccines such as the 2nd dose measles, pneumococcal and rotavirus vaccines through the national Expanded Programme on Immunisation (EPI).

An estimated 40 percent of all deaths that occur before the age of five have been found to be associated directly and indirectly with under-nutrition, making it the single most important cause of child mortality. In response, a number of initiatives have been implemented since 2007. The MoH in its five-year programme of work (5YPOW III – 2007-2011)[3]and HSMTDP 2010-2013, in conjunction with the Ghana Health Service (GHS) spearheaded the launch of the 'Imagine Ghana Free of Malnutrition.' This was a multi-sectoral strategy that sought to address malnutrition as a developmental problem in the context of the Ghana Poverty Reduction strategy (GPRS). The health sector has expanded its child health interventions specifically in nutrition services,

immunization, vitamin A supplementation and deworming that affect child nutritional and health status, primarily through the rapid delivery approach.
Many challenges still beset child survival in Ghana, despite these efforts. These include the inability to sustain funding to support programmes under the EPI, therefore requiring a significant amount of resource mobilization. There is the need for more innovative and efficient use of resources, as well as sustainable measures for resource mobilization and allocation to the child health programme.

The inadequacy of human resources and skills within the health system poses a major obstacle to quality of care especially in the area of neonatal, postnatal and child illnesses. Also under-reporting of child deaths and inadequate national data to provide complete and reliable information on child health are major contributors to challenges in delivering child health interventions.

Other reviews such as the Ghana Immunisation Service Review, 2012; Effective Vaccine Assessment Report 2010; the Policy on immunisation 2011; and the Holistic Assessment of the Health Sector Programme of Work 2012 have identified some systemic bottlenecks to improving and sustaining high immunization coverage including:

- Inadequate and poor access to services in hard to reach districts (especially, islands and lake communities),
- Inadequate cold chain capacity at lower levels (about 41%of fridges and freezers are over 10 years),
- Weak community engagement and involvement in immunisation services,
- Weak capacity for micro planning and logistics management at the sub-district and CHPS zone level,
- Poor documentation of primary data which impacts on data quality and;
- Inadequate infrastructure.

1.5.2 Maternal Health

Achieving the desired maternal health count of 185 per 100,000 LB by 2015 remains a major challenge despite several interventions to improve the situation. In the 2010 PHC, variations in the maternal mortality ratio (MMR) across age- groups, revealed disconcerting highest incidence of deaths occurring within 12 to 14 year olds. This age group recorded MMR of 5,671 deaths per 100,000 LB, more than ten times higher than the national figure of 451 per 100,000 LB. There is also evidence that the risk of death increases for women who are above age 40 years. Women aged between ages 45-59 accounted for the second highest age group with likelihood of dying from pregnancy-related complications.

There is an almost even distribution in MMR across the rural-urban divide. Regarding age specific deaths, rural areas have slightly higher deaths than the urban areas, particularly among the 12 to

14 year olds and 50 to 54 year olds. Regional variations show much wider disparities. The Greater Accra Region has the least MMR with 355 deaths per 100,000LB in comparison with the Upper East Region that has the highest number of maternal deaths, 802 deaths per 100,000LB. The Volta Region is the second poorest performing on this indicator with an MMR of 701 deaths per 100,000LB.

Antenatal care (ANC) from a health professional (nurse, doctor, midwife or community health officer) has been identified as one of the most important measures to reduce the high maternal mortality. The evidence from the 2008 GDHS stipulates that 15 percent of all pregnancies develop complications and progress to become emergencies, hence the need for early identification and consequent early management to prevent death. The coverage of pregnant women who received at least one antenatal care visit nationwide dropped by about 5 percentage points, from 95 percent in 2008 to 90.6 percent in 2010 (2010 Ghana Health Review report). The Volta Region recorded the lowest coverage of pregnant women at ANC with 70.9 percent in 2010 almost 20 percentage points lower than the national average.

Even though there has been a general improvement in the demand for skilled care during pregnancy across all wealth quintiles, a coverage gap persists between the poorest and the richest. The poorest quintile has about three (3) times less access in comparison to their richest counterparts. There are also regional, geographical and educational variations in ANC visits.

To address the high maternal mortality rate, a number of interventions have been introduced within the framework of GPRS II and the GSGDAs. Specific to GSGDA, the policy measures include improving access to quality maternal, child and adolescent health services.

CHAPTER TWO: SITUATION ANALYSIS

2.1 Health System

2.1.1 Leadership and Governance

The Ministry of Health (MoH) provides oversight responsibility of all agencies within the health sector – Ghana Health Service, Teaching Hospitals, Faith-based institutions including Christian Health Association of Ghana (CHAG), Quasi-government health institutions and Private sector. The ultimate goal of the Ghana health sector is to ensure a healthy and productive population that reproduces itself safely. Ghana's National Health Policy (2007) was developed in line with the Primary Health Care Approach and Regional strategies. This provides direction on the national health strategic plans in order to harmonize and align the management and provision of comprehensive essential health services throughout Ghana. The critical driver for Ghana was to operationalize the Alma Ata goal of "Health for All".

Ghana recognizes the urgent need for primary health care for all its citizens in order to expand promotive, preventive and rehabilitative as well as curative care. In response, the country adopted an evidence-based primary strategy to reach the unreached, essentially recognizing the role of households in achieving the national health goals. Thus, there was the need to bridge geographical access gaps in order to bring basic yet essential health services to communities, while making up for the gap in human resources for health and augmenting their capacities.

Ghana's community-based health planning and services (CHPS) approach is the national strategy for addressing these gaps in access to quality health services at the community level (2). CHPS is equity-focused and has an implementation modality that has strong support of the government and development partners in the health sector. Through the CHPS close-to-client approach, there have been significant reductions in immunization dropout rates and improvements in coverage, service accessibility, and quality of maternal and family planning care essentially bridging the access gap between communities and health facilities (2,3). The CHPS is thus recognised as the lowest level of health service delivery in the health sector. The sub-district level comprises of health centres, which serve as the next referral level after CHPS and provide oversight to CHPS.

The District Health Services (Management Teams) have been empowered to take on full oversight responsibilities to ensure that all public health initiatives (implementation activities) are organized and synchronized in collaboration with other sectors particularly District Assemblies. This set pace for one of the current strengths of the country's routine immunization system as well as national campaigns, which augment routine efforts. The Government continues its commitment to financing immunizations nationally and no one is required to pay for childhood vaccines.

2.1.2 Health Workforce

The draft Human Resource Policy and Strategies for the Health Sector (2014 – 2017) identify priority areas and challenges with a four-fold thrust to increase the production of quality health

professionals, ensure equitable distribution of health workers, improve health worker productivity and cross-cutting issues affecting health workforce.

The health workforce includes those offering clinical services and health support services, respectively. The clinical staff include medical, nursing and other health professionals whose work impact directly on service delivery. The doctor-population ratio has improved even though the change has not been significant within the last three years (one doctor to 11,698 population in 2010, to one doctor to 10,452 population in 2012), although large regional variations persist. The Greater Accra Region, which has the capital city Accra, has 11 times more doctors per population in comparison to the Upper West Region. The nurse-population ratio has progressively improved from one nurse to 1,497 population in 2009 to one nurse to 1,251 population in 2012. The total number of midwives declined from 4,034 in 2011 to 3,863 in 2012 (MoH, 2012). This sharp decline has been attributed to the relatively high number of midwives reaching retirement age in contrast to the pace of training and deployment of younger midwives. There are 11,056 community health nurses, stationed at CHPS and Health centres offering primary health care services (See Annex 2 for Trend of Sector-wide Indicators).

2.1.3 Finance

The Government of Ghana (GoG) is the major financier of the health sector. There has been substantial financial resource support from Development Partners (DPs), the majority being bilateral partners. The increase in budgetary allocation to the health sector has been progressive since 2011. Budgetary allocation increased from GHC 1,805.25 million in 2011 to GHC 2,287.50 million in 2012, to GH 3,529.44 million in 2013 (MoH, 2013 POW: pp.19) but dropped by an estimated 5% in 2014. In 2014, a total of GHC 3,353.70 million was allocated to the health (Budget Statement and Economic Policy of Ghana government as presented to the Parliament on 19th November 2013). This comprised the discretionary budget: GOG (36.4%), IGF (40.66%), DP (23.30%). The National Health Insurance Fund had an estimated allocation of GH¢926.6m.

The National Health Insurance Act (Act 650) was revised in 2012 as Act 852 to allow for an enhanced coordination within the Health Insurance System in the country. The National Health Insurance Scheme (NHIS) was introduced as a country measure to bridge the gaps in financial access to health care services. NHIS seeks to reduce catastrophic effects of out-of-pocket payment at the point of service delivery in both private and public facilities, particularly among the lowest wealth quintiles. Enrolment of new cardholders unto the NHIS increased from 8.16 million people in 2010 to 8.30 million in 2011, up to 8.65 million at the end of 2012. This number represents an estimated 33.4% of the population registered for national health insurance. At the end of 2013 the active membership was 36.8% of the total population.

2.1.4 Medical Products and Technologies

Ghana continues to implement the goals of the Ouagadougou declaration to increase access to quality and safe health technologies as well as develop national policies and plans on the use of such technologies. The Ghana Health Sector has developed standard designs and specifications to improve the quality of the built environment within the sector, with the continuous adaption of new technologies to improve both efficiency and effectiveness of health service delivery and management. There are 15 regional laboratories established across the Regional Hospitals and 3 Public Health laboratories to support their activities. In addition two Health Research laboratories exist to support research activities in the health sector. At the District level there are 188 laboratories, while at the rural level there are 219 health facilities with laboratories.

The Health sector has developed and instituted a transparent and reliable system for the procurement of health technologies governed by the National Procurement Act.

In the last five years, Ghana's health sector has taken advantage of the nascent internet and the proliferation of mobile phones and mobile internet around the country to explore the utilisation of electronic capture of client details. This has enhanced client tracking and follow-ups to routine service delivery particularly to augment the activities of the Child Welfare Clinics (immunizations and child growth promotion).

2.1.5 Service Delivery

Service delivery within the health sector is organised at four main levels: First, tertiary services provided mainly by the 4 Teaching hospitals, 3 Psychiatry and other specialised hospitals. At the secondary level, 10 regional hospitals in the country serve as referral centres to the lower level health facilities. The third level is made up of 109 district hospitals at the district level, although the country currently has 216 administrative districts. At the sub-district level, there are 793 health centres, although there are 1,005 health administrative sub-districts (an additional level created within the health sector) and at the community level, there are 1,676 Community Based Health Planning and Services (CHPS). CHPS are located within sub-districts with an average of 5 CHPS zones per sub-district. A zone is a defined geographical area that covers a population of an estimated 5000 people. A CHPS zone typically comprises 5 to 8 communities and is managed by a minimum of two Community Health Officers, who are supported by the local leaders and community-based volunteers to plan and organise health services required by that community. There are plans to increase functional CHPS zones to cover all 6,500 electoral areas by 2018.

Additionally, health services are also delivery through some 969 clinics, 263 hospitals, 348 maternity homes, 20 polyclinics and 2 University Hospitals. There are over 3000 immunisation centres throughout the country established to support public health activities.

2.1.5.1 Faith-Based and Quasi-Government Health Service Providers

Faith-based organization in health in Ghana include the Christian Health Association of Ghana (CHAG) which is a network organization of 183 health facilities and health training institutions owned by 21 different Christian Church Denominations. CHAG is recognised as an Agency of the MoH and provides primary and secondary care as well as preventive, promotive and rehabilitative services in all 10 Regions of Ghana.

2.1.5.2 Private Self-financing Health Sector

Ghana has a relatively large private health sector, concentrated in the urban and peri-urban areas. Private self-financing health providers in rural areas face more challenges given the higher poverty rate of the population, hence their low rural concentration.

2.1.5.3 Mechanisms for ensuring quality of service delivery

The quality of service delivery is ensured at various levels of the health care in Ghana. At the policy level, the mechanisms to achieve that are through dialogues and performance monitoring and evaluation. These include the Health Sector Working Group, MOH-DPs Business Meetings, Annual Health Summits, Inter Agency Leadership Committee, the Inter-Agency Coordinating Committees, Agency specific Dialogue. At the service delivery points, quality of service is promoted through the operations of regulators like MDC, NMC, Pharmacy Council and lately the implementation of the (Health Institutions and Facilities Regulatory Acts (HIFRA) and Council for Allied Health. Other means for ensuring quality care include supportive supervision activities and engagement key stakeholders such as community and opinion leaders, the private sector and Civil Society Organisations (CSOs) *(see CMA III, 2010:pp.8-15).*

2.1.6 Information and Research

The main database information software for recording and reporting routine health indicators in Ghana is a web-based application known as the District Health Information Management System (DHIMS). Most primary data are collected using community registers that is aggregated into DHIMS at the district level and reviewed electronically by the regional and national levels. Strategies to improve data quality include the introduction of electronic registers to gradually replace the manual community registers and institutionalise data quality audit. Data validation is conducted at the various service levels. The MOH's Integrated Monitoring and Evaluation Framework provides the levels and frequency of data reporting as well as key performance assessment indicators; which also focuses on EPI. The timeliness and completeness of health information has significantly improved with the upgrading of DHIMS-I to DHIMS-II. Ghana conducts Demographic and Health Survey (DHS) every five years and Multiple Indicator Cluster Survey (MICS) in between DHS. The EPI undertakes periodic performance reviews which are in

tandem with the overall health sector performance review and reporting requirements. Additionally, specific reports and assessment are undertaken periodically, which are reported quarterly to the Inter Agency Coordinating Committee (ICC). In addition, assessments such as the Effective Vaccine Management Assessment (EVMA), Ghana Immunisation Service Review and Coverage surveys provide an indication of EPI performance. This engenders identification of strength and weaknesses and strategies for redress.

2.1.7 Community Involvement and Partnership

Ghana has been implementing CHPS since 2005 to improve access to care in consonance with the dictates of the Ouagadougou Declaration (2008), aside earlier interventions under the strengthening of its District Health Systems. The proportion of total population covered by CHPS has been increasing since its inception such that its coverage rose from 19.2% in 2010 to 23% 2011. Community ownership and participation is one of the key tenets for CHPS. Collaboration at the community level has been strengthened for health delivery through partnership with District Assemblies, training of volunteers and engagement of community-based organisations, which has improved demand creation for health services. The implementation of CHPS has been estimated to account for total OPD attendance by an average of 5% annually. CHPS has proved to be important in the health care delivery system especially in rural communities as it is most preferred by mothers and caregivers in rural communities in management of sick children compared to other forms of community or home based care programmes (GHS, 2013). The establishment of CHPS was shown to have positive effect on service outputs such as family planning, management of sick children and immunisation.

The major bottleneck to expanding the CHPS is the need for continuous investment ot match the increasing demand for the various demarcated electoral areas vis a vis the capital costs involved. There is also the challenge of effectively engaging MMDAs and communities to support the establishment of CHPS compound and its operations. CSOs are also supportive in demand creations at community levels especially in deprived and hard-to-reach communities. It was however observed that CSOs are zealous in getting involved in service delivery than their traditional role of advocacy and community mobilization, which calls for their capacity strengthening.

Advocacy to promote increased community involvement in the uptake of public health programs remains inadequate at the subdistrict and community levels resulting in weak community engagement for routine health activities, particularly EPI and CHPS where immunization coverage have fallen and CHPS implementation has slowed.

2.2 National Immunisation Programme

2.2.1 Strategies for Service delivery

A number of innovative strategies are used to deliver immunization services. Static immunization is the main service delivery strategy. Every health facility has a static clinic responsible for daily routine immunizations. The increasing availability of such clinics in the country has made access to routine immunization easier. Outreach immunization services are organized to reach children in communities where static clinics are not available. The outreach programme has contributed immensely towards bridging the gap between communities with health facilities and those who do not have. Thus, increasing access to EPI services to all eligible children and women. Mop-ups are also done in areas with low coverage and difficult to reach areas (areas not accessible during the rainy season) with the aim of reaching every child. Transit point vaccination including vaccinations done at Lorry parks, markets, churches, mosques etc. are also used. When necessary, mass vaccinations are conducted to reach out to specific groups.

2.2.2 New Vaccines Introduction

Ghana successfully introduced four new vaccines in 2012. Three of these vaccines (measles second dose (MSD), Rota Virus Vaccine and Pneumococcal Vaccines) were introduced into the routine immunization programme. The fourth one, which is Men A was introduced in a campaign mode in the three regions in the North, targeting the age group 1-29 years. In 2013, Ghana received support for HPV demonstration in four districts. The country also introduced Measles-Rubella (MR) vaccine into the routine immunization programme. The uptake of these new vaccines have been satisfactory except MSD.

The country has good experience with regards to the introduction of new vaccines into routine immunization as well as deploying new vaccines through mass vaccination. There are well organized structures as well as competent staff to guide the introduction of new vaccines. Technical expertise is drawn from both within and outside of the EPI Programme. There are established committees that take care of all the technical elements which are common to any new vaccine introduction. These committees include cold chain, training and service delivery, logistics and waste management, surveillance, communication.

In the area of advocacy, communication and social mobilization, previous introductions have shown that adequate public education and high level advocacy contributed in the acceptance of new vaccines by the general population. Development, printing and dissemination of fact sheets also help service providers to know what and how to communicate to the public. Development of training plan and training materials enabled facilitators at all levels to conduct standardized trainings. Cascaded training ensured all levels were trained on all aspects of vaccine introductions. Early revision and printing of data collection tools in previous introduction was found to be very important. Portions were created in the existing data collection tools for new vaccines. This ensured recording and reporting of performance of new vaccines.

Experience in vaccine introductions have shown that critical attention must be paid to cold chain availability, requirements and plans for improvements where necessary. Every new vaccine has an impact on cold chain requirement. Fortunately for Ghana, the recent introduction of vaccines for pneumonia and diarrhea led to an expansion of the cold chain capacity nationwide. However, there are some deficits, especially, at the national, district and facility levels.

In previous introductions, the existing surveillance systems for the disease of interest were enhanced. In addition, special adverse event surveillance systems were set up to monitor any event reported after administration of the vaccine. Monitoring and supervision was also a key component of previous introductions. The country also introduced peer-monitoring and reviews among regions for best practices to be shared and bad practices avoided.

2.2.3 Performance Analysis (Performance against set targets)

System Components	Indicators	Target (%)	Achievement			
			2010	2011	2012	2013
Immunization coverage	Administrative Coverage % BCG	100	102	105	104	98
	Administrative Coverage % DTP3	90	92	94	92	90
	Administrative Coverage % Measles-1	88	92	95	93	89
	WHO/UNICEF Official estimate % BCG	NA	99	98	98	-
	WHO/UNICEF Official estimate % DTP3	NA	94	91	92	-
	WHO/UNICEF Official estimate % Measles-1	NA	93	91	88	-
	Most recent survey coverage % DTP3	90	94	97	92	-
	Percentage fully immunized child		-	91	94	-
Timeliness of reports	Number of District Reporting		170	170	170	216
	Number of expected reports		2040	2040	2040	2592
	Number of reports received on time		1882	1820	1547	2137
	Completeness of district reports to national (%)		100	100	100	100
	Timeliness of district reports (%)		92	89	76	82
Immunization demand	Percentage drop-out DTP1 – DTP3	<=10	3.4	3.2	4.6	3.9
	Percentage drop-out BCG – Measles	<=10	14.1	16.4	15.0	14.2
	Percentage gap Measles-Yellow Fever	0	0.2	0.6	1.0	0.5
Immunization equity	Percentage gap in DTP3 between highest and lowest socioeconomic quintiles	NA	5.3	1.4	1.4	1.4
	Percentage gap in fully vaccinated children between males and females	NA	1.3	2.5	2.5	2.5
	Proportion of districts with DTP3 coverage >80%	80	78.8	78.8	80.0	75.0
New vaccines introduction	Number of new vaccines introduced into the routine schedule in the last plan period		NA	NA	3	1
	PCV-1	90	NA	NA	81	93
	PCV-3	90	NA	NA	64	89
	Rotavirus-1	90	NA	NA	75	92
	Rotavirus-2	90	NA	NA	65	87
	Measles-2	90	NA	NA	58	54
Polio	OPV3 coverage	90	94	91	92	91
	Non-polio AFP rate per 100 000 children under 15 years-of-age	2	1.8	2.3	1.6	2.7

System Components	Indicators	Target (%)	Achievement			
			2010	2011	2012	2013
	Number of rounds of national (NID) and subnational (SNID) immunization days		2	4	1	2
MNT	TT2+ coverage	90	76	76	74	71
	Percentage target population protected at birth from neonatal tetanus		86	88	88	-
	Proportion of districts reporting >1 case of neonatal tetanus per 1000 live births		0.5	1.7	0	0.5
	Was there an SIA? (Y/N)		N	N	N	N
	Delivery at facility rate		49.5	52.2	55	54
Measles and Rubella	Measles / MR vaccination coverage (1st dose)	90	92	95	93	89
	Measles / MR vaccination coverage (2nd dose)	90	NA	NA	58	54
	Number of laboratory confirmed measles/rubella outbreaks		1	6	17	6
	Proportion of laboratory confirmed measles/rubella outbreaks investigated	100	100	100	0	33.3
	Geographic extent of supplemental immunization activities		1	0	1	0
	Age group supplemental immunization activities	NA	9-59 mth	0	9m-14yr	0
	Coverage supplemental immunization activities	100	92.7	0	99	0
	Total measles cases (Lab/clinical/epidemiological)		36	120	329	319
	Total rubella cases (Lab/clinical/epidemiological)		86	586	420	168
Yellow Fever	YF coverage	90	92	92	92	87
	Percentage of districts reporting >1 suspected case					
	Was a preventive campaign conducted? (Y/N)	NA	N	Y	Y	N
	Number of districts involved in yellow fever campaign	NA	0	40	15	0
	Coverage	95	0	73.5	88.2	0
Epidemic meningitis	Number of districts involved in Meningitis Campaign		NA	NA	38	7
	Meningococcal A coverage	95	NA	NA	98.1	91.1

The table above indicates that coverage for all antigens are declining. There are variations in coverage for both intra-regional and district performance, for virtually all antigens. Ghana achieved a dropout rate between 3.2 to 4.6%, there are challenges in 32 districts, with dropout rate above 10%.

2.2.4 Post Introduction Evaluation

Post introduction evaluation of PCV, ROTA and MSD was successfully conducted with technical support from partners (WHO, UNICEF, GAVI, PATH)
The decision to introduce multiple vaccines in one year and in particular the launching and introduction of pneumococcal and rotavirus vaccines simultaneously was generally a positive one. It took determination, strong partnership, proper coordination, adequate planning and training, effective social mobilization, and logistics forecasting to achieve the desired results. It is equally important to point out that the complexity of GAVI approval process (during the application stage), delay in receiving vaccines for training and piloting, inadequate cold chain capacity for the large volume of vaccines, staff response and funds for preparations can negatively affect the success of the programme if not properly planned.
The addition of MCV2 to the EPI programme brings with it the challenge of reaching a new target of children for immunization in Ghana: those over 1 year of age. Ghana was able to successfully reach older children through integration of EPI services with their strong nutrition and malaria programs, which have established contact with 18-month old children for distribution of vitamin A and insecticide treated nets (ITNs). Still, missed opportunities were observed during this PIE mostly due to inadequate training of healthcare workers regarding the age eligibility for MCV2 and for guidance on catching up missed doses of infant vaccines.
The following are summary of strengths and challenges observed during the post introduction evaluation of the new vaccines introduced in 2012:

Table 1: Key findings from PIE for new vaccines introduction 2013

	Strengths	**Challenges**	**Efforts to address challenges**
Planning	For all antigens, early planning in 2011 provided time for bench marking before the introduction of the new vaccines into the routine immunization programme and permitted good involvement of stakeholders. For PCV and rotavirus, establishment of area specific working groups to provide guidance and monitoring. For MCV2, integration with other programmes	Lack of clear policy on "catch up" dosing for children over 1 year who missed vaccines in their infant series.	As part of the review of the EPI Policy and Field guide to include IPV introduction, the policy on dosing children more than 1 year will be clarified.

	Strengths	Challenges	Efforts to address challenges
	like nutrition and malaria facilitated reaching eligible children.		
Data management	Coverage data for all vaccines including the newly introduced vaccines were available for the year of introduction (2012). Updated recording and reporting forms were available for PCV and Rotavirus.	Most of the immunization monitoring charts available in the health facilities were not updated with the new vaccines Poor availability of reporting documents including MCV2.	The immunization monitoring charts have been updated to include the new vaccines. The updated charts have been printed and distributed. All data collection and reporting tools have been reviewed to incorporate all new vaccines.
Vaccine and Cold chain management, transport and logistics	The cold chain was expanded in preparation for the anticipated increase for PCV and Rotavirus (cold rooms were built in every regional office) Cold chain equipment at health facilities was sufficient and supplied timely for the introduction of the new vaccines	Malfunctioning refrigerators were found in some health facilities. Baskets meant to separate the various antigens in the refrigerators were not being used in a number of TCW refrigerators in the majority of health facilities visited.	The country is constantly updating the cold chain inventory and maintenance protocols have been established to ensure non-functional but serviceable refrigeration equipment are repaired. There are still some non-serviceable equipment that are yet to be disposed.
AEFI, injection safety, waste management	Adequate waste management practices have been adopted and implemented in most health facilities. 22 of 24 (92%) of HCW used safe injection techniques Despite lack of guidelines, HCW were able to describe the process of managing and reporting AEFI.	Over half (58%) of health facilities visited did not have written guidelines or protocols on AEFIs.	An AEFI section was part of the training manual that was developed for the new vaccines. The National Guidelines on AEFI monitoring has also been developed and shared (softcopy). The document is however yet to be printed.
Advocacy, communications, community acceptance	57% of care-givers interviewed knew of the new vaccines 100% of caregivers accepted the new vaccines and trusted HCWs even when they did not know the diseases they prevent.	Care givers had very little knowledge about the diseases prevented by the new vaccines.	Health workers are constantly being oriented to strengthen interpersonal communication with caregivers

2.2.5 Accelerated Control of VPDs

2.2.5.1 Supplemental immunization Activities

As part of efforts to accelerate control of vaccine preventable diseases, a number of supplementary immunization activities were conducted. There were at least two rounds of polio NIDs (2010-2013), targeting 0-59 months; two rounds of measles SIAs; two rounds of sNIDs of yellow fever in 2011 and 2012 as well as Meningitis A campaign in the three regions in the North. The overall coverage in all these campaign was above 90%.

Table 2: Summary of Supplemental Immunization Activities 2010-2013

Antigen	Performance (%)								
	2010		2011				2012	2013	
	Rd 1	Rd 2	Rd 1	Rd 2	Rd 3	Rd 4	Rd 1	Rd 1	Rd 2
Polio	103.2	102.1	103.9	103.4	101.6	102.5	104%	103.8	106
Yellow Fever			101.7					90.4	
MCV	92.7							98.5	
Men A							98%		

2.2.5.2 Progress on Disease Control

The World Health Organization certified Ghana as having eliminated neonatal and maternal tetanus in 2011. This was after a survey in the two highest risk districts (Nanumba North and Nanumba South districts) in September 2011. Using the total live births for the two districts, the maximum acceptance level for the survey was ≤ 1 NT death for a "pass" decision. Since no NT death was found during the survey, NT was considered eliminated in Nanumba North and Nanumba South districts and, by extension, in Ghana as a whole. NT is therefore not a public health problem in Ghana based on the survey.

In October 2007, Ghana's documentation for polio-free certification was accepted by the African Regional Certification Committee (ARCC). Since then, Ghana has been vigorously pursuing interventions to ensure that the gains made in the country's polio eradication efforts are maintained. The last indigenous case was in October, 2000. The country recorded 8 cases each in 2003 and 2008 with all cases linked to importation. Ghana has not reported any wild polio virus since October 2008. There is high routine polio immunization coverage of about 90% and campaign coverage of over 95%.

In October 2012, the country conducted meningitis A vaccination campaign in the three regions in the northern part of Ghana which falls within the meningitis belt. Following the successful campaign, meningitis due to meningococcus A serotype has not been identified.

After the adoption of the African Regional measles control goals and strategies in 2002, Ghana made significant progress towards measles control in terms of routine immunization coverage for children under 1-year-old and further reduction in cases with SIAs in 2006, 2010 and 2013. Measles vaccination coverage has improved from 84% in 2000 to 89% in 2013. The number of reported cases of measles dropped from 140,000 in 1980 to about 12,000 before the measles SIAs

in 2002 and to 319 cases in 2013. Since 2003, there has not been any reported death due to measles. The country has entered elimination stage in measles control and measles elimination strategic plan has been developed.

2.2.6 Innovations and technologies

Several innovations have been introduced as part of measures to deliver quality services to the target population. Peer-monitoring of routine immunization services among regions have been instituted. In peer-monitoring, EPI managers from one region provide supportive supervision to other regions and lessons learnt including best practices are shared in a discussion session involving all EPI managers and coordinators. Feedback is also provided to all places visited.

In 2010, Ghana piloted the use of hub cutters during the measles SIA as part of efforts to ensure injection safety; however, it was discovered that it gets blunt often, making it less useful. Additionally, the programme is piloting the Direct Solar Drive (DSD) system.

The Ministry of Health in collaboration with WHO is piloting TT vaccination status of women through the monitoring of protection at birth of children in two districts in Western Region. It is part of the maternal and neonatal tetanus elimination validation process. This will enable the country to get data on the number of children who are protected at birth.

The country adopted mobile incineration technology during the Yellow Fever Preventive Campaign in 2012. Its portability allows movement of the device to areas where there are no incinerate to facilitate complete and sterile incineration of waste. Twenty of these devices were procured and are still in use.

Ghana is piloting the electronic register system (e-register) for tracking children who have contact with the health service at any point in time to ensure that they received all childhood interventions and to minimize defaulters.

The GHS with the support of the World Health Organization piloted a system for reporting campaign data other than the conventional paper-based reporting called the Early Reporting System (ERS). The ERS is an SMS-based system whereby daily campaign data is transmitted by team supervisors through their mobile phones to a toll-free number using specified codes. The data is collated and aggregated on a web-based platform. The data is then presented on a web-based dashboard by the various levels within the health system. The dashboard is accessed only by user-rights provided by the service. During the Yellow Fever Campaign in 2012, the ERS allowed for validation of immunization data. This system will be useful in future campaigns.

2.2.7 Advocacy and Communication

2.2.7.1 Advocacy

Communication serves as the bedrock on which all other components of immunization ride. For effective communication to thrive three activities are essential. These are; advocacy, social mobilization and behaviour change communication. There is an Inter-Agency Coordinating Committee (ICC) that meets quarterly and also on emergency basis to address EPI issues. This Committee is chaired by the Director General of the Ghana Health Service. Membership includes representatives from different funding partners and Agencies (WHO, UNICEF, USAID, Rotary Club, etc.). The major role of the ICC includes:

- Providing and coordinating support as well as overseeing technical and financial commitment to the national immunization programme activities
- Supporting national level to review annual plans at all levels
- Enhancing transparency and accountability by reviewing the use of funds and other resources together with the EPI Programme at regular intervals
- Supporting and encouraging information sharing and feedback at national and implementing levels within and outside the country
- Ensuring that the Programme receives both technical and political support that helps to validate issues pertaining to EPI.
- Addressing technical issues as and when they arise such as introduction of new vaccines and strengthening immunization services etc.

In addition, the Programme engages other Ministries such as Education, Gender and Social Protection as well as the political leaders in advocacy and communication activities especially during supplementary immunization activities. At the operational level, advocacy and community mobilization is done through the district assemblies, traditional, religious, and opinion leaders including queen mothers, chiefs as well as the private sector in improving immunization. Their advocacy activities ensure that:

- There is increased commitment of policy makers at all levels to allocate resources for immunization activities
- Increase endorsement among communities to own and participate in immunization activities

2.2.7.2 Social Mobilization

Social mobilization aims to gain and maintain the involvement of a broad range of groups and sectors in supporting immunization activities and also involves informing and motivating the public to participate. There are standing social mobilization committees at national and regional levels comprising multi sectorial organizations (WHO, UNICEF, Red Cross, NGOs, Religious bodies etc.) that plan, coordinate and ensure the implementation and management of immunization communication activities. However, this Committee is only active during supplementary immunization activities due to lack of funds. While there have been marked achievements in terms of vaccination coverage especially during Supplementary Immunization Activities, Ghana's Immunization Programme continuously face daunting challenges such as creating demand for routine immunization activities which inadvertently enhance coverage.
Current evidence indicates that coverage is slackening in all regions especially in urban areas where the population is quiet dense. In order to sustain the confidence in the immunization

programme and improve coverage, there are plans to improve routine immunization through community mobilization, engaging influencers, tracking missed children and house to house focused counseling on immunization.

2.2.7.3 Behaviour Change Communication

Behaviour Change Communication involves using a variety of communication channels to promote positive behaviours and sustained individual, community and societal behaviour change. The national EPI/HPD is a focal point in communicating and heightening awareness on immunization. A five year communication plan has been developed to guide implementation of communication activities; however, it is yet to be finalised. There is a strong support by the media gatekeepers and journalist; yet there is limited encounter with most of these media practitioners which has given way for anti-vaccination campaigners to spread false information on immunization.

At the operational level communication activities include: house to house education by community volunteers, durbars, gong-gong beating, and community information centres etc. Evidence gathered from monitoring and supervision indicates that most health workers lack the skills to communicate effectively with their clients and this has resulted in missed opportunities and drop outs. There are plans to train health workers in Inter Personal Communication (IPC) to address this gap. This will thus promote the uptake of immunization services and reduce the above problems. Additionally, the Programme intends to promote ownership of immunization through participatory planning, monitoring and evaluation and sharing of best practices.

2.2.8 Surveillance

Ghana implements the integrated disease surveillance and response (IDSR) system that includes surveillance for vaccine preventable diseases (VPD) at all levels. As well surveillance of Adverse Events Following Immunisation (AEFI) has been a major strategy towards achieving injection safety in immunisation service delivery.

2.2.8.1 Vaccine Preventable Disease Surveillance

In 2001, Ghana with support from WHO, established two sentinel sites in Korle-Bu and Komfo Anokye Teaching Hospitals in Accra and Kumasi respectively, for the surveillance of paediatric bacterial meningitis (PBM) as part of requirements for the introduction of the haemophilus influenza type b (Hib) (alongside hepatitis B vaccine) into the routine immunization programme in 2002. The two sites have been functional to date.

Prior to the introduction of pneumococcal conjugate vaccine (PCV) as part of the dual introduction with rotavirus vaccine in 2012, the PBM surveillance was expanded to include invasive bacterial

disease surveillance, targeting pneumococcal diseases. Although these sites are still functional, the major challenge is the expansion and integration of this system with the IDSR.

Two sentinel rotavirus surveillance sites were set up in the same Teaching Hospitals under the auspices of WHO, as a precursor to the dual introduction of PCV and Rotavirus vaccines. The Accra site was established in 2006 while the Kumasi site was set up in 2009. These sites were expanded to include La General Hospital (Accra, Greater Accra), Eikwe Hospital (Eikwe, Western Region), Ho Municipal Hospital (Ho, Volta Region), Tamale Teaching Hospital (Tamale, Northern Region), Navrongo Health Research Centre (Navrongo, Upper East Region).

Case based surveillance for suspected measles cases was set up in 2003 after the measles Supplementary Immunization Activities (SIA's). Suspected cases that come out to be negative for measles are further tested for rubella IgM antibodies.

Case-based surveillance for Acute Flaccid Paralysis to track poliomyelitis was established in 1996 with laboratory component based in Noguchi Memorial Institute for Medical Research. The Laboratory tests stool specimens from all cases of acute flaccid paralysis (AFP) among children under fifteen years of age.

Case-based meningitis has been part of the IDSR. In 2012, prior to Meningitis-A vaccination campaign in the Northern, Upper East and Upper West regions; case-based meningitis surveillance was enhanced with PCR-based diagnosis centred in the Public Health Laboratory in Tamale in the Northern Region.

Yellow fever surveillance is integrated into the IDSR with laboratory support offered by the NPHRL. Confirmation of presumptive positive yellow fever cases are done at the Regional laboratory in Dakar, Senegal.

Maternal and Neonatal tetanus Surveillance is an integral part of the IDSR with case-based data aggregated from District level.

VPD surveillance is fraught with some challenges. There are challenges with meeting standard surveillance indicators. For example, although the country met the AFP rate for 2013, this is not uniform across regions.

For a permanent measure, a comprehensive surveillance plan has been drafted to mainstream the surveillance of all the new vaccines into the national IDSR system under the national surveillance department and to be implemented at all levels just as with the existing system.

2.2.8.2 Surveillance of Adverse Events Following Immunisation

An Adverse Event Following Immunization (AEFI) is any untoward medical occurrence which follows immunization and which does not necessarily have a causal relationship with the usage of the vaccine. The adverse event may be any unfavorable or unintended sign, abnormal laboratory finding, symptom or disease. Reported adverse events can either be a result of the vaccine or immunization process, or coincidental events that are not due to the vaccine or immunization process but are temporally associated with immunization.

Surveillance of AEFIs is an effective means of monitoring immunization safety and it contributes to the credibility of the immunization program. It allows for proper management of AEFIs and

avoids inappropriate responses to reports of AEFIs that can create a sense of crisis in the absence of safety surveillance.
A surveillance system for intussusception has been setup in two teaching hospitals – Komfo Anokye Teaching Hospotal and Korle-Bu Teaching Hospital. The rationale is to track intussusception as an adverse event following rotavirus vaccination. Plans are underway for the expansion of intussusception surveillance to other parts of the country.

2.2.8.3 Laboratory Support for VPD Surveillance

The Public Health and Reference Laboratories (PHRL) and Noguchi Memorial Institute for Medical Research (NMIMR) provide support to VPD surveillance. The NMIMR is a WHO-accredited site for laboratory component of AFP and rotavirus surveillance for the West African Sub-region and beyond.

3.2.9 Vaccines, Logistics, Cold Chain and Waste Management

3.2.9.1 Cold Chain Requirement

Adequate cold chain in terms of sufficient storage capacity and effective vaccine distribution at both facility and stores levels is very important in immunization delivery service. In 2001 when Ghana planned to introduce the Pentavalent (DPT-HepB+Hib) vaccine, the cold chain capacity was expanded by 30% to provide adequate storage space and distribution facilities.
In August 2010 the Government of Ghana with the support of WHO and UNICEF conducted an 'Effective Vaccine Management Assessment' in all regions. The assessment was done prior to the introduction of vaccines for pneumonia and diarrhoea. The findings showed insufficient cold storage capacity at the regional and district levels. Since then steps have been taken to address the gaps identified. Walk-in cold rooms (WICR) were installed in all the ten regions. TCW 2000 and 3000 refrigerators were procured and distributed to districts to improve cold chain capacity at the operational level. Approximately 270 vaccine fridges have been procured and distributed to health facilities since 2010. However, gaps still exist in about 85 of the existing 216 districts.

3.2.9.1.1 Cold chain Capacity at the National level

The net cold chain capacity for positive storage at the national level currently stand at 56,250 litres. This capacity will not be adequate to accommodate the vaccine requirements for 2015 through to 2019. The Government of Ghana has already procured two (2) units 40,000 litres (totaling 80,000 litres gross capacity) for installation at the national level in 2015.
With regards to the negative storage capacity, there is adequate space for 2015 – 2019. These are presented in the tables below:

Table 3: Cold chain capacity needs assessment for positive storage at the national level

		Formula	2015	2016	2017	2018	2019
A	Annual positive volume requirement, including new vaccine (specify:_____) (litres)	*Sum-product of total vaccine doses multiplied by packed volume per dose*	114,086 litr	120,890 litr	125,275 litr	129,506 litr	132,978 litr
B	Existing net positive cold chain capacity (litres)	#	56,250 litr	56,250 litr	56,250 litr	56,250 litr	56,250 litr
C	Estimated minimum number of shipments per year required for the actual cold chain capacity	*A/B*	2.03	2.15	2.23	2.30	2.36
D	Number of consignments / shipments per year	*Based on national vaccine shipment plan*	4	4	4	4	4
E	Gap in litres	*((A*(1/D+Buffer/12) - B)*	**793 litr**	**4,195 litr**	**6,388 litr**	**8,503 litr**	**10,239 litr**
F	Estimated additional cost of cold chain	*US $*	$123,472	$0	$0	$0	$0

Table 4: cold chain capacity need assessment for negative storage at the national level

		Formula	2015	2016	2017	2018	2019
A	Annual negative volume requirement, including new vaccine (specify:_____) (litres)	*Sum-product of total vaccine doses multiplied by packed volume per dose*	4,993 litr	5,783 litr	5,928 litr	6,076 litr	0 litr
B	Existing net negative cold chain capacity (litres)	#	6,250 litr	6,250 litr	6,250 litr	6,250 litr	6,250 litr
C	Estimated minimum number of shipments per year required for the actual cold chain capacity	*A/B*	0.80	0.93	0.95	0.97	0.00
D	Number of consignments / shipments per year	*Based on national vaccine shipment plan*	4	4	4	4	4
E	Gap in litres	*((A*(1/D+Buffer/12) - B)*	**- 3,754 litr**	**- 3,358 litr**	**- 3,286 litr**	**- 3,212 litr**	**- 6,250 litr**
F	Estimated additional cost of cold chain	*US $*	$0	$0	$0	$0	$0

3.2.9.1.2 Cold Chain Capacity at Regional Level

The country embarked on cold chain expansion at the regional level following the EVM assessment 2010. Walk-in cold rooms of 40m3 capacity have been installed in Ashanti, Brong-Ahafo and Central regions. With the exception of Greater Accra Region which has 80m3 capacity WICR, all other regions now have 30m3 WICR.

The introduction of IPV and the subsequent introduction of bOPV into routine immunization will make the cold chain capacity in Ashanti Region inadequate. The Government of Ghana with the support of partners will procure and install a 10m3 walk-in-cold-room in the region to make up for the gap. There is therefore adequate positive cold chain capacity in all other regions.

Walk-In Freezers (20m3) have also been installed in Greater Accra and Ashanti regions to help improve quality of storage of Oral Polio Vaccines. There is adequate negative capacity at all regions. Tables 4 and 5 summarize positive and negative cold chain requirement and capacity at the regional level needed for the introduction for the new vaccine using the WHO Logistics Forecasting tool.

3.2.9.1.3 Cold Chain Capacity at District and Health Facility Levels

As with the national and the regional levels, the WHO Logistics Forecasting tool was used to assess the cold chain requirement, capacity and the needs at the district level. The analysis showed that 85 out of the 216 districts in the country do not have adequate positive cold chain capacity for the planned introduction of IPV. As per the policy of the government, all these 85 districts will be provided with TCW 3000 refrigerator.

Provision has been made in the GAVI HSS funding to procure hundred (100) TCW 3000 refrigerators in 2014/2015 to support vaccine storage. A total of fifty (50) TCW 2000 will also be procured for distribution to health facilities.

3.2.9.2 Dry Storage

There is adequate dry storage capacity at both national and regional levels. Some regional medical stores have been renovated and expanded to improve storage of dry injection materials.

Table 5: Cold chain capacity needs assessment for positive storage at the regional level

		Formula	Ashanti	Brong Ahafo	Central	Eastern	Great Accra	Northern	Upper East	Upper West	Volta	Western
A	Annual positive volume requirement, including new vaccine (specify:_____) (litres)	*Sum-product of total vaccine doses multiplied by packed volume per dose*	25,926 litr	11,932 litr	12,129 litr	13,951 litr	22,087 litr	13,553 litr	5,352 litr	3,692 litr	11,400 litr	12,540 litr
B	Existing net positive cold chain capacity (litres)	#	12,500 litr	12,500 litr	12,500 litr	9,375 litr	25,000 litr	25,000 litr	9,375 litr	9,375 litr	9,375 litr	9,375 litr
C	Estimated minimum number of shipments per year required for the actual cold chain capacity	*A/B*	2.07	0.95	0.97	1.49	0.88	0.54	0.57	0.39	1.22	1.34
D	Number of consignments / shipments per year	*Based on national vaccine distribution plan*	4	4	4	4	4	4	4	4	4	4
E	Gap in litres	*((A*(1/D+Buffer/12) - B)*	463.15507	- 6,534 litr	- 6,435 litr	- 2,400 litr	- 13,956 litr	- 18,223 litr	- 6,699 litr	- 7,529 litr	- 3,675 litr	- 3,105 litr
F	Estimated additional cost of cold chain	*US $*	$39,584	$0	$0	$0	$0	$0	$0	$0	$0	$0

Table 6: Cold chain capacity needs assessment for negative storage at the regional level

		Formula	Ashanti	Brong Ahafo	Central	Eastern	Great Accra	Northern	Upper East	Upper West	Volta	Western
A	Annual negative volume requirement, including new vaccine (specify:_____) (litres)	*Sum-product of total vaccine doses multiplied by packed volume per dose*	0 litr	0 litr	0 litr	0 litr	0 litr	0 litr	0 litr	0 litr	0 litr	0 litr
B	Existing net negative cold chain capacity (litres)	#	6,250 litr	216 litr	264 litr	641 litr	6,250 litr	6,250 litr	110 litr	63 litr	183 litr	264 litr
C	Estimated minimum number of shipments per year required for the actual cold chain capacity	*A/B*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D	Number of consignments / shipments per year	*Based on national vaccine distribution plan*	4	4	4	4	4	4	4	4	4	4
E	Gap in litres	*((A*(1/D+Buffer/12) - B)*	- 6,250 litr	- 216 litr	- 264 litr	- 641 litr	- 6,250 litr	- 6,250 litr	- 110 litr	- 63 litr	- 183 litr	- 264 litr
F	Estimated additional cost of cold chain	*US $*	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

3.2.10 Plan to improve vaccine and cold chain management

Ghana conducted Effective Vaccine Management Assessment (EVMA) in 2010 with the goal of updating the storage capacity and improving on the vaccine management system at all levels. Storage capacity has been increased in all regions in the country. Brong-Ahafo and Ashanti regions have 40 meter cubic walk-in cold rooms whiles Greater Accra has a 60 cubic meter walk-in cold room. All other regions were provided with 30 cubic meter walk-in cold rooms.

Cold chain and Vaccines are managed at the national level by a team comprising headed by the Deputy EPI Programme Manager (Logistician). The other team members include a National Logistician, Cold Chain Manager, Supply Chain Officer and biomedical engineers who are responsible for cold chain equipment maintenance.

There are also trained Cold Chain Managers at the regional level who monitor all regional cold chain equipment in the regions and update the national cold chain Team for prompt action.

The country's cold chain inventory is updated every six (6) months using the WHO Cold Chain Equipment Inventory and Replacement tool. Currently, there is a deficit in the positive cold storage capacity at the national level as presented in section 3.4.1. There is no cold chain gap at the regional level with the exception of Ashanti Region which will need cold chain expansion in 2017. At the district level, cold chain gaps exit in 85 districts. Plans are underway for these gaps to be filled.

The last EVM was conducted in 2010, the country intended to conduct another assessment in August 2014. However, there was a challenge with an external technical assistance; hence, the assessment has been rescheduled for October 2014. Findings from the assessment will reveal status of indicators such as storage facility, temperature monitoring, vaccine management, and staff capacity etc. at all levels. Recommendations from the assessment will help to improve staff training, storage facility expansion, equipment replacement, monitoring and supervision which will go a long way to improve vaccine and cold chain management in general.

The EPI Programme is mindful of the effectiveness of the supply chain; hence vaccines from the national level to the facility level follows a laid down structure, which has been consistent since the inception of the programme. Based on this structure, Vaccines are supplied quarterly from national level to the regional level. Regions also supply to districts on monthly basis and facilities also receive vaccines on monthly basis.

There is planned preventive maintenance of cold chain facilities at all levels; a team of technicians from the Biomedical Engineering Unit of the Ministry of Health and Clinical Engineering Unit of the Ghana Health Service assist the regional equipment management teams to repair broken down cold chain facilities.

Temperature is monitored twice daily at all levels and data is plotted on temperature monitor charts. It is also reported monthly in the DVDMT by every district. The Programme has also procured fridge tags for continuous monitoring of vaccines at the regional and district levels. Continuous temperature data loggers were procured for national and regional walk-in-cold rooms. However the data loggers have been re-called by the manufacture due to technical challenges for rectification. We are waiting for the equipment to be installed as soon as they are repaired to enhance cold chain management.

Vaccine ledgers are used at all levels to monitor vaccine usage. Additionally, national and regional levels use the WHO Stock management tool. Maximum and minimum stock levels as well as the first-to-expire first-out (FEFO) principles are followed in the management of vaccine stock. Vaccine wastage is monitored at all levels through the routine monthly reporting format. Immunization tally books are also in use at the operational levels to record daily immunization.

Additionally, immunization coverage for various antigens are monitored by the use of immunization monitor charts.

3.2.10.1 Vaccine procurement and quality

The country uses the UNICEF Procurement Services to procure all its vaccines and dry injection materials for immunization programme. This system has worked very well for us over the years and would continue with the agreement. The country continues to pay for the traditional vaccines as well as co-finance with GAVI for the new and underused vaccines. However, in 2013 the country defaulted in the payment of its co-financing component but was settled in 2014. High level advocacy, will be embarked upon to prevent future defaulting and also prepare the country to take up full cost of financing immunization activities when we are finally graduated from the GAVI Co-financing programme.

The national cold room has a stand-by generator to back-up the national electricity grid. The equipment is aged so plans will be made to replace it with a new one. This will help improve vaccine quality at the national level. With the exception of western and central regions, the rest of the eight regions also have stand by generators. Provision will also be made to install one in each of the two regions. As a measure to improve temperature monitoring and cold chain maintenance system 3,600 fridge tags were procured by UNICEF and distributed to facilities in all the regions. UNICEF again supported the country to acquire 10 data loggers to be installed in the WICR's. Nine more loggers will be needed for the rest of the existing regional cold rooms.

3.2.10.2 Waste Management

According to the EPI Policy on Injection Safety, the "bundling" principle is being followed for the procurement and distribution of vaccines with auto-disable (AD) syringes and safety boxes for the collection of sharps.

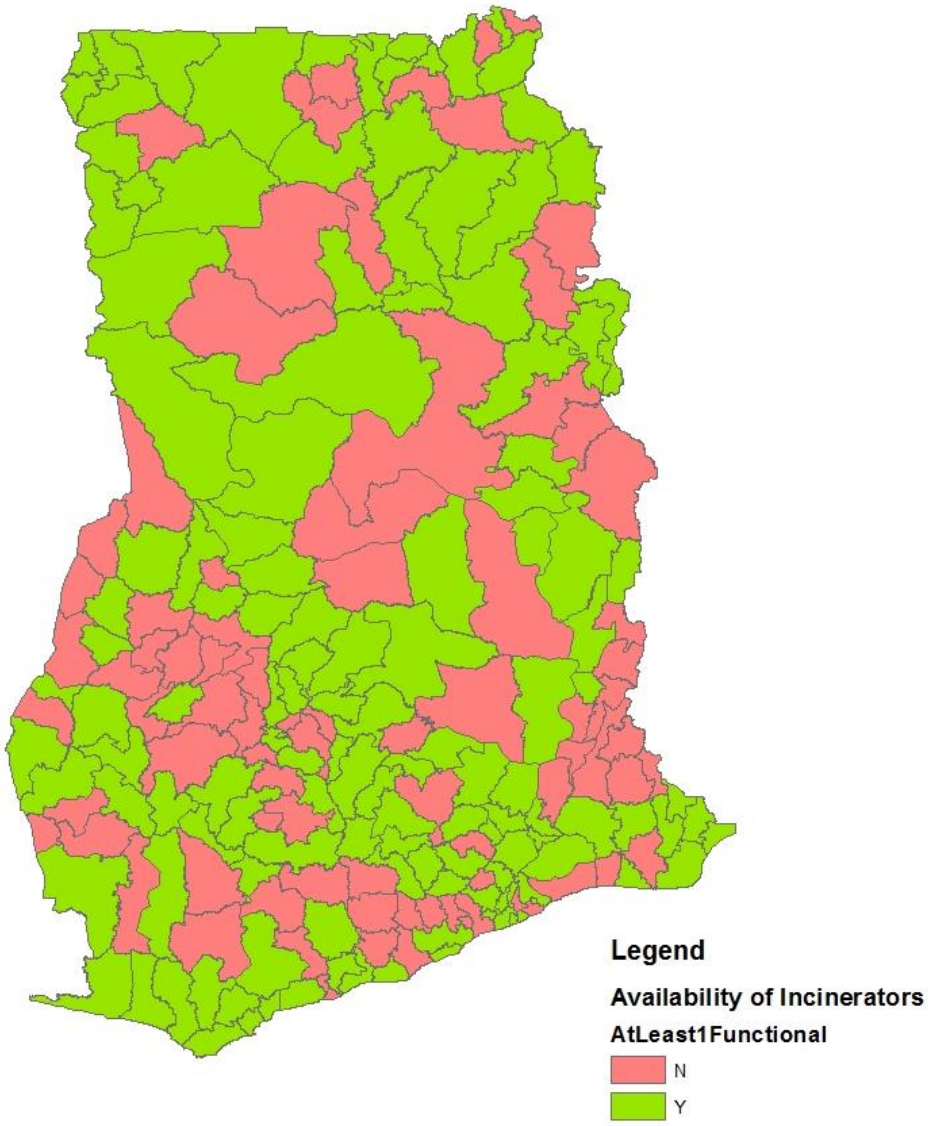
The final disposal of used syringes and sharps is done by incineration where an incinerator is available. Where there is no incinerator, the used safety boxes are stored in a safe place and later transported to a nearby facility for incineration. In the very distant areas open pit burning method is use for disposal. There are currently 46 new districts without incinerators and also a number of incinerators that were constructed from 2000-2008 require rehabilitation.

Figure 1 shows distribution of incinerators nationwide. There are 85 districts with nil or non-functional incinerators. WHO and UNICEF are sponsoring 22 more incinerators (in 22 districts) in addition to 43 already completed with their support.

Figure 1: Status of Incinerators in Ghana, 2014

In response to equipping all districts with at least one incinerator, provisions have been made within the current HSS support from GAVI to construct 50 new incinerators in newly created

districts. Additionally, existing but non-functional ones in old districts will be rehabilitated with same support. The remaining 13 districts will be provided with an incinerator in 2016/2017.



In the current arrangement, districts without incinerators cart injection waste to nearby districts which have functional incinerators for disposal. Until new incinerators are fully built and functional, this arrangement will continue and districts will be supported with disinfectants and clothing kits for waste managers including boots, heavy-duty (utility) gloves, coverall gown, goggles, etc using funds from GAVI-HSS.

Plans are afoot to update healthcare workers and waste managers on infection prevention and injection safety within support from VIG. The major component of the training will focus on disaggregation of waste under the principle of "DO NO HARM" to self and others.

Regular inspection of disposal sites will continue in all districts to ensure effective management of the waste. Protective materials for the attendants will regularly be supplied and they will be oriented to use the materials at all times to avoid other health hazards.

3.2.10.3 Plan to improve Injection Safety

The bundling system of supply of vaccines and devices ensures regular supply and availability of immunization devices. Appropriate and efficient distribution planning will be employed to avoid mal distribution of devices.
There will be regular orientation on the use of injection safety devices to reduce/avoid needle stick injuries. All new staff recruited into the health service will be given extensive orientation prior to their deployment unto the field to provide immunization.
Supervision at the service delivery levels would be strengthened to motivate and improve capacity of service providers. The programme piloted the use of Hub Cutters during the measles SIA in 2010 and was found to be efficient. The option of introducing it into routine will be exploited especially in districts that do not have incinerators. Staff training on injection safety will continue at all levels.

3.2.10.3.1 Plan to improve-adverse events following immunization – AEFI

AEFI monitoring is part of the monthly district EPI activity reporting system. Through the monthly reporting form zero-reporting is ensured. Case investigation forms have been designed for all health facilities to investigate each case. There will be regular orientation of health workers on the importance of AEFI monitoring and reporting. The Programme will continue to collaborate with the Pharmaco-vigilance Centre at the Food and Drugs Authority to monitor AEFI's. This collaboration will continue and even be strengthened through regular meetings, training and monitoring visits to regions, districts and health facilities providing immunization services.

3.2.10.4 Vaccines and injection Supplies

Tables 6 and 7 below are the vaccines and injection safety equipment estimated for the five year period using the WHO Logistics forecasting tool.

Table 7: Total vaccine and supplies estimates for 2015-2019

Vaccines	Type	2015	2016	2017	2018	2019	2015-2019
BCG	lyophilized	2,250,100	2,306,400	2,364,000	2,423,100	2,483,700	11,827,300
OPV	liquid	5,023,400	1,248,300	-	-	-	6,271,700
bOPV1+3	liquid	-	6,397,200	5,277,700	5,409,600	1,344,200	18,428,700
IPV	liquid	675,100	2,411,200	2,127,600	2,180,800	2,235,400	9,630,100
DTP-HepB-Hib	liquid	3,727,500	3,820,600	3,968,500	4,110,800	4,202,900	19,830,300
PCV-13	liquid	3,138,900	3,217,400	3,341,900	3,461,800	3,539,300	16,699,300
Rota_liq	liquid	2,092,600	2,144,900	2,227,900	2,307,900	2,359,500	11,132,800
Measles	lyophilized	855,100	1,148,700	1,178,800	1,235,200	1,317,100	5,734,900
MR	lyophilized	1,339,600	1,373,100	1,426,000	1,457,900	1,494,400	7,091,000

YF	lyophilized	1,339,600	1,373,100	1,426,000	1,457,900	1,494,400	7,091,000
Td	liquid	2,220,100	2,275,600	2,371,700	2,423,100	2,524,900	11,815,400

Table 8: Total annual safe injection equipment estimate for 2015 – 2019

		2015	2016	2017	2018	2019
No. of syringes required for ID injections	ADS_0.05ml	1,248,800	1,280,100	1,312,100	1,344,900	1,378,500
No. of syringes required for SC injections	ADS_0.5ml	711,900	956,300	981,300	1,028,300	1,096,500
No. of syringes required for IM injections	ADS_0.5ml	1,848,300	1,894,500	1,974,400	2,017,300	2,102,000
Syringes 2ml for dilution BCG/Hib	Sdilution_2ml	-	-	-	-	-
Syringe,RUP-1,2ml,w/fixed ndl/BOX-100	RUPF_Sdilution_2ml	112,505	115,320	118,200	121,155	124,185
Syringes 5ml for dilution Msls/YF	Sdilution_5ml	-	-	-	-	-
Syringe,RUP-1,5ml,w/fixed ndl/BOX-100	RUPF_Sdilution_5ml	85,510	114,870	117,880	123,520	131,710
Safety boxes	SB_5l	40,100	31,200	45,100	46,400	48,400

3.2.10.5 Strengths and weaknesses of EPI by system components, Ghana, 2014

SYSTEM COMPONENT	STRENGTHS	WEAKNESSES
Vaccine supply and quality	**Procurement and distribution** ▪ Timely forecast and procurement of vaccines and injection safety materials through UNICEF ▪ Government of Ghana paying 100% for BCG, OPV, Measles-Rubella and Td vaccines, and their injection safety materials ▪ Ghana Government is co-financing the procurement of DPT-HepB-Hib PCV13, Rotavirus, and Yellow fever vaccines and injection materials with GAVI ▪ Quarterly distribution plan from national to regions established ▪ Monthly delivery of vaccines and other EPI logistics from regions to districts and sub-districts ▪ Cold vans for vaccine distribution procured for all ten regions ▪ New cold van of higher capacity procured to improve vaccine distribution from the national level ▪ Bundling concept adequately practiced in the country ▪ Stock control system for vaccines and other EPI logistics fully functional at national level **Vaccine management** ▪ Stock Control Tools(electronic and manual) available at all levels ▪ VVM on all vaccines for routine immunization; Multi Dose Vial Policy (MDVP) and Open Vail Policy (OVP) practiced at all service delivery level. ▪ Vaccine wastage sentinel monitoring being piloted in 20 districts from all the ten regions	- Constrained transport situation especially at district and service delivery levels. - Inadequate storage capacity for vaccines in some districts especially the new ones - Vaccine potency testing for different levels not being carried out. - Poor documentation on vaccine usage at the district and sub-district levels

SYSTEM COMPONENT	STRENGTHS	WEAKNESSES
	▪ Food and Drugs Authority; National Regulatory Authority (NRA), is charged with the responsibility of ensuring registration, lot release, quality, safety and efficacy of vaccines used in the country. It also works closely with the National Ethics Committee which oversees all clinical trials.	
Logistics	**Cold Chain** - Increased in cold chain equipment through support from Unicef and other partners. - Existence of cold chain corrective and maintenance teams at national level with regional equipment managers supporting regions and districts. - Cold chain equipment spare parts are procured centrally to support the Maintenance activities Injection safety and waste management - Policy, standards and guidelines on injection safety and waste management available and being implemented - Committee in place to coordinate injection safety within GHS - All health facilities (100%) are using AD syringes for immunizations - Construction of 65 new incinerators is on-going through the support of WHO and Unicef	- Regular breakdown of EPI equipment at the lower level. - Frequent breakdown of WICR's in the regions - Inadequate supply of spare parts especially for solar powered refrigerators. - Weak technical capacity in the regions for cold chain maintenance teams - Not all districts have functional incinerators.
Service delivery	- Reduction in morbidity and mortality due to VPDs especially measles, polio andHib (Hib meningitis in infants). - Maternal and Neonatal tetanus eliminated in the country - New vaccines introduced into EPI routine without interruption of services i.e. PCV13, Rotavirus and Measles/Rubella. - Plans underway to introduce Inactivated Polio Vaccine (IPV)	- 26% (5/216) of the districts have Penta3 coverage less than 80% in 2013. - High attrition rate of health workers at service delivery level - Minimal involvement of the private sector and community in planning and implementation of services especially outreaches.

SYSTEM COMPONENT	STRENGTHS	WEAKNESSES
	- Human Papilloma Virus (HPV) vaccine piloted in the country - Integration of EPI with other child survival strategies e.g. Vit. A supplementation, deworming, growth monitoring through strategies such as , SIAs, CHPW and IMCH campaigns etc.	- Poor utilization of data for decision making at the lower levels - High and Negative dropout rate remain a problem in some districts
Advocacy and communication	- High community awareness about immunization which has resulted in increased demand for services - High level of political involvement - Communication strategic plan in place - Assigned Personnel for communication at national and regional levels - Involvement of traditional and Opinion leaders in advocacy - Civil Society organizations (CSO's), Coalition of NGO's in health and other NGO's involved in social mobilization and communication - Community-based volunteers are mobilized for NIDs	- Inadequate interpersonal communication (IPC) skills among health workers - Lack of IEC materials for routine immunization - Some of the existing IEC materials are not in local languages - Not all districts have communication focal persons - Most districts do not have EPI communication included in their district work plans.
Surveillance	- Surveillance for AFP, measles, NNT, Pediatrics Bacterial Meningitis (PBM), yellow fever and rotavirus is being implemented within the Integrated Disease Surveillance and response (IDSR) framework. - IDSR document updated to include other diseases of public health importance - Plans to expand CRS sentinel sites. - No wild polio virus has been report in the country since November 2008. - Case based measles/rubella surveillance implemented in all districts - Functional national polio certification committee (NCC), national polio expert committee (NPEC) and National Polio Laboratory Containment Task Force (NTF)	- Diphtheria not on MOH priority diseases list for surveillance - Weak community based surveillance system - Inadequate specimen containers for sample collection - Weak AFP surveillance - Volunteer fatigue

SYSTEM COMPONENT	STRENGTHS	WEAKNESSES
	- Case definition guidelines for MOH priority diseases have been updated	
Programme management	**Policy, planning and management** - EPI policy document updated - EPI field guide updated - Structures for partner coordination are in place: ICC, NCC, technical committees with strong collaboration with partners - Integrated bottom up planning within the districts - Review meetings held at all levels - Strong managerial skills at national and regional levels **Supervision** - Integrated supervision plan and checklist at all levels - Feedback provided to all levels on a regular basis - Technical assistance provided by partners for specific areas.	- EPI policy, standards, guidelines are not available at all levels - Updated EPI field guide not printed - Adhoc activities disrupt planned activities at all levels - Poor coordination of partners at district level. - Districts not implementing all planned activities - Irregular technical support supervision from all levels especially to the operational level - Lack of feedback from supervision and monitoring
Strengthening human and institutional resources	- Human Resource structure/staffing norms available at all levels with skilled manpower at the implementation level - MLM training for National, regional and districts officers planned - Training conducted for pre-service health institutions on EPI - Improvement in the number of technical staff at the service delivery levels	- Weak staff knowledge and skillsin logistics - Planned training in MLM not often implemented
Sustainable financing	- Financial Sustainability Plan (FSP) developed at national level with involvement of all stakeholders. - Government renewed its commitment to GAVI through signing of the Partnership Framework Agreement (PFA).	- Delays and inadequate disbursement of funds to districts. - Delayed accountability of funds advanced for implementation of activities at all levels.

SYSTEM COMPONENT	STRENGTHS	WEAKNESSES
Accelerated Disease Control	**Polio Eradication** - Increasing trends in OPV3 coverage at national level with current coverage above 85% - No case of Wild Poliovirus has been detected since November 2008 - Ghana maintains polio free status. **Maternal & Neonatal Tetanus Elimination** - Tetanus diphtheria (Td) vaccine introduced to replace Tetanus Toxoid (TT) - MNT eliminated in the country **Measles Control** - Measles coverage at national level is above 80%. - Measles second dose introduced into routine - Measles-Rubella vaccine also introduced into routine. - Case based measles/rubella surveillance sustained nationwide. - Negative measles cases tested for rubella - No Recorded death due to measles since 2003	- 26% (56/216) of districts have OPV3 coverage less than 80%. - Not all districts suspect AFP cases. - National Td2+ coverage among pregnant women still less than 80%. - Documentation of Td coverage results still a challenge - MNT elimination sustainability strategic plan yet to be drafted - Not all districts are reporting suspected measles cases - Measles/rubella elimination strategic plans yet to be drafted

3.2.10.6 Opportunities and Threats of EPI by system components, Ghana, 2014

SYSTEM COMPONENT	OPPORTUNITIES	THREATS
Vaccine supply and quality	**Procurement and distribution** ▪ Availability of GAVI financing scheme to support procurement of new and underused vaccines	▪ Global economic crunch ▪ Donor fatigue ▪ Possible withdrawal of GAVI support for achieving middle level income status

SYSTEM COMPONENT	OPPORTUNITIES	THREATS
	▪ Using UNICEF procurement and supply services to procure and deliver vaccines and injection supplies into the country ▪ Existence of External partners and donors ▪ Vibrant private business community **Vaccine management** ▪ Availability of vaccine management resource materials at WHO and Unicef websites ▪ Regulatory and research institutions to ensure vaccine safety and efficacy	▪ Frequent update of vaccine management tools by by WHO and Unicef
Logistics	**Cold Chain** - Abundant supply of sunlight for solar Direct Drive (SDD) cold chain equipment - Partner support to develop real-time cold chain inventory integrated into DHIMS **Injection safety and waste management** - Regulatory agency with mandate to ensure environment safety (EPA) - Capacity to recycle used syringes available in country - Partner support to construct more incinerators	- - Irregular and erratic power and gas supply at all levels - High cost of electricity and fuel supply for maintaining cold chain system - High cost of cold chain equipment, spare parts and maintenance - Limited local technology for construction of incinerators
Service delivery	- Civil Service Organizations (CSO's) and Local NGO's (Coalition of NGO's in Health) providing supplementary immunization activities - Partners and International organizations interest in Immunization	- Reliance of donor support for delivery of immunization services - Dwindling flow of funds from the Central Government

SYSTEM COMPONENT	OPPORTUNITIES	THREATS
	- Involvement of communities, traditional, opinion and religious leaders	
Advocacy and communication	- Parliamentary Sub- committee on health to advocate for resources - Vibrant media for education and communication - Enough Intellectual Capacity to generate data for advocacy, communication and decision making	- Anti-immunization campaigners advocating against immunization
Surveillance	- International accredited laboratories e.g. polio lab. At Nugouchi and PHRL	- Out breaks and re-emergence of vaccine prevented diseases
Programme management	**Policy, planning and management** - EPI policy document updated - EPI field guide updated - Structures for partner coordination are in place: ICC, NCC, technical committees with strong collaboration with partners - Integrated bottom up planning within the districts - Review meetings held at all levels - Strong managerial skills at national and regional levels **Supervision** - Integrated supervision plan and checklist at all levels - Feedback provided to all levels on a regular basis - Technical assistance provided by partners for specific areas.	- EPI policy, standards, guidelines are not available at all levels - Updated EPI field guide not printed - Adhoc activities disrupt planned activities at all levels - Poor coordination of partners at district level. - Districts not implementing all planned activities - Irregular technical support supervision from all levels especially to the operational level - Lack of feedback from supervision and monitoring
Strengthening human and institutional resources	- International Workshops, meetings and conferences available through partners for building human resource capacity of staff	- Weak staff knowledge and skills in logistics - Planned training in MLM not often implemented

SYSTEM COMPONENT	OPPORTUNITIES	THREATS
Sustainable financing	- Extension of GAVI support immunization and devices - GAVI's new Health System Strengthening Support for improved immunization coverage	- Contribution to the programme costs by GoG has been declining despite the increase in target population and coverage - Delays in release of funds from central government for statutory payments e.g. co-financing
Accelerated Disease Control	**Polio Eradication** Renewed global interest in polio eradication polio **Maternal & Neonatal Tetanus Elimination** - Tetanus diphtheria (Td) vaccine introduced to replace Tetanus Toxoid (TT) - MNT eliminated in the country **Measles Control** GAVI support to introduce measles/rubella into routine	- Renewed outbreaks of polio in the sub region - Nigeria remains polio endemic country in the region - National Td2+ coverage among pregnant women still less than 80%. - Documentation of Td coverage results still a challenge - MNT elimination sustainability strategic plan yet to be drafted - Measles outbreaks in some countries - GAVI not supporting routine MR immunization

2.2.9 Identified Problems, Potential causes and solutions

Identified Problems	Potential Causes	Solutions
Service Delivery -General decline in immunization coverage	-Inadequate operational funds to conduct outreach services -Low capacity to use data for decision making	-Strengthen the CHPS - Strengthen RED approach in the operational level
-Mal-distribution of Health Staff	-Inadequate accommodation at operational level	-Advocate for the re-distribution of staff
-Inequity in coverage among districts	-Difficult terrain, poor access in urban slums, floating population, migrant herdsmen	-Identify all the hard to reach areas and Develop micro plans and provide support
Advocacy and Communication - Inadequate interpersonal communication (IPC) skills among health workers	-Lack of skilled health promotion officers at the district level	-Advocate for district health promotion officers
- Lack of IEC materials for routine immunization	-EPI Communication plan not available	-Finalize, print and operationalize EPI communication plan
- Most districts do not have communication included in their district work plans	-Weak expertise in planning for EPI	-Conduct MLM training
Surveillance - Diphtheria not on MOH priority diseases list for surveillance	-It was an oversight probably due to the fact that the disease is not common in Ghana	-Review of IDSR to include Diphtheria as part of the priority diseases list for VPD surveillance
- Weak community based surveillance system - Volunteer fatigue	-Inadequate knowledge of health workers and volunteers on community based surveillance -Lack of logistics to conduct active surveillance	-Train Health workers and volunteers in community based surveillance and provide logistics for active surveillance

Identified Problems	Potential Causes	Solutions
- Inadequate specimen containers for sample collection - Weak AFP surveillance	-Low morale of CBSv to conduct active case search -Poor planning and collaboration with WHO -Weak clinician and community sensitization	-Motivate volunteers to conduct active surveillance -Advocate for effective planning and collaboration between Surveillance and WHO -conduct frequent clinician and communities sensitization
Logistics - Regular breakdown of EPI equipment at all levels - Inadequate supply of spare parts especially for solar powered refrigerators. - Weak technical capacity in the regions for cold chain maintenance teams - Not all districts have functional incinerators.	-Erratic Power supply -Ineffective planning -Lack of dedicated technicians for cold chain maintenance in the regions -Inadequate skills and competence of regional teams to maintain cold chain equipment -There are newly created districts with no incinerators -There are old and dilapidated incinerators that are out of use	-Install stabilizers for cold chain equipment -Put in place planned preventive maintenance system -identify and train regional cold chain technicians -Train regional teams on cold chain maintenance -Provide incinerators for newly created districts -Replace old incinerators
Vaccine supply and quality - Constrained transport situation especially at district and service delivery levels. - Inadequate storage capacity for vaccines in some districts especially the new ones - Vaccine potency testing for different levels not being carried out.	-Inadequate transport -Inadequate cold chain inventory to identify districts with cold chain storage challenges -The Programme does not have the capacity to conduct vaccine potency testing	-Provide means of transport -Train regions and districts to conduct effective cold chain inventory -To upload cold chain inventory onto the DHIMS for real time information -Collaborate with FDA and Nouguchi Memorial Institute

Identified Problems	Potential Causes	Solutions
- Poor documentation on vaccine usage at the district and sub-district levels	-Inadequate knowledge	for Research to conduct vaccine potency testing -Train district and sub district level staff on vaccine management
Accelerated Disease Control - 26% (56/216) of districts have OPV3 coverage less than 80% - National Td2+ coverage among pregnant women still less than 80%. - MNT elimination sustainability strategic plan yet to be drafted - Measles/rubella elimination strategic plans yet to be drafted	-Poor documentation, micro planning and data management -There are difficult to reach areas - Poor documentation of Td vaccination -lack of funds	-Train staff on effective planning documentation and data management -Improve access to hard to reach areas -Training -Follow up on proposals for support from WHO
Programme Management - EPI policy, standards, guidelines are not available at all levels - Adhoc activities disrupt planned activities at all levels - Irregular technical support supervision from all levels especially to the operational level - Lack of feedback from supervision and monitoring - Weak staff knowledge and skills in logistics - Planned training in MLM not often implemented - Delays and inadequate disbursement of funds to districts.	-Not enough copies of the documents were printed -Uncoordinated activities -Inadequate resources -Irregular update on EPI and refresher training of staff -Lack of funds -Inadequate funding from Government and partners	-Update, Print and distribute copies of these documents to all levels -Coordinate and integrate activities -Provide resources for supportive supervisory visits and give feedback -Provide regular update on EPI and refresher training for all staff -Provision has been made in the HSS for funds on MLM training -Advocate for prompt release of adequate funds

CHAPTER THREE: GOALS, OBJECTIVES, STRATEGIES AND KEY ACTIVITIES

4.1 Goals

The general goal of Ghana's EPI is to reduce child morbidity, mortality, disability associated with vaccine preventable diseases through the provision of high quality immunization services. Specifically, the program aims to

- Maintain a polio free status
- Achieve measles/Rubella elimination
- Sustain MNT elimination
- Achieve 95% coverage for all antigens by 2019
- Accelerate control of other VPDs through the introduction of new vaccines and technologies

4.2 Objectives

4.2.1 Objectives in relation to programme objectives, national, regional and global goals

Objective 1: Reach everyone targeted for immunization to achieve and sustain 95% coverage in all childhood immunizations and 85% for Tetanus-diphtheria (Td) for pregnant women by 2019

Objective 2: Improve communication, advocacy and information dissemination

Objective 3: Strengthen surveillance system

Objective 4: Improve programme management and integration with health systems

Objective 5: Ensure that the immunization Programme has sustainable access to predictable funding, quality supply and innovative technologies

4.3 Target Population

	2015	2016	2017	2018	2019
Estimated total population	27,955,567	28,654,456	29,370,818	30,105,088	30,857,715
Total Population	27,955,567	28,654,456	29,370,818	30,105,088	30,857,715
Total annual birth cohort:	1,118,223	1,146,178	1,174,833	1,204,204	1,234,309
Total annual surviving infants	1,062,312	1,088,869	1,116,091	1,143,993	1,172,593
Total annual pregnant women	1,118,223	1,146,178	1,174,833	1,204,204	1,234,309

4.4 Strategies

1. Reach every child by strengthening the RED/REC strategy

Planning for better management of human and financial resources, improving access to services, building community partnership and ownership, supportive supervision and monitoring for action using tools and providing feedback for continuous self-assessment and improvement.

2. Strengthen safe injection practices and waste disposal

Ghana's injection policy states that every injection must be given using a single sterile syringe and needle combination, which is then safely disposed of after use. This policy will be adhered to by providing safe injection equipment and waste disposal facilities. There will be continuous strengthening and monitoring of adverse events following immunization.

3. Ensure sustainable financing through continuous advocacy and mobilization

There has been a progressive increase in Government allocation to the health sector since 2011. Government, by tradition has been supporting the purchase of vaccines through the National health insurance scheme albeit inadequate. Advocacy will continue for effective resource mobilization to ensure the financial sustainability: we will continue to work with health partners and other stakeholders while ensuring efficient use of vaccines. GAVI Alliance will continue to support the country with vaccines.

4. Ensure Effective Cold Chain and Vaccine Management

Adequate cold chain and effective management are important in ensuring potency of vaccines throughout the supply chain. We will continue to ensure preventive maintenance. Vaccine storage will also continue to be decentralized. Regions have been supported with adequate walk-in cold rooms. However, we will continue to expand the capacity at the national and district cold rooms. Usage of continuous temperature monitoring devices will be promoted in all cold rooms. Capacity of staff on cold chain management will be updated regularly.

5. Strengthen Advocacy, Communication and IEC

Strengthen EPI communication and advocacy at all levels to engender vaccine demand. The EPI communication strategic document will be finalised and used as a working tool to improve communication at all levels. Stakeholders (Parliamentarians, media, traditional leaders, community and civil society organizations) will be actively engaged to promote demand and sustain the uptake of immunization services.

6. Sustain the benefits of integrated interventions through SIAs

Immunization campaigns will be carried out as required. Child Health Promotion Week (CHPW) as usual will be celebrated in the 2nd week of May every year. The Programme will continue to use this platform to advocate and sensitize communities to demand child survival services like immunization, Vitamin A supplementation, deworming and insecticide-treated nets (ITNs) as the

minimum package of services. The last week of April which has been institutionalized as African Vaccination Week will be celebrated every year to create and sustain demand for immunization services. Yellow Fever Preventive Campaign will be conducted in districts which were not covered during the 2011 and 2012 Yellow Fever Preventive Campaign.

7. Ensure effective and sustainable introduction of new vaccines and technologies

a. Ghana will introduce inactivated polio vaccine (IPV) by 2015 into its routine immunization services. The World Health Assembly in May 2012 declared that the completion of poliovirus eradication is a programmatic emergency for global public health. The Global Polio Eradication Initiative (GPEI) developed the Polio Eradication and Endgame Strategic Plan 2013-2018 . The plan outlines a comprehensive approach for completing eradication including the elimination of all polio disease by 2018.

   As one of its four major objectives, the plan calls on countries to introduce at least 1 dose of Inactivated Polio Vaccine (IPV) into routine immunization schedules, strengthen routine immunization and withdraw Oral Polio Vaccine (OPV) in a phased manner, starting with type 2-containing OPV to hasten the interruption of all poliovirus transmission. The endgame plan calls for the introduction of IPV in all OPV-only using countries by the end of 2015. More specifically, IPV needs to be introduced for the following reasons:

   To reduce risks; Once OPV type 2 is withdrawn globally, IPV will help fill the immunity gap by priming population against type 2 polio virus should it be reintroduced. A population immunized with IPV would have a lower risk of re-emergence or reintroduction of wild or vaccine-derived type 2 polio virus.

   To interrupt transmission in the case of outbreaks; Should monovalent OPV type 2 (mOPV type 2) be needed to control an outbreak, those primed with IPV would be expected to have a better immune response, thus facilitating outbreak control and interruption of polio transmission.

   To hasten eradication; IPV will boost immunity against poliovirus types 1 and 3 in children who have previously received OPV, which could further hasten the eradication of these two wild viruses

   Ghana remained polio free since 2008 however there are still wild polio viruses circulating in the West Africa sub-region. Ghana intends to introduce one dose of IPV into the routine immunization by 2015 and replace trivalent oral polio vaccine (tOPV) with bivalent oral polio vaccine (bOPV) in 2016 in response to this objective. When introduced IPV will play a major role in;

   i. Risk reduction due to planned OPV type 2 withdrawal,
   ii. Interruption of transmission if type 2 outbreaks occur, and
   iii. Boosting immunity against all types of poliovirus

b. Yellow Fever Preventive Campaign: In 2010, the country conducted YF Risk Assessment using a WHO mathematical modelling tool. A total of 122 districts out of the then 170

districts were considered to be at high risk. Preventive campaigns were conducted in 43 districts in 2011 and 15 districts in 2012. A reactive campaign was conducted in one district in 2012. In all, a total 59 districts have conducted YF Preventive Campaign out of the 122 high risk districts. Sixty-three (63) districts remained uncovered due to funding. With the creation of new districts in 2012, these uncovered districts have increased to 65. A total of 8,067,753 persons living in these districts are at risk. A total of 5,405,394 (67%) of this population will be targeted for the vaccination campaign. A Yellow Fever Preventive Campaign will be conducted in July 2018 in these high risk districts.

c. **As part of the Eliminate Yellow Fever Epidemics (EYE) Strategy, the country plans to vaccinate all districts in the country against the disease. When the last batch of the at risk districts are covered, there will remain 74 districts which were not considered at high risk. As a result of the EYE strategy, pans have been put in place to vaccinate all these district in the First Quarter of 2019. A total of 5,771,054 persons are targeted for the EYE campaign.**

   It is expected that the campaign will prevent the incidence of yellow fever in these districts in particular and the entire country as a whole.

d. Meningitis Preventive Campaign: the northern sector of Ghana as well as some areas of the middle part of the country lie within the meningitis belt of Africa. A total of eighty-one (81) districts in five (5) regions lie within the belt. These areas have experienced repeated episodes of meningitis outbreaks. There is a lot of population movement from these areas (which fall within the meningitis belt) to other areas in the middle and southern zones of the country. Traders move from the southern and middle zones to the northern part of Ghana on daily basis for economic activities. Nomads from the northern sector also commute regularly to the middle and southern zones with their herds. Fisher folks also travel along river banks across the country. It is important that a catch-up campaign is conducted in the northern zone and a preventive campaign in the middle and southern zones.

   The catch-up campaign will target children aged 1 – 3 years who were not vaccinated during the 2012 campaign. This group will also not be eligible for the proposed routine introduction of the vaccine. The preventive campaign will target persons aged 1 – 29 years. The meningitis campaign will be conducted from 19 - 28 November 2015.

e. Meningococcal A conjugate vaccine introduction in routine immunization: in order to further protect the population against meningococcal disease, the country will take steps to introduce the vaccine into routine immunization. This will be done after the mini catch and preventive campaigns have been conducted. The vaccine will be introduced nationwide. It will be given at 18 months together with the second dose of measles. The introduction is scheduled for January 2016.

Other potential vaccines that may be introduced are malaria vaccines, Human Papilloma virus Vaccine (HPV) and hepatitis B vaccine for new borns.

8. Strengthen AEFI and VPDs surveillance

Surveillance for Vaccine Preventable Diseases (VPDs) will be strengthened especially at the community level using all available structures and possible innovations. Institutionalized AEFI surveillance will also be strengthened.

9. Effective Monitoring, evaluation and supervision for quality service

Periodic reviews will be organized to assess performance and provide feedback to all levels. Facilitative supervision will be done regularly to strengthen capacity. The District Health Information Management System (DHIMS II), a web based electronic application for reporting will enhance effective data transmission. The usage of the tool will be enhanced through training and orientation of staff.

10. Strengthen the capacity to conduct operational research relevant to immunization

Evidence-based decisions will be used to improve programme performance. The Programme will collaborate with the Health Research and Development Division of the Ghana Health Service and other relevant institutions such as Kintampo College of Health to undertake various researches. The capacity of staff will be strengthened through this collaboration.

4.5 **Key Activities and Timeline (By System Components)**

Immunization system component	Objectives	Strategies	Activities	Timeline				
				2015	2016	2017	2018	2019
Immunization services	1. To increase immunisation coverage to 95% or above in all childhood immunizations by 2019 (2013 baseline: 90% for Penta-3)	Strengthening routine immunization activities through RED/REC strategy in all districts	Organize workshops on microplanning with districts/ Develop RED/REC Plans at various levels	X	X	X	X	X
			Implement all the five components of RED/REC in all districts	X	X	X	X	X
			Identify hard to reach/difficult to reach populations and make special plans to reach them	X	X	X	X	X
			Provide and distribute relevant documents/charts for RED implementation	X	X	X	X	X
			Conduct quarterly performance review at all levels (National, Regional, Districts, sub districts)	X	X	X	X	X
			Mobilize resources for routine immunization activities	X	X	X	X	X
			Carry out Periodic intensification of Routine immunization (mop-up) immunization in poorly performing sub districts twice in a year in every district using vaccination weeks	X	X	X	X	X

Immunization system component	Objectives	Strategies	Activities	Timeline				
				2015	2016	2017	2018	2019
			Conduct quarterly supportive supervision and feedback	X	X	X	X	X
	2. To achieve at least 90% of districts with a Penta1-MCV1 drop-out rate of less than 10%	Drop out monitoring and introduce strategies for tracing defaulters to reduce missed opportunities	Conduct e-registration and defaulter tracing of target children	X	X	X	X	X
			Establish daily immunisation at static clinics and screen for immunisation status in all out patient departments	X	X	X	X	X
	3. To achieve 85% coverage at national level and at least 80% of districts with 80% Td 2+ for pregnant women	Implementation of MNTE Sustainability plan	Strengthen integration of ANC with Td immunization	X	X	X	X	X
			Implement Protected monitoring at birth in all health facilities and outreach points	X	X	X	X	X
			Establish nationwide school based Td immunization in collaboration with GES and Family Health Division	X	X	X	X	X
			Conduct annual MNT risk assessment and implement response campaign	X	X	X	X	X
Logistics and Supply	1. To achieve 100% availability of vaccines and devices	Annual logistics forecast and inventory	Build capacity for logistic forecasting at all levels	X	X	X	X	X
			Supervise forecasting and inventory at lower levels	X	X	X	X	X

Immunization system component	Objectives	Strategies	Activities	Timeline				
				2015	2016	2017	2018	2019
	2. To establish an effective and efficient logistics management information system at all levels	Integrate logistics management information system (LMIS) integrated into DHIMS	Adapt and implement and implement the LMIS at all levels	X	X	X	X	X
			Conduct a comprehensive inventory for all EPI equipment at all levels	X			X	
			Quarterly update of the cold chain inventory in DHIMS	X	X	X	X	X
	3. To prevent interruption of immunisation activities as a result of cold chain breakdown	Establish a planned preventive maintenance in every region	Train regional cold chain technicians in preventive cold chain maintenance and provide periodic refresher	X		X		X
			Support regional and district teams to carry out routine and timely maintenance and repair of equipment	X	X	X	X	X
			Provide cold chain spare parts and workshop consumables for timely maintenance of equipment	X	X	X	X	X
	4. To increase cold storage capacity to 100% at all levels	Develop and implement a cold chain expansion plan	Procure and install additional cold room at the national level	X				
			Procure and distribute cold chain equipment to new and needy districts	X	X	X	X	X

Immunization system component	Objectives	Strategies	Activities	Timeline				
				2015	2016	2017	2018	2019
			Conduct regular cold chain needs/replacement assessment at all levels	X	X	X	X	X
	5. To strengthen the transport management system for immunization activities	To increase the transport fleet for EPI operations at all levels	Procure and maintain field 4 wd vehicles, trucks, motorcycles, bicycles and boats in line with expanding administrative levels and transport replacement plan	X	X	X	X	X
	6. To achieve regular supply of vaccines and logistics at all levels	Maintain a quarterly distribution plan	Implement quarterly and monthly vaccine and supplies distribution system from central level to districts and within districts	X	X	X	X	X
	7. To attain 100% safe injection practices at immunisation sites	Establish injection and waste management practices at district and facility levels	Provide adequate safe injection related materials (AD syringes, safety boxes etc) on a regular basis	X	X	X	X	X
			Provide personal protective equipment for management of waste	X	X	X	X	X
			Construct on incinerator in every hospital and major health centres	X	X	X	X	X
			Rehabilitate all the old incinerators	X	X	X	X	X

Immunization system component	Objectives	Strategies	Activities	Timeline				
				2015	2016	2017	2018	2019
			Train all vaccinators in injection safety and waste management practices	X	X	X	X	X
Vaccine supply and quality	1. To strengthen the existing national capacity for vaccine regulation and quality control	Collaborate with National Regulatory Authority eg FDA to develop standard guidelines to ensure vaccine quality	To support FDA to conduct regular vaccine potency testing at the lower levels	X	X	X	X	X
	2. To prevent stock out of vaccines and supplies	Build capacity for vaccine management at all levels	Train health workers on vaccine forecast, stock management and vaccine wastage monitoring	X	X	X	X	X
			Provide revised tools for vaccine forecasting	X	X	X	X	X
			Conduct vaccine forecast and obtain cost estimates	X	X	X	X	X
			Procure adequate quantities of vaccines	X	X	X	X	X
			Quarterly delivery of EPI vaccines	X	X	X	X	X
			Monitor vaccine wastage at all levels	X	X	X	X	X
			Conduct effective vaccine management assessment				X	

Immunization system component	Objectives	Strategies	Activities	Timeline				
				2015	2016	2017	2018	2019
Advocacy and communication	1. To increase demand for immunisation	Awareness creation on immunisation services to decision makers and community	Conduct KAP study on immunisation services utilization	X	X	X	X	X
			Develop immunisation communication materials	X	X			
			Print and distribute immunisation communication materials	X	X	X	X	X
			Develop, print and distribute fact sheets on key immunisation messages to decision makers and community leaders	X	X	X	X	X
			Organize annual African Vaccination Week and Child Health Promotion Week celebrations	X	X	X	X	X
			Partner Ministry of Education in implementing child health education activates	X	X	X	X	X
			Develop and implement a behavioral change communication plan	X	X	X	X	X
			Focused mobilization of urban and hard to reach populations	X	X	X	X	X

Immunization system component	Objectives	Strategies	Activities	Timeline				
				2015	2016	2017	2018	2019
		Capacity building for communication for EPI	Training of health workers in immunization communication skills	X	X	X	X	X
			Organize durbars in communities	X	X	X	X	X
		Build advocacy and partnership with political leaders, media, religious leaders, opinion leaders and civil society	Sensitization of religious, cultural and civil societies in EPI	X	X	X	X	X
			Organize meetings with NGOs and associations, including community health workers to discuss their participation in immunisation	X	X	X	X	X
			Support CSOs and community groups to strengthen communication for immunisation	X	X	X	X	X
			Lobby parliamentarians and local political leader etc. to support immunization activities	X	X	X	X	X
			Conduct advocacy meetings with partners-UNICEF, Polio Plus, Parliamentarians, religious and traditional leaders	X	X	X	X	X

Immunization system component	Objectives	Strategies	Activities	Timeline				
				2015	2016	2017	2018	2019
			Orientation for broadcasters and reporters and media managers	X	X	X	X	X
			Sensitisation of Village health committees to include EPI in routine health meetings	X	X	X	X	X
			Conduct community dialogues and exit interviews to identify barriers to immunizations	X	X	X	X	X
			Quarterly EPI ICC meeting at National	X	X	X	X	X
		Enhance school involvement in EPI activities	Develop guidelines on EPI for competition and drama in schools	X	X	X	X	X
Surveillance	1. To achieve at least 80% of all the standard indicators for all VPDs	Strengthen the VPD surveillance system within the Integrated disease surveillance and response	Review and disseminate AFP, measles, MNT and other VPD guidelines and case investigation forms	X	X	X	X	X
			Implement measles rubella elimination surveillance mode	X	X	X	X	X
			Support active case search, case investigation and community sensitization of AFP, measles, YF, and MNT	X	X	X	X	X
			Conduct quarterly surveillance review meetings	X	X	X	X	X

Immunization system component	Objectives	Strategies	Activities	Timeline				
				2015	2016	2017	2018	2019
			Support the collection and transportation of specimen to the laboratory	X	X	X	X	X
		Capacity building for surveillance of EPI target diseases within the IDSR framework	Training and sensitization of pre-service training tutors lecturers and in-service health workers in disease surveillance and response	X	X	X	X	X
			Support districts to prepare emergency preparedness and response plans	X	X	X	X	X
			Train district and regional teams in outbreak investigation and response	X	X	X	X	X
		Strengthen Community Based Surveillance System	Collaborate with Surveillance department to identify and train old and new cadre of surveillance officers at all levels	X	X	X	X	X
			Collaborate with other stakeholders in training and equipping the CBSV to work efficiently	X	X	X	X	X
		Use of data for decision making	Train health workers in analysis and use of data for action	X	X	X	X	X

Immunization system component	Objectives	Strategies	Activities	Timeline				
				2015	2016	2017	2018	2019
			Conduct data quality self-assessment (DQSA)	X	X	X	X	X
			Conduct coverage surveys	X	X	X	X	X
			Organize quarterly performance review meetings	X	X	X	X	X
	2. To strengthen capacity for certification	Strengthen the technical committees	Support quarterly NCC, NPEC and NTF	X	X	X	X	X
			Document polio certification activities	X	X	X	X	X
			Document the gains and challenges from polio eradication initiative	X				
	3. To establish systems for providing epidemiological data for monitoring and evaluating the impact of new vaccines (hepatitis B, paediatric bacterial meningitis, rotavirus diarrhoea and congenital rubella syndrome	Sentinel surveillance for diseases targeted for new vaccines	Provide reagents and relevant supplies to the sentinel site laboratory to collect, transport and examine specimen	X	X	X	X	X
			Regular orientation of laboratory staff in VPD surveillance	X	X	X	X	X
			Conduct laboratory search for potentially WPV contained materials	X	X	X	X	X
			Conduct sero-prevalence survey for targeted diseases	X	X	X	X	X
			Establish sentinel sites for congenital rubella syndrome	X				

Immunization system component	Objectives	Strategies	Activities	Timeline				
				2015	2016	2017	2018	2019
	4. To strengthen immunisation safety	AEFI Monitoring and management	Train regional and district staff on AEFI monitoring and management	X		X		X
			Conduct regular monitoring and reporting for AEFI	X	X	X	X	X
			Strengthen facilities to manage AEFIs	X	X	X	X	X
			print and distribute AEFI monitoring and management guidelines to all levels	X				
Accelerated disease control	To reduce burden of disease due to VPDs	Increase herd immunity through polio NID	Develop and implement national plan in case of outbreak	X	X	X	X	X
			Implement nationwide under 5 campaigns for polio integrated with other child survival interventions	X	X	X	X	X
		Measles Rubella under five supplemental activities	Plan and implement nationwide SIAs every four years			X		
		Yellow Fever supplemental activities in high risk areas	Conduct risk assessment	X				
			Plan implement SIA in high risk districts	X	X			

Immunization system component	Objectives	Strategies	Activities	Timeline				
				2015	2016	2017	2018	2019
		Meningitis Preventive Campaign	Plan and conduct catch-up campaign in the three northern region	X				
		Meningitis Preventive Campaign	Plan and conduct preventive campaign in the middle and southern sector of Ghana	X				
Introduction of new vaccines and technologies	1. To provide evidence-based information to support introduction of new vaccines	Conduct operational research including burden of disease assessments	Conduct disease burden assessment before introduction of new vaccines	X	X			
			Conduct KAPB studies in new vaccines and acceptance of multiple injections	X	X			
	2. To document the impact of new vaccines	Initiate surveillance and reporting systems for the diseases targeted with the new vaccines	Establish a surveillance system for targeted disease	X	X	X	X	X
	3. To reduce the threat of vaccine derived polio paralysis due to type two	Introduce IPV into routine	Introduction of the new vaccine - IPV	X				
			Application for bOPV	X				
		Replace tOPV with bOPV (1 and 3)	Introduction of bOPV into routine		X	X	X	X
	4. To protect newborns from hepatitis B infection	Introduce Heb B dose at birth	Apply to GAVI to introduce Hep B		X			
			Introduce Hep B vaccine into routine			X	X	X

Immunization system component	Objectives	Strategies	Activities	Timeline				
				2015	2016	2017	2018	2019
	5. To protect the population against serogroup A meningitis	Introduce Men A into routine immunization	Plan and introduce MenAfriVac into routine immunization		X			
Sustainable Financing	1. To achieve 100% availability of vaccines and operational activities	Increase government budgetary allocation for immunization	Use evidence-based advocacy for resource mobilization from government	X	X	X	X	X
			Submit annual request to Ministry of Health and Ministry of Finance to secure co-financing for new vaccines	X	X	X	X	X
		Extension of GAVI support for new vaccines	Request for extension from GAVI for new vaccines	X	X	X	X	X
		Mobilize support from the private sector and bilateral agencies	Negotiate for support from the private sector and other bilateral agencies	X	X	X	X	X
Programme Management (Policy, planning and management)	1. To maintain standard operations of EPI at all levels	EPI Policy dissemination to all levels	To update the existing policy and guidelines	X	X			
			To print and disseminate EPI policy and guidelines to all service delivery points			X	X	X
	2. To strengthen program coordination at national level	Strengthening of ICC and NITAG	Hold ICC meeting quarterly	X	X	X	X	X
			Hold ICC technical committee meeting every month	X	X	X	X	X
			Establish NITAG	X				

Immunization system component	Objectives	Strategies	Activities	Timeline				
				2015	2016	2017	2018	2019
			Hold quarterly NITAG meetings	X	X	X	X	X
		Strengthen departmental meetings	Hold monthly data validation and reconciliation meeting	X	X	X	X	X
			Organize weekly departmental meeting	X	X	X	X	X
	3. To improve quality service	Supervision monitoring and evaluation	Develop supervisory check list	X	X	X	X	X
			Quarterly supervisory visits and feedback	X	X	X	X	X
			Reconcile the DHIMS and DVDMT	X	X			
			Quarterly performance review and bulletin	X	X	X	X	X
			Conduct comprehensive EPI Review			X		
			Annual update cYMP	X	X	X	X	X
	4. To generate information for decision making	Operations research	Build capacity for operations research	X	X	X	X	X
			Develop implementation research protocols	X	X	X	X	X
			Train health workers in the use of GIS, EPI Info and STATA in data management	X	X	X	X	X
			Build capacity for bottleneck analysis to identify barriers	X	X	X	X	X

Immunization system component	Objectives	Strategies	Activities	Timeline				
				2015	2016	2017	2018	2019
			Hold annual dissemination of research findings	X	X	X	X	X
Programme Management (Strengthening human resource and institutional capacity)	1. To build capacity for pre and in-service health workers at national and district levels	Equip pre- and in-service health workers and mid-level managers with knowledge, skills and competencies in EPI service delivery	Review and update the EPI training manuals and reference materials	X	X	X	X	X
			Work with the Ministry of Education to update the pre-service health-training curriculum	X	X	X	X	X
			Revise pre-service institution curriculum to include updates on EPI	X	X	X	X	X
			Training health tutors in EPI					
			Develop on the job training plan and implement at all levels	X	X	X	X	X
			Build demonstration centres in selected institutions	X	X			
			Print copies of EPI MLM training modules	X	X			
			Conduct EPI MLM training	X	X	X		
	To strengthen partnership and integration for EPI	Involvement in stakeholders meetings and activities	Support annual meeting of DDPH, DDHS, PHN, CHN, GHAPTO, Pediatric Society	X	X	X	X	X
	To enhance the capacity central		Review existing EPI organogram	X	X	X	X	X

Immunization system component	Objectives	Strategies	Activities	Timeline				
				2015	2016	2017	2018	2019
	office to implement its core functions	To update the organizational structure	Request for additional staff as per the new organogram	X	X	X	X	X
			Orientation of new staff in key areas of immunization	X	X	X	X	X
			Implement performance based management system	X	X	X	X	X
			Support short, long term training and distance learning courses relevant to EPI	X	X	X	X	X
	To improve the working environment for staff performance	Rehabilitate and furnish the national office	Rehabilitate EPI Office	X	X			
			Furnish and maintain office with furniture, equipment and communication facilities	X	X	X	X	X

Table 9: National objectives and milestones, and priorities

Immunization System Component	Current performance	Objectives	Milestones	Order of Priority
Immunization System: Immunization Services				
Immunization coverage	Coverage decreased from 94% in 2011 to 90% in 2013	To increase immunisation coverage to 95% or above in all childhood immunizations by 2019	2016: 94% national coverage for Penta-3	1
	Coverage decreased from 76% in 2011 to 71% in 2013	To achieve 85% coverage at national level and at least 80% of districts with 80% Td2+ for pregnant women	2016: 80% national coverage for Td2+	1
Immunization demand	Proportion of districts with Penta1-Penta3 drop-out rate has increased from 17% in 2011 to 19% in 2013	To reduce the proportion of districts with Penta1-Penta3 drop-out rate to <10% by 2019	2016: 90% of districts achieve Penta1-Penta3 drop-out rate of >10%	1
	Proportion of districts with Penta1-Measles1 drop-out rate has increased from 12% in 2011 to 27% in 2013	To reduce the proportion of districts with Penta1-Measles1 drop-out rate to <10% by 2019	2016: 90% of districts achieve Penta1-Measles1 drop-out rate of >10%	1
Immunization equity	The percentage gap between highest and lowest socioeconomic quintiles remains at 2.5%	To maintain the percentage gap in Penta3 between highest and lowest socio-economic quintiles at less than 5% by 2019	2016: To maintain the percentage gap in Penta3 between highest and lowest socio-economic quintiles at less than 5% by 2016	2
New vaccines introduction	Monitoring and documentation of vaccine derived poliovirus in the sub-region	To introduced IPV into routine immunization by 2015	2016: National coverage of IPV vaccination of >85% by 2016	1

Immunization System Component	Current performance	Objectives	Milestones	Order of Priority
	Documentation of increasing incidence of hepatitis B as documented in routine health information reports	To introduced hepatitis B into routine immunization by 2015	2016: National coverage of hepatitis B vaccine of >90% by 2016	2
Immunization System: Logistics and Supply				
Cold chain functionality	Proportion of functioning refrigerators increased from 69.4% in 2013 to 78.1% in 2014 (June)	To prevent interruption of immunisation activities as a result of cold chain breakdown	2016: Proportion of functioning refrigerators of 90% by 2016	1
Vaccine Availability	Proportion of districts with stock out of PENTA maintained at 0% since 2011	To achieve zero stock out of all vaccines at regional and district levels	2016: Proportion of districts with stock out of PENTA vaccine at 0% by 2016	1
Immunization System: Advocacy and Communication				
Caregiver awareness	Proportion of caregivers interviewed who are aware of immunization increased from 96% in 2008 to 98% in 2012	To achieve 100% awareness of immunization among caregivers in all communities	2016: 100% of caregivers aware of immunization by 2016	1
Caregiver awareness	Proportion of districts having IEC materials on immunization reduced from 32% in 2008 to 19% in 2012	To increase demand for immunisation	2016: >80% of districts having IEC materials by 2016	2
Availability of IEC materials	Proportion of districts reporting on IEC activities on immunization reduced from 76% in 2008 to 51% in 2012	To increase demand for immunisation	2016: >90% of districts having IEC materials by 2017	2
Immunization System: Surveillance				

Immunization System Component	Current performance	Objectives	Milestones	Order of Priority
Immunization safety	Proportion of districts reporting AEFI monthly less than 1% in routine immunization	To strengthen immunisation safety	2016: >50% of districts reporting on AEFI every month including zero reporting in routine immunization	1
Polio surveillance	Non-polio AFP rate increased from 2.3 per 100 000 chn less than 15 years in 2011 to 2.7% in 2013	To achieve at least 80% of all the standard indicators for all VPDs	2016: Maintain non-polio AFP rate of 2.0 per 100 000 chn less than 15 years	1

CHAPTER FOUR: COSTING, FINANCING AND FINANCIAL SUSTAINABILITY

5.1 Costing

Total cost of immunization services including shared cost for immunization staff for the period 2015 to 2019 is about $317.8m. About 59.5% of this amount is for vaccines and logistics supplies for routine immunization. Supplemental immunization activities take about 24.2% whilst service delivery support and shared health system cost is 2.9% and 3.0% respectively.

Table 10: Table 4.2: Total Cost of Immunization Services, 2015-2019

cMYP Component	Future Cost Projections			Total		
	US$	US$	US$	US$	US$	US$
	2015	2016	2017	2018	2019	2015 - 2019
Vaccine Supply and Logistics	31,445,676	38,815,656	38,785,771	40,009,895	40,120,693	189,177,691
Service Delivery	1,659,204	1,742,040	1,832,893	1,919,887	2,015,763	9,169,788
Advocacy and Communication	1,624,187	1,163,620	1,528,547	1,929,076	377,136	6,622,566
Monitoring & Disease Surveillance	3,363,323	2,333,094	2,408,506	2,593,005	2,401,973	13,099,901
Programme Management	2,727,024	2,478,047	3,119,885	2,349,305	1,993,958	12,668,219
Supplemental Immunization Activities	36,230,022	8,158,428	5,122,575	19,640,273	8,504,055	77,655,353
Shared Health Systems Costs	1,708,953	1,794,387	1,884,093	1,978,283	2,077,183	9,442,899
GRAND TOTAL	**78,758,389**	**56,485,273**	**54,682,268**	**70,419,725**	**57,490,762**	**317,836,417**

5.2 Total Immunization Cost

Total immunization cost represents about 97% of total cost of the cMYP whilst shared health systems cost takes the remaining 3.0%. Shared health systems cost was estimated for salaries of non-direct immunization staff contribution to immunization services at all levels.

Table 11: Total Immunization Cost 2015-2019

cMYP Component	Future Cost Projections					Total
	US$	US$	US$	US$	US$	US$
	2015	2016	2017	2018	2019	2015 - 2019
Vaccine Supply and Logistics	31,445,676	38,815,656	38,785,771	40,009,895	40,120,693	189,177,691
Service Delivery	1,659,204	1,742,040	1,832,893	1,919,887	2,015,763	9,169,788
Advocacy and Communication	1,624,187	1,163,620	1,528,547	1,929,076	377,136	6,622,566
Monitoring & Disease Surveillance	3,363,323	2,333,094	2,408,506	2,593,005	2,401,973	13,099,901
Programme Management	2,727,024	2,478,047	3,119,885	2,349,305	1,993,958	12,668,219
Supplemental Immunization Activities	36,230,022	8,158,428	5,122,575	19,640,273	8,504,055	77,655,353
GRAND TOTAL	**77,049,436**	**54,690,886**	**52,798,175**	**68,441,442**	**55,413,579**	**308,393,518**

5.2.1 Routine Immunization

Total routine immunization cost is about $230.5m over the five years. Vaccines and injection safety supplies represent about 78.2% of routine recurrent cost. Maintenance of cold chain equipment is about $8.7m representing 3.8% of total cost of routine immunization over the period.

Table 12: Routine Recurrent Costs 2015-2019

Cost Category	Future Cost Projections					Total
	2015	2016	2017	2018	2019	2015 - 2019
Vaccines (routine vaccines only)	29,108,601	36,161,338	36,023,957	37,197,381	37,277,314	175,768,591
Traditional	1,526,680	887,153	915,097	944,086	987,008	5,260,024
Underused	8,591,707	8,806,352	9,146,925	9,449,813	9,666,537	45,661,335
New	18,990,213	26,467,833	25,961,935	26,803,482	26,623,769	124,847,232
Injection supplies	801,787	883,711	912,369	940,277	958,819	4,496,963
Personnel	1,655,070	1,737,823	1,824,714	1,915,950	2,011,748	9,145,305
Salaries (full-time NIP workers)	43,690	45,874	48,168	50,576	53,105	241,413
Outreach vaccinators/mobile teams	175,900	184,695	193,930	203,626	213,807	971,958
Supervision and monitoring	1,435,480	1,507,254	1,582,617	1,661,748	1,744,835	7,931,934
Transportation	4,134	4,217	8,178	3,937	4,016	24,483
Maintenance and overhead	1,502,320	1,736,980	1,786,593	1,843,113	1,854,853	8,723,859
Short-term training	597,548	530,189	642,831	475,473	588,114	2,834,155
IEC/social mobilization	1,624,187	1,163,620	1,528,547	1,929,076	377,136	6,622,566
Disease surveillance	3,363,323	2,333,094	2,408,506	2,593,005	2,401,973	13,099,901
Programme management	1,224,810	997,855	1,570,314	921,755	408,430	5,123,164
Other routine recurrent costs	904,666	950,003	906,740	952,077	997,414	4,710,900
Subtotal	**40,786,446**	**46,498,831**	**47,612,748**	**48,772,045**	**46,879,817**	**230,549,887**

5.2.2 Supplemental Immunization

Supplemental Immunization Services (SIAs) will be conducted each year for different antigens over the five-year period. Total cost of Supplemental Immunization Services over the period is $77.7m.

Table 13: Total Supplemental Immunization Cost, 2015-2019

Type	Future Cost Projections					Total
	2015	2016	2017	2018	2019	2015 - 2019
OPV	2,410,341	-	-	-	-	2,410,341
bOPV1+3	-	5,012,249	5,122,575	5,235,641	5,351,542	20,722,006
MR	-	3,146,179	-	-	3,152,513	6,298,692
YF	10,590,816	-	-	6,078,492	-	16,669,308
Men A	23,228,866	-	-	8,326,140	-	31,555,006
Subtotal	**36,230,022**	**8,158,428**	**5,122,575**	**19,640,273**	**8,504,055**	**77,655,353**

5.2.3 Cost by Strategy

The National Immunization Programme (NIP) will focus mainly on three strategies for the delivery of immunization services. The cost of fix and outreach strategies represents about 60.5% of total cost for the five years. Mobile strategy and campaigns takes 15.1% and 24.4% respectively.

Table 14: Costs by Strategy (shared costs excluded)

	2015	2016	2017	2018	2019	Total
Fixed & Outreach Strategy	34,022,694	38,661,476	39,647,755	40,623,562	39,189,365	192,144,852
Mobile Strategy	8,505,673	9,665,369	9,911,939	10,155,890	9,797,341	48,036,213
Campaigns	36,230,022	8,158,428	5,122,575	19,640,273	8,504,055	77,655,353
TOTAL	**78,758,389**	**56,485,273**	**54,682,268**	**70,419,725**	**57,490,762**	**317,836,417**

The trend of each of the strategies will increase linearly over the years and their proportion to the total will not vary much.

Table 15: Total Immunization Cost by Strategy, 2015-2019

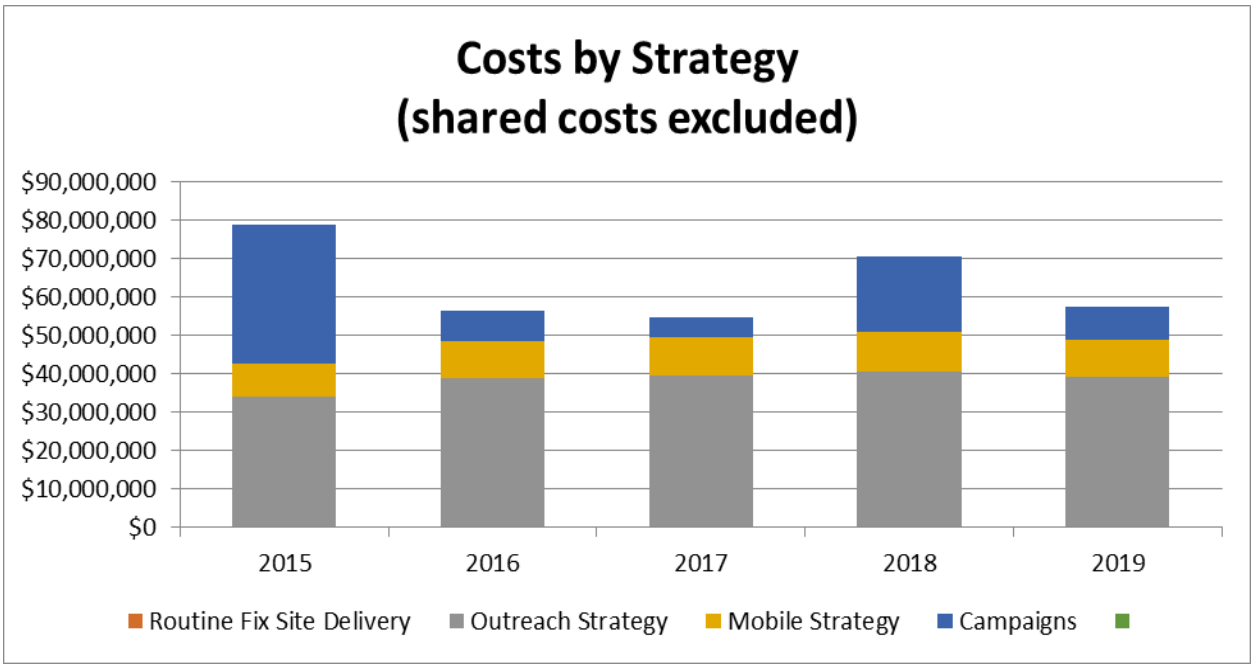
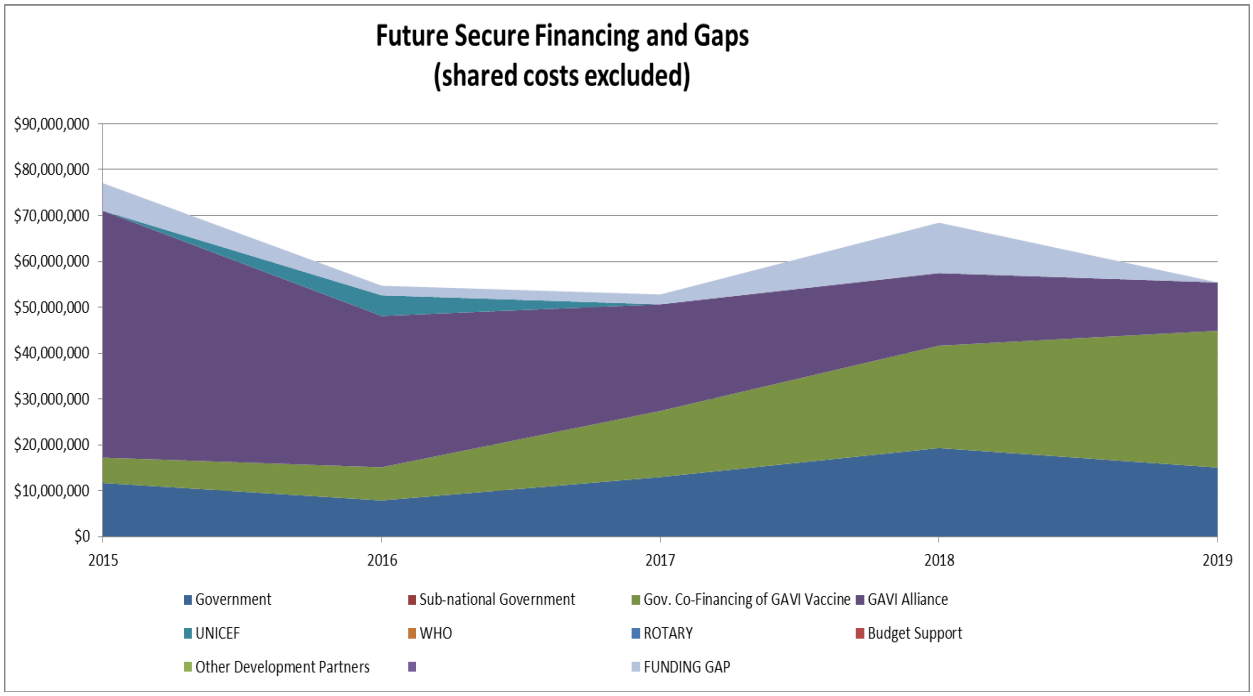


Figure 2: Future Secure and Probable Financing and Gaps (shared costs excluded)



4.2.4 Resource Requirement & financing gaps

Table 16: Funding Gap (with secured funds only)

Secure Funding	2015	2016	2017	2018	2019
	US$	US$	US$	US$	US$
Government	11,702,312	7,896,515	12,994,769	19,309,518	15,070,940
Gov. Co-Financing of GAVI Vaccine	5,516,384	7,231,579	14,408,491	22,316,144	29,799,300
GAVI Alliance	53,810,543	32,987,978	23,245,904	15,828,309	10,543,339
UNICEF	-	4,495,181	-	-	-
WHO	-	-	-	-	-
ROTARY	-	-	-	-	-
Budget Support	-	-	-	-	-
Total Secure Funding	71,029,239	52,611,253	50,649,164	57,453,971	55,413,579
Total Cost / Resource Needs	77,049,436	54,690,886	52,798,175	68,441,442	55,413,579
FUNDING GAP	6,020,197	2,079,633	2,149,012	10,987,472	-

5.3 **Financing and Financial Sustainability Strategies components**

5.3.1 GAVI Graduation and Graduation Process

The Government of Ghana has received different kinds of support from Gavi since 2001. Among these supports are: Civil Society Organization support, Cash support, Health System Strengthening support (HSS2), HPV demonstration support, Measles (NVS), and Pentavalent, Pneumococcal, Rotavirus and Yellow Fever vaccines supports. The GNI per capita of Ghana has exceeded the Gavi's criteria for eligibility. Ghana therefore entered Gavi graduation in 2015. The country will continue to receive support from Gavi until end of 2019 where the government will be expected to pay for the full cost of vaccinations.

The Government will pay 20% of all co-financed vaccines in 2016. This will rise to 40 in 2017, then 60% in 2018, 80% in 2019 and by 2020, government will make full payment (100%). This was taken into accounts in the development of the financing component of this document.

5.3.2 Sustainability plan

The government of Ghana will continue to provide for health services and still remain the major source of financing. However due to Donor specialization, it is possible that in some programmes, a multilateral or bilateral may be the major funding source. A practical example is vaccines for immunization.

The GAVI Alliance will be supporting the national immunization programme with about $134.4m of the total amount required for immunization services over the five years. This is about 44.2% of total immunization cost. The Government of Ghana will secured the first two years of the programme cost within the current medium term budget. The remaining years would be reviewed as the sector prepares its next medium term budget 2017-2019. This situation is similar with many of the bilateral and multilateral organizations working with the health sector in Ghana[1].

All public health facilities in Ghana generate revenue from the sale of services. Though the income generated is part of government revenue, hundred per cent of it is retained by the health facilities for their use to improve service delivery. Currently health facilities accredited by the National Health Insurance Authority (NHIA) are reimbursed for services rendered to their clients whilst non insurance clients purchase service from out of pocket. These funds are used to support government budgetary allocations in all the four expenditure areas. The use of IGF by facilities is guided by guidelines developed by the Ministry of Health. Under the Medium Term Expenditure Framework (MTEF) facilities are obliged to plans and budget for IGF before it can be used.

There are benevolent organizations and individuals who are working increasingly towards the use of new vaccines and technologies to improve Vaccine preventable diseases (VPDs). The Ministry of Health will continue to explore the many opportunities within the international community to mobilize resources to support all the five health system strengthen components. There will be

[1] DPs and other donor organizations are yet to pledge their commitment

strong advocacy with evidence of the successes of the NIP to the Government of Ghana through the Ministry of Finance to increase funding to the health sector. The sector will also work with the Local Government structures through the District Health Administrations for support from the Metropolitan, Municipal and District Assemblies (MMDAs). Specific efforts will be made to support MMDA in advocacy.

The government of Ghana is committed to the immunization programme and has shown its commitment to its funding over the years. The Government through the Ministry of Finance will be encouraged to improve on the reliability of timely disbursement of funds to the district levels. As a policy the Ministry of Health is increasing resources to the sub-national level which has been identified as the action point.

CHAPTER FIVE: MONITORING AND EVALUATION

6.1 **Description of M&E Plan**

The MoH has developed an M&E framework to guide the implementation of the HSMTDP (2014 -2017). Key performance indicators for monitoring EPI activities are already incorporated in the document. The activities outlined in the cMYP 2015 – 2019 for immunizations in Ghana will be monitored as part of the regular M&E process for the entire health sector. The rationale is to monitor implementation of activities outlined in the cMYP and validate data that will be generated. A set of outputs related to activities that will be used to monitor progress towards the achievement of the objectives of the cMYP. There is a set of intermediate results to measure the extent of progress on the outcomes. Also indicators for rewarding performance will be developed and implemented. The levels for performance monitoring is described as follows:

- District level – (i) Quarterly review with sub-districts (ii) supportive supervisory and monitoring visits (iii) monthly data validation and feedback.
- Regional level – (i) Monitor results primarily through the DHIMS and send feedback to the district level. (ii) Quarterly monitoring visits to all districts to provide technical guidance. (iii) Quarterly and annual performance reviews
- National level – (i) Quarterly MoH/health partners' joint monitoring, (ii) half year and annual reviews, (iii) quarterly managerial and technical visits to regions and districts, (iv) health summit to assess the performance of the sector (including performance of health partners), (v) quarterly ICC meeting to report progress made in implementing EPI annual programme of work as well as other development partner intervention support.

6.2 **Data source for M&E**

The main data sources for routine monitoring and evaluation of performance are from the DHIMS platform and the DVD-MT. Both manual and electronic systems are employed at the peripheral level. Client specific immunisation data is obtained from child health record and child welfare clinic register. At the community and sub-district levels, the eRegister database system is being piloted in two districts to capture data on immunization.

Progress on the implementation of activities and immunization data will be reported through the existing reporting systems (which is from sub districts through districts, regions to national level). In addition to the routine system, the outcome and impact indicators will be reported through surveys (MICS and DHS) and the other process monitoring systems including operational research. These include coverage surveys, EVMA, cold chain inventory, dropout surveys, KAP, safety monitoring (AEFI) etc. There is also quarterly and annual EPI reviews at all levels to identify challenges and re-strategize.

6.3 **M&E systems strengthening activities**

MoH/GHS has a technical unit responsible for coordinating M&E activities within the sector. In a bid to strengthen M&E, MoH has developed an integrated M&E framework for monitoring health interventions. The EPI M&E system which is within the existing MoH/GHS M&E framework will be strengthened through the following activities;

- Build capacity for M&E at all levels
- Develop and implement integrated M&E checklist in monitoring district
- Monitor monthly performance and provide feedback
- Strengthen data management systems at the facility level
- Conduct training on data quality
- Build capacity on DHIMS, DVD-MT and the use of information for evidence based decision making
- Train EPI managers on Geographic Information System (GIS)

6.4 Monitoring and Evaluation System

	Impact indicator	Baseline			Targets				
		Value	Year	Source	Year 1	Year 2	Year 3	Year 4	Year 5
					2014	2015	2016	2017	2018
1	Under five mortality rate (per 1000)	82	2011	MICS, 2011	<80	<80	<75	<70	<50
2	Infant Mortality Rate (IMR) per 1,000	53	2011	MICS, 2011	<50	<50	<45	<40	<30

6.5 Immunisation Outcome Indicator

cMYP Objectiv	Immunisation Outcome Indicator	Baseline			Targets				
		Value	Year	Source	Year 1	Year 2	Year 3	Year 4	Year 5
					2014	2015	2016	2017	2018
1-5	PENTA-3 coverage - % of surviving infants receiving Penta3	92%	2011	Country Administrative data	92	93	94	94	94
1-5	MCV1 coverage- % of surviving infants receiving MCV1	89%	2011	Country administrative data	89	89	89	89	90
1-5	Geographic equity of PENTA 3 coverage - % of districts that have at or above 80% PENTA 3 coverage	80%	2012	Country administrative data	80	83	86	88	90
		NA	NA	Latest coverage survey					
1-5	Socio-economic equity in immunisation coverage - PENTA 3 coverage in the lowest wealth quintile of the coverage in the highest wealth quintile	1.4%	2011	Latest coverage survey (MICS)	1.4%	1.4%	1.4%	1.4%	1.4%
1-5	Dropout rate - percentage point difference between PENTA 1 and PENTA 3 coverage	5%	2011	Country administrative data	4.5	4.5	4.3	4.2	4
1-5	Dropout rate - percentage point difference between PENTA 1 and MCV-1 coverage	5%	2011	Country administrative data	4.5	4.5	4.3	4.2	4

cMYP Objectiv	Immunisation Outcome Indicator	Baseline			Targets				
		Value	Year	Source	Year 1	Year 2	Year 3	Year 4	Year 5
					2014	2015	2016	2017	2018
1-5	Proportion of children 12-23 months fully immunized - % of children aged 12-23 months who receive all basic vaccinations in a country's routine immunisation program	77%	2011	Latest coverage survey (MICS)	78	79	80	82	83

6.6 Output / Intermediate results indicator

Linked to Objective	Output / Intermediate results indicator	Baseline			Targets				
		Value	Year	Source	Year 1	Year 2	Year 3	Year 4	Year 5
					2014	2015	2016	2017	2018
5	Proportion of functioning refrigerators at district level	66%	2012	Accenture	75%	80%	90%	95%	95%
1	Proportion of facilities undertaking at least 75% of planned outreach activities	-	-	-	75%	90%	95%	95%	95%
5	Stock out rate for PENTA vaccine at district level	0	2013	WHO/UNICEF JRF, March, 2013	0	0	0	0	0
4	Proportion of district with managers trained in MLM	-	-	-	20%	45%	60%	80%	100%
1	Proportion of low performing district (with PENTA coverage of <80%)	20%	2013	WHO/UNICEF JRF, March, 2013	15%	10%	5%	5%	5%
2	Proportions of districts reporting active CSO participation in annual DHMT micro planning meetings and reviews per annum	-	-	-	50%	70%	90%	100%	100%
4	Proportion of targeted districts sensitized on the benefits of immunization and the need for service uptake	-	-	-	30%	50%	65%	85%	100%

3	Percentage of districts reporting 100% data completeness in the DHIMS	64%	2012	GHS 2012 Annual Report	70%	75%	85%	90%	95%
3	Percentage timeliness by districts in the DHIMS	64%	2012	GHS 2012 Annual Report	70%	75%	85%	90%	95%
1	Proportion of districts with integrated annual operational plans	40%	2012	GHS Routine Administrative data	50%	60%	70%	75%	80%
1	Proportion of sub-districts with integrated annual operational plans	40%	2012	GHS Routine Administrative data	50%	60%	70%	75%	80%
3	Proportion of caregivers interviewed who are aware of immunization	95%	2012	Rapid assessment	98%	99%	100%	100%	100%

ANNEX 1: SUMMARY OF POLIO NIDS CONDUCTED IN GHANA

Year	NID or SNID round	Month conducted	House-to-house (yes/no)	No. of < 5 yr olds targeted	No. of <5yrs reached with OPV	Reported coverage (%)
1996	NID	October	No	3,584,643	3,154,486	88
1996	NID	November	No	3,584,643	3,441,257	96
1997	NID	October	No	3,612,811	3,540,555	98
1997	NID	November	No	3,612,811	3,685,067	102
1998	NID	October	No	3,804,129	3,956,294	104
1998	NID	November	No	3,804,129	3,994,335	105
1999	NID	January	No	3,835,551	4,104,040	107
1999	NID	February	No	3,835,551	4,219,106	110
2000	SNID	May	No	680,880	633,218	93
2000	SNID	July	No	680,880	735,350	108
2000	NID	October	Yes	4,250,000	4,335,000	102
2000	NID	November	Yes	4,250,000	4,547,500	107
2001	SNID	April	Yes	2,478,000	2,410,997	97
2001	SNID	May	Yes	2,478,000	2,484,610	100
2001	NID	October	Yes	4,716,831	4,662,768	99
2001	NID	November	Yes	4,716,831	4,733,220	100
2002	SNID	October	Yes	2,220,561	2,137,064	96
2002	SNID	November	Yes	2,220,561	2,143,262	97
2003	SNID	June	Yes	803,743	783,071	97
2003	SNID	July	Yes	803,743	820,634	102
2003	NID	October	Yes	4,785,451	4,913,656	103
2003	NID	December	Yes	4,785,451	4,998,538	104
2004	NID	February	Yes	5,141,538	5,196,362	101
2004	NID	March	Yes	5,141,538	5,433,676	106
2004	NID	October	Yes	5,219,210	5,418,395	106

Year	NID or SNID round	Month conducted	House-to-house (yes/no)	No. of < 5 yr olds targeted	No. of <5yrs reached with OPV	Reported coverage (%)
2004	NID	November	Yes	5,219,210	5,504,492	107
2005	NID	February	Yes	5,518,566	5,784,379	105
2005	NID	April	Yes	5,518,566	5,760,027	104
2005	NID	November	Yes	5,518,566	5,725,618	104
2005	NID	December	Yes	5,518,566	5,959,601	108
2006	NID	November	No	5,964,181	5,045,867	85
2007	NID	November	No	4,582,797	4,599,929	100
2008	NID	October	No	4,669,285	4,804,490	103
2008	SNIDs	November	Yes	944,183	922,386	98
2008	SNIDs	December	Yes	944,183	933,739	99
2009	NID	February	Yes	4,836,337	4,807,262	99
2009	NID	March	Yes	4,807,262	4,988,591	104
2009	NID	May	Yes	4,884,571	5,087,152	104
2010	NID	March	Yes	5,095,044	5,258,575	103
2010	NID	April	Yes	5,095,044	5,201,937	102
2011	NID	March	Yes	5,258,575	5,462,530	104
2011	NID	May	Yes	5,258,575	5,434,743	103
2011	SNID	August	Yes	746,089	757,993	102
2011	NID	October	Yes	5,258,575	5,391,064	103
2012	NID	March	Yes	5,392,426	5,624,005	104
2013	NID	June	Yes	5,391,064	5,596,187	104
2013	NID	October	Yes	5,394,064	5,715,720	106

ADDENDUM: NATIONAL YELLOW FEVER CONTROL/ELIMINATION PLANS

Situation Analysis

Yellow fever (YF) is an acute viral haemorrhagic disease transmitted by biting infected aedes mosquitoes. An estimated 200,000 cases of yellow fever with 30,000 deaths occur annually worldwide. YF is endemic in tropical areas of Africa and Latin America with a combined population of over 900 million people of which Ghana is part. Of all infections, 85% may be asymptomatic or present with mild disease. However, of the 15% who are severely affected, over 50% have fatal outcomes. Treatment is only symptomatic or non-specific. Yellow fever can be prevented with a single dose yellow fever vaccine which provides lifetime full protection.

YF Control Strategies

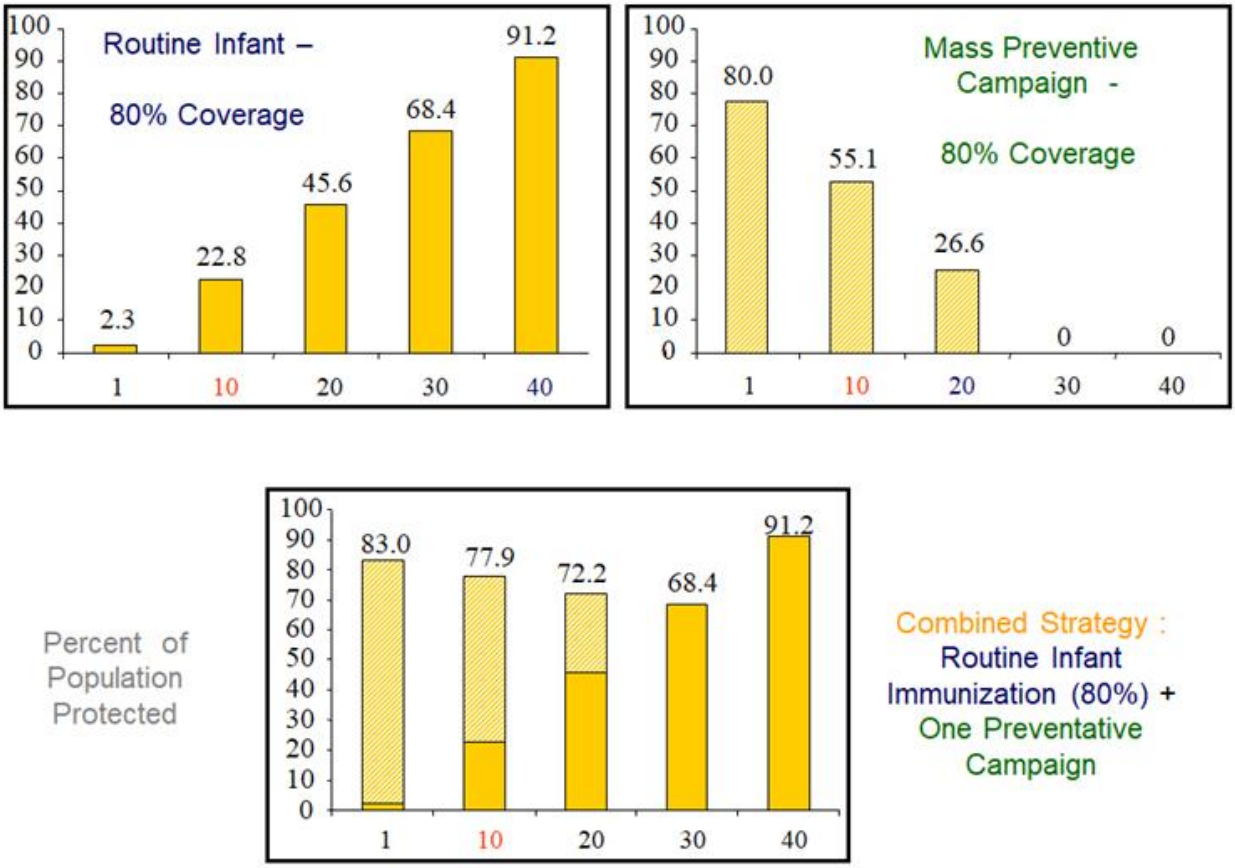
The main recommended control strategies are

1. Childhood routine immunization administered at 9 months of age: reaching the desired level of population immunity takes more than 30 years with infant routine immunization only, even with a high coverage
2. Mass preventive vaccination campaign: to rapidly increase the population's immunity and to protect susceptible older age groups in selected high risk areas
3. Outbreak response vaccination campaign: carried out during yellow fever epidemics with minimum delay in order to limit the spread of the disease
4. YF Disease Surveillance: Sustained YF control strategies must rely on strong surveillance and diagnostic capacities to allow for early detection of outbreaks and implementation of control measures that can help mitigate the risk of spread and limit the use of extensive resources

Figure 3 shows three scenarios of impact of YF Prevention Strategies. The figure shows three scenarios of YF control developed using modelling techniques. With infant immunisation alone at

coverage of 80%, it is estimated that 68% of the population will be protected only after 30 years and 90% will be protected only after 40 years. If the preventive mass campaign alone the strategy with coverage of 80%, protection will wane to 55% by 10 years and finally disappear by 30 years. If infant immunisation is combined with mass preventive campaign where both reach 80% coverage, protection is sustained for large number of the population. It is for this reason that periodic campaigns must be combined with routine immunisation for optimal levels of protection

Figure 3: Estimated Impact of YF Prevention Strategies



Yellow fever disease and control in Ghana

Ghana has had periodic yellow fever outbreaks with large spikes especially during the 1970s (Figure 4). Between the 1950s and 2000s, all regions except Western and Central recorded major outbreaks (see Figure 5Figure 5). These outbreaks were controlled by selective mass preventive and reactive mass vaccination campaigns particularly during the late 1970s to mid1980s.

Figure 4: Trends in Yellow fever cases in Ghana: 1950-2016

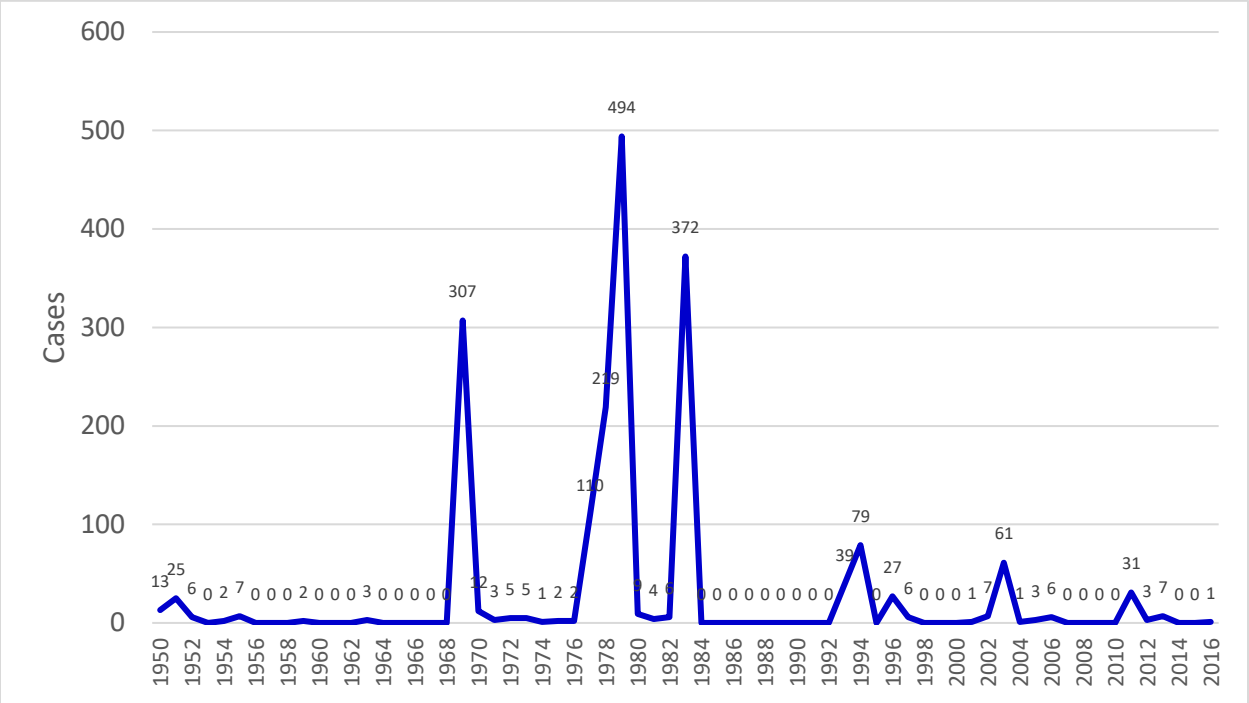
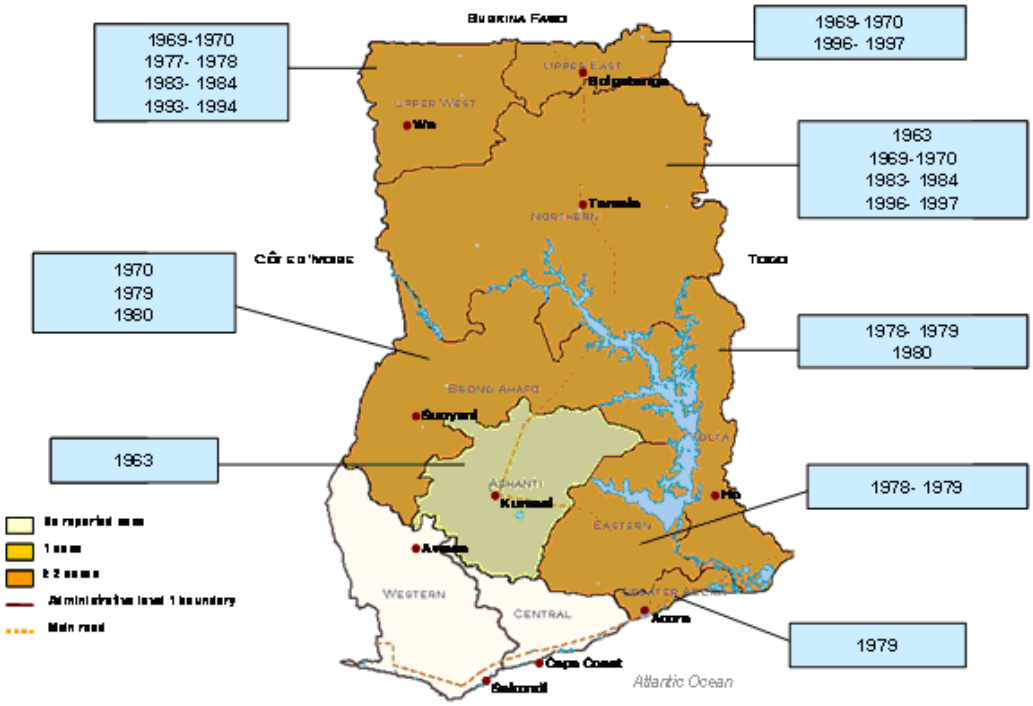


Figure 5: Regions reporting YF outbreaks in Ghana 1950 – 2004



Interventions before routine immunisation

Before routine immunisation of yellow fever in the country, there had been attempts by health authorities to control the disease, respond to and prevent further outbreaks. From 1977 up to 1983, selective mass vaccination carried out by mobile teams of the then Medical Field Unit (MFU) contained the epidemics which occurred in Ghana around the time. The Yaws-Yellow Fever Control Programme was a combined programme in 1981-1983 which aimed at controlling YF through preventive campaigns (while administering penicilin to control yaws simultaneously). YF control strategies were continued through 1984-85 in the form of Immunization–Continuation Programme. Selective mass campaigns in selected districts in 2005/2007

Routine Yellow Fever immunisation performance

YF vaccine was introduced into Ghana's routine immunisation programme in 1992. Since then, coverage has steadily improved. Table 17Table 17, Table 18 and Table 19 show administrative, WUENIC[2] and Survey estimates of coverage of routine yellow fever immunisation in Ghana from 2013 to 2016.

Table 17: Trends in Yellow Fever Vaccination Coverage Rates by Region, 2013 – 2016

Regions	2013		2014		2015		2016	
	# Vaccin	% Cov	# Vaccin	% Cov	# Vaccin	% Cov	# Vaccin	% Cov
Ashanti	177,760	90	192,588	95	197,570	95	173,904	85
Brong-Ahafo	89,501	95	100,197	104	95,755	97	98,144	97
Central	81,766	89	87,405	92	92,241	95	85,671	93
Eastern	89,781	84	93,211	86	103,641	93	101,104	88
Greater Accra	133,012	80	143,433	83	164,038	92	143,691	82
Northern	113,635	111	118,270	112	119,789	110	101,627	94
Upper East	33,538	81	35,754	86	37,238	88	32,764	73
Upper West	22,151	78	22,427	78	28,558	97	23,445	78
Volta	66,596	77	72,233	81	79,626	87	74,037	80
Western	86,691	90	86,866	89	95,922	96	84,304	77
Ghana	**894,431**	**89**	**952,384**	**92**	**1,014,378**	**95**	**918,691**	**85**

Routine coverage dipped in 2016 due to vaccine stock outs at the national level. Regional disparities also exist in coverage levels as shown by respective tables. In summary, Ghana has

[2] WUENIC-WHO/UNICEF Estimates of National Immusation Coverage

maintained consistently high yellow fever vaccine coverage levels in the past few years but coverage appears to have stagnated in the last two to three years.

Table 18: WHO-UNICEF Official Estimates, Yellow fever and Penta-3 coverage 2011 - 2016

Indicator	2012	2013	2014	2015	2016
Penta-3	92	90	98	88	93
YF	89	87	92	88	88

Table 19: Yellow Fever coverage estimates from Household Surveys

Region	PENTA-3		YF	
	DHS	MICS	DHS	MICS
	Year: 2014	Year: 2011	Year: 2014	Year: 2011
	DHS (%)	MICS (%)	DHS (%)	MICS (%)
Ashanti	92.5	97.6	93.6	96.4
Brong-Ahafo	88.2	97.5	88.9	90.8
Central	89.5	85.3	87.2	94.1
Eastern	89.8	94.5	89.6	86.9
Greater Accra	94.6	89.1	92.9	92.7
Northern	80.7	91.7	77.5	95.6
Upper East	93.3	97.7	93.5	99.6
Upper West	96.7	97.4	94.9	89.9
Volta	85.6	83.4	86.9	97.0
Western	83.5	98.1	78.9	97.5
Ghana	**88.5**	**92.1**	**88.0**	**83.3**

Most recent Yellow fever Preventive Mass Vaccination Campaigns

Ghana conducted a two-phased YF preventive campaign based on findings from a WHO-supported risk assessment which was conducted in 2010 (see Figure 8). The first phase was conducted from 22nd to 28th November 2011 and covered 40 districts. Additionally, three districts had reactive campaigns in response to YF outbreak during the same period. In total, 7 regions participated.

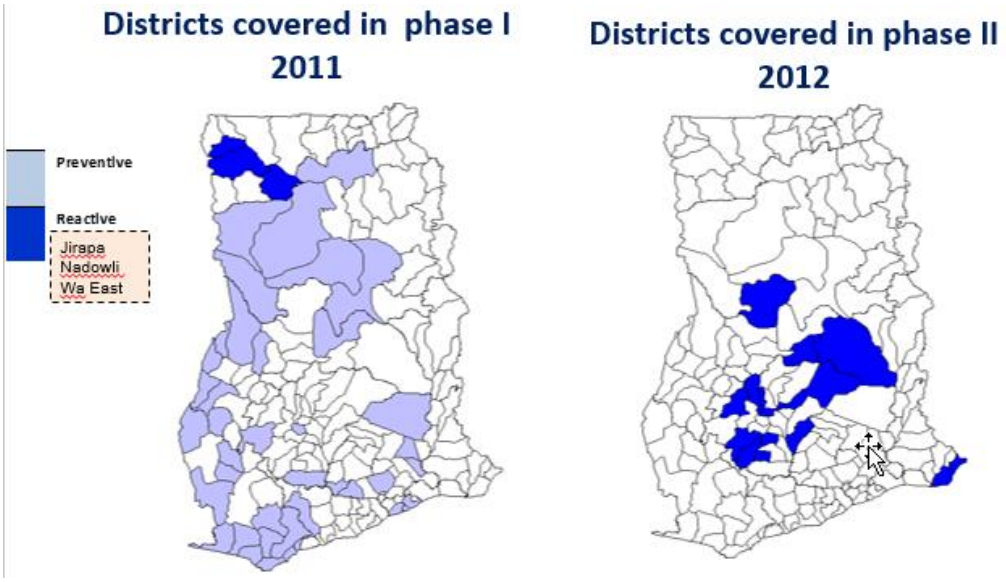
Table 20: Coverage Rates for YF Selective Preventive Mass Vaccination Campaigns

Indicators	2011	2012
Target	5,808,538	1,463,809

Administrative Coverage (%)	101.9	90.41
Post-campaign coverage survey (%)	73.5	83.7

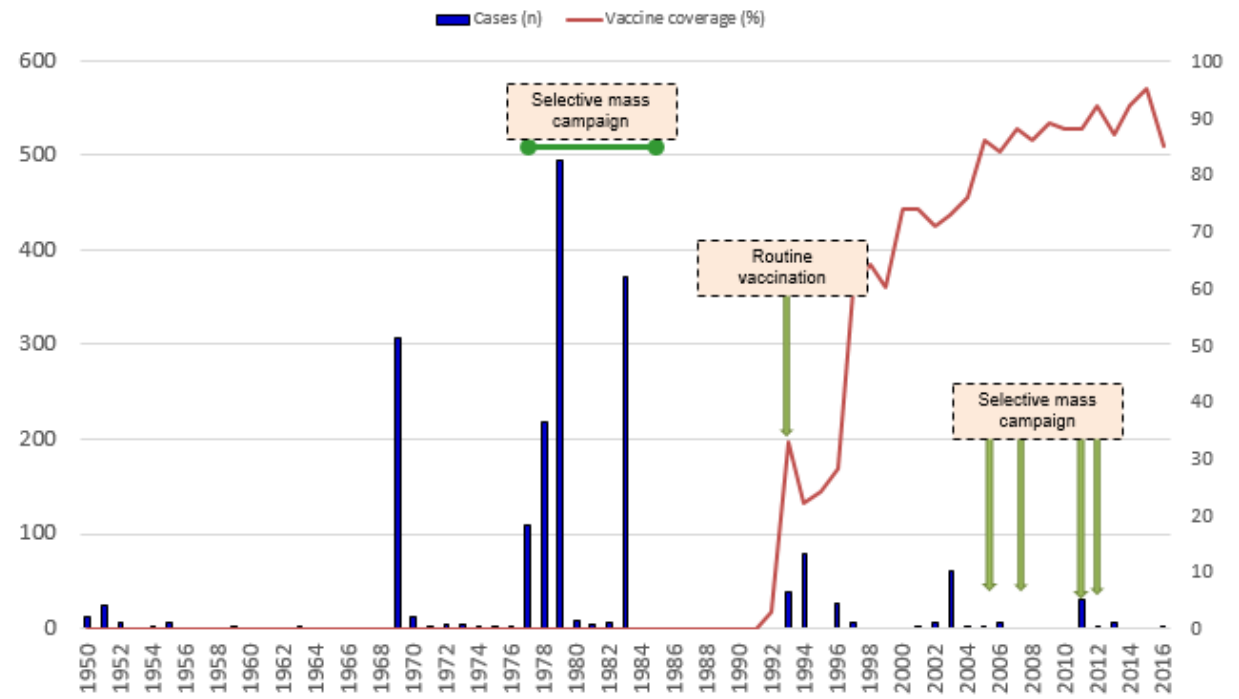
The second phase was conducted from 5th to11th September 2012 and covered 15 districts in 3 regions. The target for both phases were all persons 10 years and above excluding pregnant women. The combined administrative coverage was 99.8% (out of a combined target of 7,272,347). Figure 6shows the districts that participated in the campaign while Table 20 shows a summary of the coverage during the two phases of the campaign.

Figure 6: Districts participating in the 2011-2012 Yellow feve r Preventive Mass Campaign



Impact of YF control measures on cases

Figure 7: Trends in Yellow Fever cases and control interventions in Ghana, 1950-2016



With routine YF vaccination and additional periodic mass vaccination campaigns against the disease, notably in the 1980s, 2005/2007 and 2011/2012, there has been marked reduction in the burden of yellow fever in Ghana although pockets of outbreaks still occur in the country as shown Figure 7.

Yellow Fever case-based surveillance

Sustained YF control strategies rely on strong surveillance and diagnostic capacities to allow for early detection of outbreaks and implementation of control measures that can help mitigate the risk of spread and limit the use of extensive resources. Case-based surveillance was introduced in Ghana in 2003.

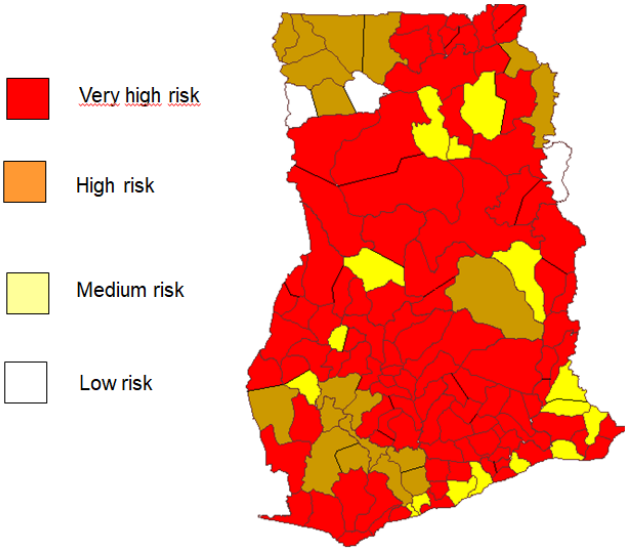
Rationale and justification for 2019 Yellow fever PMVC

Yellow fever is endemic in Ghana. Cases continue to be reported annually. These are interspersed with focal outbreaks in spite of high routine infant immunisation coverage and previous selective mass campaigns (Figure 5 and Figure 7).

From 2005 to 2007, 22 districts were vaccinated. In 2010, following YF outbreaks in La Cote d'Ivoire (with which Ghana shares international border), the Government of Ghana with the support of health partners (notably WHO and UNICEF), convened a meeting in November 2010

to assess the levels of risk of yellow fever in Ghana. YF risk assessment (RA) was done using a WHO mathematical modeling tool. The results showed that nearly all districts in Ghana are at medium to very high risk as shown in Figure 8. Following that meeting, a 2-phased YF campaign was conducted. The first phase covered 40 districts (in 7 regions) in a Preventive Mass Vaccine Campaign–PMVC in 2011. During that same period, three additional districts (Jirapa, Nadowli and Wa East districts in the Upper West Region) were covered in a Reactive Vaccination Campaign. The second phase PMVC covered 15 districts in (3 Regions) in 2012. Thus, 79 districts were covered between 2005 and 2012.

Figure 8 Yellow fever risk in Ghana, Risk Assessment, 2010



Of the 216 districts in the country, 137 are yet to be covered. In addition, two districts, previously covered in the 2005-2007 PMVC achieved a coverage of <60% (Assin North-59% and Wassa-Amenfi West-44%) and are potentially still at risk. Therefore, 139 districts in total are potentially 'uncovered'.

In 2015, Gavi approved six million doses of YF vaccine for PMVC in 65 selected districts (hereafter referred to as 'Phase A' PMVC). The campaign was deferred due to Ghana's default in honouring its Gavi co-financing obligations vis-à-vis global vaccine shortages as a result of reactive vaccination response to outbreaks in Angola and Democratic Republic of Congo (DRC) and Uganda in 2015/2016 which depleted the global stocks. The "Phase A" PMVC is now scheduled for 3rd Quarter 2018. Therefore, 74 districts will still be unvaccinated.

Under the new Global Strategy for Elimination of Yellow Fever Epidemics (EYE) which aims at protecting risk populations, preventing international spread and containing and outbreaks rapidly, there is need to vaccinate 'unreached' at risk populations in the country in order to prevent outbreaks. Hence, the 74 "left-out" districts need to be covered.

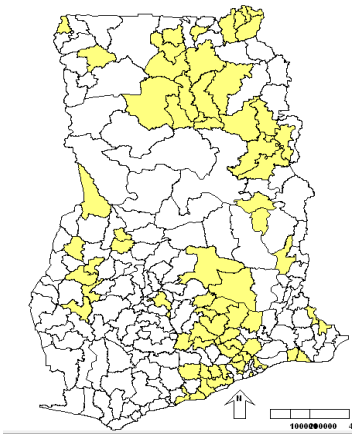
National Decision Making Process

Gavi's window for support under the EYE strategy was opened in 2017, giving Ghana the opportunity to cover areas not yet Gavi endorsed. At a meeting of stakeholders from Ghana Health/Service/Ministry of Health (GHS-MoH), UNICEF-Country Office, WHO-Country Office, WHO-Headquarters, in Accra on 25th July 2017, a consensus was reached to cover the 74 'left-out' at risk districts in "Phase B" PMVC in 2019. On 29th August 2017, the plan for the "Phase B" PMVC was presented and endorsed by the Interagency Coordinating Committee (ICC). Members attending the meeting included the Deputy Director General of the Ghana Health Service, Directors and Heads of Departments from Divisions/Departments of the Ghana Health Service, representatives from the Ministry of Health and Development Partners.

The technical sub-committee of the ICC (EPI, Disease Surveillance Department-DSD, WHO and UNICEF) was tasked to constitute 'Phase B' PMVC Planning Committee with sub-committees to plan towards application and implementation of the vaccination campaign. The application process was initially deferred due to the country's engagements on a concurrent Cold Chain Equipment Optimisation Platform (CCEOP) application process to Gavi. With re-opening of Gavi's window for support under the EYE strategy in November 2017, the proposal was re-activated and re-endorsed by the ICC at a meeting on 11th January 2018.

Targets

Figure 9 Selected districts for the proposed YF campaign



The campaign will be conducted in 74 selected districts in nine regions of Ghana (Figure 3). These districts were selected based on a set of criteria as elaborated in Paragraph **Error! Reference source not found.**. The campaign will target persons 10 years and above excluding pregnant women. This represents 67% of the total population in these districts. A total of 5,704,090 persons are therefore, targeted for the campaign. The minimum coverage expected is 95% of the target population.

Priority activities

A. Routine Immunisation Strengthening

1. The training, communisation and pre-campaign assessments will be used to reinforce practices that enhance routine immunisation.

2. Efforts to improve coverage in hard to reach areas/population

A special line has been created in the budget for island and riverine communities which are very difficult to reach and require more funding in order to cover such communities within the campaign implementation period. During the campaign, the island and lake teams are made to go with routine vaccines as well and provide a holistic routine immunisation services in addition to the campaign.

B. Efforts to ensure high quality campaigns

To ensure high quality campaign requires high level of commitment at all levels. The Ministry of Health will engage the political heads to ensure that the campaign is given the highest priority by the political leaders at the national, regional, district and community level. This will ensure visibility and acceptability of the campaign.

The Ministry of Health will also collaborate with all key stakeholders including health partners, religious and traditional leaders. Where possible, representatives of these stakeholder organizations will be part of the campaign planning committee. Both human and financial resource will also be solicited from partners to support other local level activities planned for the campaign.

The campaign process will be monitored at all levels and at all stages. The national level will monitor the activities of all regions and districts involved. Regions will monitor activities in all districts and sub-districts and lastly, districts will monitor activities of sub-districts and vaccination teams.

A pre-campaign checklist will be used to assess campaign preparedness. Corrections and modification would be effected in micro plans if they are found to be deficient. During campaign implementation, a checklist will be used to monitor team performance. In areas already covered

by vaccination teams, intra campaign rapid convenient monitoring will be conducted to identify poorly covered areas where team will have to revisit. A post campaign coverage survey will be conducted at the end of the campaign.
Review meeting will be carried out at all levels with partners to review the conduct of the campaign, document best practices and chart way forward. The national level will then make a final presentation on the campaign to the ICC before the final report is submitted to partners.

C. Linkage with other interventions/integration for both routine and campaigns

The YF campaign is planned for first quarter 2019. As part of the Polio End-game strategy, the country plans to introduce IPV into routine immunisation in April 2018. The country is also part of the Malaria Vaccine Implementation Program (MVIP) and making plans to pilot RTS,S vaccine for malaria in four selected regions in 4th Quarter 2018. The infrastructure, human resource capacity that will be built for communication, service delivery, injection safety, cold chain management, waste management, disease surveillance and vaccine safety monitoring will contribute to an improvement in the quality of proposed YF campaign. In the same vein, the infrastructure and human resource capacity that will be built for the YF campaign will assist in improving the quality of routine immunisation and future campaigns.
The country also plans to re-apply to Gavi for the Cold Chain Equipment Optimisation Platform (CCEOP). If successful, this platform will also enhance storage and distribution of YF vaccines, for the PMCV, in addition to routine vaccines. The CCEOP is a Gavi-led initiative to support eligible countries to upgrade/expand their cold chain equipment.
Other interventions include Periodic Intensification of Routine Immunisation (PIRI). In Ghana, this is done during African Vaccination Week and Child Health Promotion Week celebrations which are jointly commemorated in the last week of April annually. These interventions are aimed at raising awareness about the benefits of immunisation and other child health services. Opportunity will be taken to raise awareness on benefits of preventive vaccination as well including YF in 2018. The proposed PMVC for Yellow Fever will not be integrated with any other campaign. However, districts will be encouraged to integrate the campaign with routine immunisation services especially in areas with low coverage levels.

Budget
The total estimated cost of the Yellow Fever Preventive Campaign is $ 3,691,951. Gavi support will cover $ 3,174,080 (86%) and an additional amount of $ 146,037 (4%) will be sourced from the Gavi Performance-Based Funding Award for Ghana's 2016 performance. The Government of Ghana, and local partners (mainly WHO, UNICEF and CDC), will provide the remaining $ 371,833 (10.1%) for the vaccination campaign.

Gavi activity Category	Budgeted figures in USD TOTAL
1. Service Delivery	2,728,412
2. Capacity building of human resources	308,647
3. Procurement & supply chain management	-

4. Health information systems	-
5. Advocacy, communication and social mobilisation (ACSM)	137,021
6. Legal, policy and regulatory environments	-
7. Health Financing	-
8. Program Management	-
9. Program Support Costs	-
10. Other	-
TOTAL	3,174,080