EXPANDED PROGRAM ON IMMUNIZATION

MULTI-YEAR PLAN 2017-2021

MINISTRY OF PUBLIC HEALTH, GUYANA

COMPILED BY THE MATERNAL AND CHILD HEALTH/EXPANDED PROGRAMME ON IMMUNIZATION IN COLLABORATION WITH PAHO/WHO

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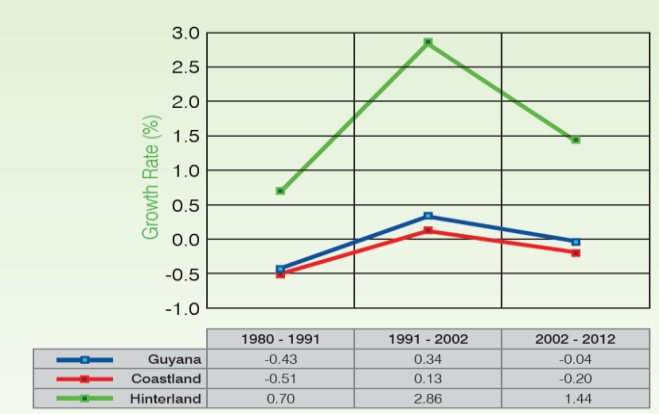
Part 1: Background

1.1 Brief Country Profile

Guyana covers an area of 83,000 square miles (215,000 square kilometres) and is located along the north-eastern coast of South America. The country is divided into ten administrative regions that vary significantly in population density, geography, ethnicity, income level, health care access, and vaccination coverage. The population, estimated at 747,884 in the 2012 Bureau of Statistics Census, is clustered primarily within the five smaller coastal regions. By contrast, the four main hinterland (interior) regions are very sparsely populated, covering nearly three-quarters of Guyana's land mass but containing only 10% of the population. A little over twenty-six percent of the population lives in urban areas, primarily in the capital city of Georgetown. In 2014, 35.5% of the population of Guyana was less than 15 years old, 11.8% was less than 5 years old, and 6.2% was over 60 years old. Guyana's population growth rate has declined to -0.04 % in 2012(refer to Figure 1, BOS, Population Census 2012).

Figure 1 - Comparative growth rates 1980 - 2012



	1980 - 1991	1991 - 2002	2002 - 2012
Guyana	-0.43	0.34	-0.04
Coastland	-0.51	0.13	-0.20
Hinterland	0.70	2.86	1.44

Guyana is rich in natural resources with an economy based on agriculture, gold, bauxite, and timber. Despite this natural wealth, Guyana has attained the status of middle income country because of its GDP per capita is 3,496.3 (Bureau of Statistics, and Ministry of Finance, Guyana 2013). Health as a percentage of the national budget is 8.5%and education is 13.6 %(Bureau of Statistics, and Ministry of Finance, Guyana 2013).

Some progress has been made in indicators over recent years with Guyana's HDI value for 2013 is 0.638— which is in the medium human development category—positioning the country at 121 out of 187 countries and territories. Between 1980 and 2013, Guyana's HDI value increased from 0.516 to 0.638, an increase of 23.6 percent or an average annual increase of about 0.65 percent (Human Development Report 2014).

The Coastal plain represents the smallest physical geographic area of Guyana. It varies in width from 26 km near the Venezuela border to the west and extends to a maximum of 77 km to the Corentyne River in the east. It is generally flat and lies approximately 1.5m

below sea level, and occupies about 7.5 percent (16,125 km2) of Guyana's landmass including the Coastland strip of Barima-Waini (Region 1).

The Coastal plain is densely populated in contrast to the Hinterland regions, though such density is not evenly distributed as there are some interior/inland parts of the coastal belt that are also sparsely populated. The heavy concentration of population is due to the fact that the majority of the commercial activities in the country are carried out in the Coastland regions.

The Hinterland regions of Guyana comprise about two-thirds (67.6 percent) or approximately 145,353km2 of the land area of Guyana. They include: Barima-Waini (Region 1), Cuyuni-Mazaruni (Region 7), Potaro-Siparuni (Region 8) and Upper Takatu-Upper Essequibo (Region 9). These highland areas are covered by dense forest lands and mountain ranges and marked also by series of hills and rivers.

1.2 Program Description

Since1967, Guyana has been a member country of the Caribbean Epidemiology Centre (CAREC), the premier disease control surveillance and prevention institution in the region. This has been changed to the Caribbean Public Health Agency (CARPHA) in 2012. Its EPI programme provides support to member countries for the laboratory investigation of diseases that can be attributed to diseases that are preventable by vaccination...

In Guyana, EPI is integrated into the Maternal and Child Health (MCH) Programe of the Ministry of Public Health (MOPH). As such, EPI does not maintain an independent staff and is not separately financed. At the national level, the MCH/EPI Program is directed by an MCH/EPI Officer and other staff includes: an EPI Disease Surveillance Coordinator; a Deputy Chief Nursing Officer; a MCH Nurse; and an Administrative Assistant. National level staff is mainly responsible for policy direction, planning, monitoring and evaluation.

At the regional level, EPI is managed by a Regional Health Officer (RHO). Within specific health facilities, Senior Health Visitors or a Medex coordinate implementation of the Program. Presently, there are 327 health facilities throughout Guyana's 13 administrative regions and sub-regions. Staff members from these health facilities provide comprehensive primary health care services, including EPI. At the Annual National EPI Meeting, a designated regional representative provides feedback regarding regional coverage rates, plans of action, training needs and updates to the MOPH. These reports are compiled by the MCH/EPI Officer into a national report that includes comparative analysis of regional trends in vaccination coverage and the programme as a whole.

Planning for EPI is undertaken annually at both the central and regional levels. All financial requests are designated as either capital or recurrent expenditures in accordance with the structure and process of the national budget. Vaccines and syringes are procured under the Drugs and Medical Supplies allocation of the Primary Health Care Budget. These vaccines are distributed through the government sector and provided at no direct

cost to the client. (See Part 3**,** Analysis of Costing and Financing for a more detailed description of this process.)

Table 1 below shows the recommended vaccination schedule in Guyana and the vaccines currently in use. With the goal of a measles-free Caribbean and rubella elimination, the measles mumps and rubella vaccine (MMR) was introduced in Guyana in 1995.
The yellow fever vaccine was introduced in 1999. In 2000, the pentavalent vaccine was introduced with the support of GAVI funding. In 2010, and 2011, Rotavirus and PCV 13 vaccines were introduced respectively. It is now proposed that in 2017 the HPV vaccine will be introduced to all girls in the 10 to 13 age group. This vaccine will become one of the routine vaccines in the government schedule.

Table 1 - Guyana National Immunization Schedule, 2015

Vaccine	Ages of administration	Comments
BCG	Birth	
DPT/Hib/Hep B	2, 4, 6 months	
DPT	Booster at 18 and 3 years 9 months	
OPV	4, 6 months; boosters at 18 and 3 years 9 months	
IPV	2, 4, 6 months; boosters at 18 and 3 years 9 months	For immune-suppressed children 1 dose of IPV has been introduced into the schedule and the number of doses may increase before 2012 depending on funding
MMR	12-23 and 18 months	
YF	12-23 months	
Td	Pregnant women, vulnerable and high risk populations	1 or 2 doses in pregnancy if not fully vaccinated prior to pregnancy
Hep B	High risk populations (e.g. health care workers	3 shot series
HPV	All girls 11yrs-13 years	2 doses

1.3 Methodology

In July of 2016, the Guyana Ministry of Health (MOH), with assistance from the Pan American Health Organization (PAHO), reviewed and updated Guyana's *ten-Year Immunization Plan 2017-2021* that was submitted to GAVI in 2016 as part of the Special concession by GAVI for HPV introduction in graduating countries. This review process consisted of:

1. Review of relevant policy documents[1];
2. Evaluation of program performance over the course of the previous five-year plan;
3. Identification of key constraints to effective program performance;
4. Development of major action points to address these key constraints;
5. Comprehensive revision of program activities;
6. Revision of program budget, including costing and financial analysis; and

The results of this process are presented in this *Comprehensive Multi-Year Plan for Immunization 2017-2021* (*Multi-Year Plan 2017-2021*). Further revisions to this situational analysis and budget will be further adjusted after the National EPI Evaluation scheduled to be conducted in 2017. Many of the present adjustments have been based on the Effective Vaccine Management assessment in July 2014.

1.4 Relationship of Multi-Year Plan 2017-2021 to Guyana's General Health Services

In keeping with the Sustainable Development Goals of improving maternal health and reducing child mortality in its Goal 3 on health the MoPH in its Health vision 2020 designates its MCH/EPI Program as a "Priority Program" for action. The EPI component of the Program not only directly addresses the Health Vision 2020 goal of reducing infant and child mortality by attempting to eradicate vaccine preventable diseases; it also has less obvious indirect effects throughout the general health system.

Due to the integration of EPI within the MCH Program, activities scheduled in this Multi-Year Plan will also strengthen the MCH program. For example, the regional health meetings planned and budgeted for by EPI provide a forum for education of MCH staff on a variety of women's health issues. Such in-service training opportunities will ultimately serve to meet the Health Vision 2020 of improving the health status of women throughout Guyana.

Additionally, several improvements to the transportation, cold chain and communication infrastructure are budgeted for in the *Multi-Year Plan 2017-2021*. These improvements will not only expand vaccination coverage, but, as they are shared with other health care programs, will provide a mechanism for meeting the Health Vision 2020 goals of increased access to general health care, medical supplies, and drugs.

Finally, by its very nature, EPI addresses the Health Vision 2020 of creating equity in health by improving access to quality health care for the poor and the indigenous population in remote villages. In its efforts to provide universal vaccination coverage, the program prioritizes investments in those areas where vaccination coverage (and often health status in general) are lowest. For example, the *Multi-Year Plan2017-2021* focuses on activities and funding on improving coverage in remote and hinterland communities, primarily inhabited by Amerindians with limited economic opportunities and severely limited health care access.

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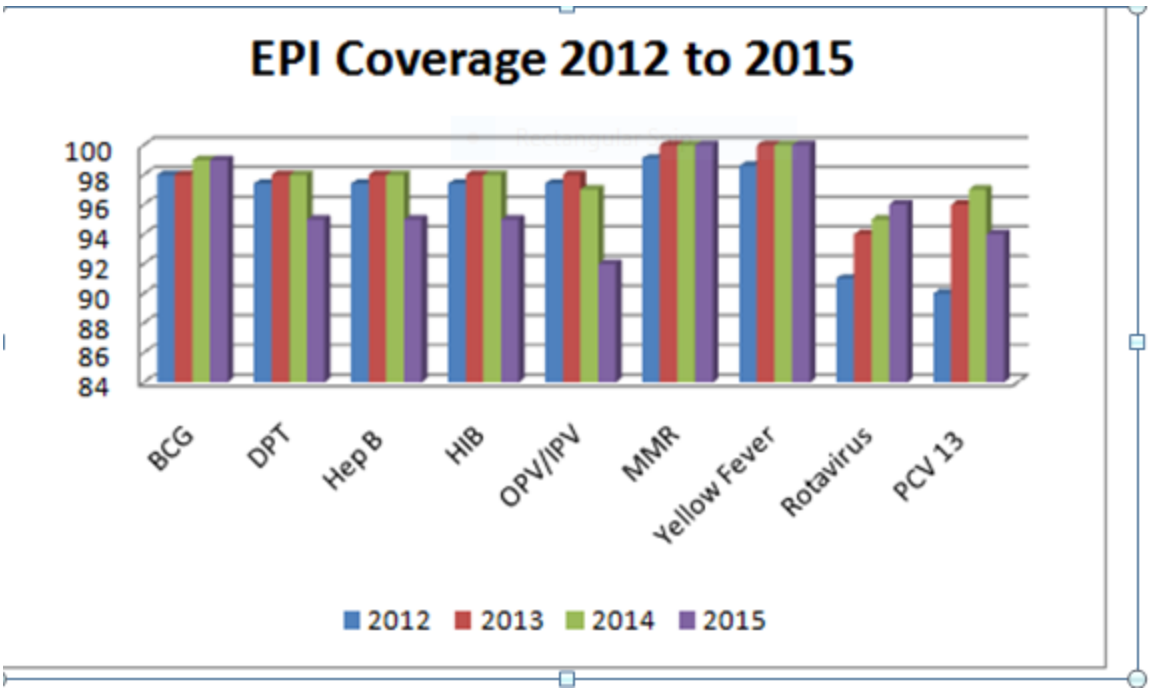
Part 2: Situational Analysis

2.1 Analysis of Immunization Coverage in Guyana

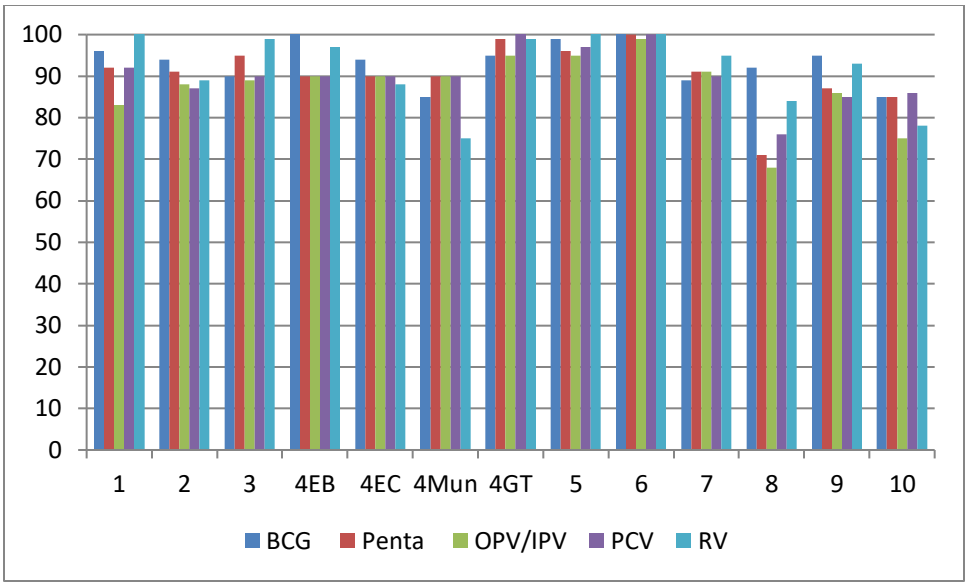
The overall objective of EPI is to reach and maintain immunization coverage of 95% or greater in every region, sub-region, district, and village of Guyana. Significant strides have been made in the area of attaining the 95% coverage. Figure 1 reveals that since 2012, for the routine vaccines BCG, OPV, pentavalent, the coverage has been maintained.

Figure: 1. Vaccination coverage 2012-2015



Improvements in vaccination coverage have been made in each of Guyana's 13 administrative regions and sub-regions and with the introduction of the new vaccines these have also shown good coverage. From 2012 to 2015, the immunization coverage has been over 90 percent. Except in 2012 when the new vaccines were being introduced

Figure 2: 2015 Regional EPI Vaccination Coverage



Difficulties still exist in Regions 1, 4 Municipality, 7, 8, 9 and some part of Region 10. Regions 1, 7, 8, 9 and some areas are remote hinterland access areas. Region 4 Municipality is a non –government Department which has a shortage of human resources. The Ministry of Public Health will work in collaboration with this municipality to ensure that the targeted children are immunized.

2.2 Barriers to Increased Vaccination Coverage

The challenges faced by EPI in continuing to improve vaccination coverage are significant. Currently, the hinterland regions have the most pressing need for intervention. These regions are particularly vulnerable to potential outbreaks of vaccine-preventable diseases because of its low vaccination coverage rates and its proximity to the bordering country. As a result, vaccination coverage in these regions must be increased and maintained greater than 95% to ensure minimal susceptible population. The main challenges of hinterland regions are its remoteness, its many waterways and difficulties in accessing the cold chain due to equipment that has been obsolete over the last decade coupled with skilled staff constraints. These differences result in unique challenges to the MCH/EPI Program staff attempting to increase coverage in these Regions. Despite this, there are several common issues that must be addressed to significantly impact vaccination coverage.

The Evaluation of Guyana's Expanded Programme on Immunization (2008), the Effective Vaccine Management July 2014 highlighted three critical program constraints to achieving universal vaccination coverage in Guyana:

(1) Insufficient human resource capacity including technical and non-technical staff;

(2) Inadequate cold chain infrastructure; and

(3) Inadequate transportation and communication infrastructure.

Despite the best efforts of a dedicated EPI staff and significant investments by the Ministry of Health (MOH) and its partners, these three issues remain of primary concern for EPI, particularly in relation to Region 1 and the other hinterland Regions. In these vast and sparsely populated rural and riverain areas, living conditions can be difficult and health staff retention is often problematic. Travel in these regions is only possible by boat or by air and can be prohibitively expensive. Often, the cost of fuel alone can limit the capacity of health care professionals to reach vaccination target populations. These high fuel costs, combined with a lack of reliable sources of electricity, can also hinder the ability of providers to ensure the integrity of the cold chain. The situation is further exacerbated by the underdeveloped communication infrastructure in these regions, with most health care facilities relying on radio transmission.

Although the transportation and communication infrastructure is significantly better in Region 4, this area faces a different set of challenges including rapid expansion of squatter housing schemes and limited human resource capacity (due to poor retention of staff) resulting in limited outreach activities.
Some improvement has been made since the last evaluation and equipment has been ordered. These items are expected to be in place before the end of 2016.

2.3 Overall Plan for Improving Immunization Coverage

To address the identified program constraints of limited human resource capacity, difficulty in maintaining cold chain integrity, and limited transportation and communications infrastructure, a set of Major Action Points have been identified in the *Multi-Year Plan 2017-2021*. These activities are summarized in the following Table.

Table 1 - Major Action Points for the Multi-Year Plan 2017-2021

Major Action Points	Timeframe
1. Updated training for health workers in new vaccines. Training will need to be conducted annually due to high staff turnover.	
2. Increase staff access to remote areas through improved: • inter-sectoral coordination • transportation system • communication capacity	1. monthly meetings 2. 2017-2019 3. 2017-2021
4. Conduct an assessment of the current status of the cold chain equipment (solar or not) in the 10 regions	2019
5. Increase cold chain capacity to improve availability of vaccines at local level especially in the hinterland and remote areas	2017-2019
6. Improve monitoring and evaluation through quarterly meetings to allow for earlier identification of dropouts and follow up visits with home vaccinations as needed.	Quarterly review EPI meetings in 2017-2021
7. Strengthen human resource capacity by filling vacant posts.	On going
8. Identify dropouts earlier and aggressively pursue through home visits, outreach activities and through social mobilization activities (such as Vaccination Week in the Americas activities).	2017-2021

The activities outlined in the Table above will be undertaken in all of Guyana's 13 regions and sub-regions. Additionally, Regions 1 and 4 will be specifically targeted for the following immediate and enhanced interventions:

In Region 1:

1. The MOH will make specific investments in the cold chain infrastructure of Region 1 by equipping and replacing solar equipment which has become obsolete through the transition funding that would be provided by GAVI 2016-2017.
2. Training workshops will be held to improve the immunization competence of Community Health Workers, Midwives and Medexes.
3. Substantial investments will be made in the transportation infrastructure of the Region. Using a combination of local and regional Government funding, an adequate supply of transportation and communication equipment will be purchased.
4. EPI staff will increase efforts to work with the Regional Democratic Council in the Region to coordinate outreach activities among the various agencies (to

save fuel costs) and to ensure sufficient fuel is allocated for vaccination activities.

In Region 7:

1. EPI staff will make improvements to the monitoring and evaluation process.
2. Targeted outreach activities will be conducted. Specifically in the remote communities of Essano, Iterbang, Upper and lower Mazaruni. Preferentially targeted for mop-up vaccination campaigns during the Vaccination Week in the Americas, using funding from PAHO/UNICEF and GOG.
3. The MOH will make specific investments in the cold chain infrastructure of Region 7 by equipping and replacing solar equipment which has become obsolete through the transition funding that would be provided by GAVI 2016-2017
4. Radio and communication equipment will be procured in order to enhance the social mobilization aspects of the EPI programme.

In Region 8

1. EPI staff will make improvements to the monitoring and evaluation process.
2. Targeted outreach activities will be conducted. Specifically in the remote communities of Mahadia, Kato, Tumaturi, Micobe and Paramakatio Mountains. Preferentially targeted for mop-up vaccination campaigns during the Vaccination Week in the Americas, using funding from PAHO/UNICEF and GOG.
3. The MOH will make specific investments in the cold chain infrastructure of Region 8 by equipping and replacing solar equipment which has become obsolete through the transition funding that would be provided by GAVI 2016-2017
4. Radio and communication equipment will be procured in order to enhance the social mobilization aspects of the EPI programme

In Region 9

5. EPI staff will make improvements to the monitoring and evaluation process.
6. Targeted outreach activities will be conducted. Specifically in the remote communities of Lethem, Aishalton, Sand Creek and Annail . Preferentially targeted for mop-up vaccination campaigns during the Vaccination Week in the Americas, using funding from PAHO/UNICEF and GOG.
7. The MOH will make specific investments in the cold chain infrastructure of Region 9 by equipping and replacing solar equipment which has become obsolete through the transition funding that would be provided by GAVI 2016-2017
8. Radio and communication equipment will be procured in order to enhance the social mobilization aspects of the EPI programme

2.4 Analysis and Planning by Key Program Component

In keeping with the format of *Immunization Plan 2007-2017* and *Multi-Year Plan 2017-2021, Effective Vaccine Management Assessment 2014 and the GAVI transitional plan 2015-2017* divides EPI into several critical programmatic areas. The following is a

situational analysis of each of these critical components. Vaccine wastage and immunization safety are discussed in Parts 4 and 6 below.

2.4.1 Biological and Logistics

The objectives for this programmatic area are to:

1. Ensure that a consistent and adequate supply of vaccines, syringes, needles, and safety boxes are procured each year on a timely basis;
2. Continued procurement of new vaccines (e.g., pneumococcal conjugate, human papilloma virus, and rotavirus vaccines) through the transition period 2017-2019 and post transition.
3. Eliminate indigenous cases of measles, mumps, rubella, and congenital rubella syndrome (CRS); eradicate poliomyelitis; and
4. Ensure adequate protection against yellow fever.

Over the course of the *ten-year Immunization Plan 2007-2017,* EPI has successfully procured vaccines and other supplies efficiently through the PAHO Revolving Fund for Vaccine Procurement. No major vaccine stock-outs have occurred. This reliability in vaccine procurement stems from the Government of Guyana's political and financial commitment to EPI. (See Parts 3.4 – 3.7 for more detailed discussion of the specific mechanisms that ensure the reliability and security of Government financing for EPI).

The Government of Guyana is continuing to make efforts to expand routine vaccination services through the introduction of new vaccines. The MOH had introduced pneumococcal conjugate vaccine 13 into the national schedule in 2011. In keeping with the Global Polio Endgame Plan, one dose of Inactivated Polio Vaccine (IPV) was introduced with funds from the GAVI Alliance in 2015 followed by an additional dose of IPV in 2016 funded by the government of Guyana. On the 1 September 2016, IPV was introduced as the first dose into the routine schedule as part of the Polio endgame strategy.

Polysaccharide pneumococcal vaccine has also been introduced for the high risk population. Additionally, rotavirus surveillance activities will be expanded to at least two other sentinel sites between 2016 and 2018. The MOH has introduced rotavirus vaccine (Rotateq) into its routine vaccination services in 2010. In June 2014, EPI Programme has changed from the 3rd dose Rotateq and introduced the 2 dose Rotarix vaccines. HPV vaccine was introduced as a pilot in 2012; this donation was made possible by GARDASIL for young females between the ages of 9-13 years. However, due to problems with the manufacturer this programme came to a standstill in 2014 since the supply of Gardasil was unable through the manufactures only Cervarix. A small amount of vaccine became available and the pilot project commenced again but on a smaller scale. The roll out to the entire country in 2017 with 3 cohorts being attempted will be done with the assistance of GAVI in the first year of 2017/8. Thereafter the annual cohort of girls in their 11th year will be targeted in school.

2.4.2 Cold Chain

The objectives for this programmatic area are to:

1. Increase cold chain capacity at the national and regional levels;
2. Replacement and maintenance of the National Cold Chain at all levels
3. Complete and appropriately maintain the National Vaccine Cold Storage Facility

The implementation of the previous *Five-Year Immunization Plan 2006-2011*has resulted in the expansion of cold chain capacity at the national and regional levels. Cold chain equipment and supplies (e.g., vaccine carriers, thermometers, and cold chambers) were acquired using funding from various donor agencies and the Government of Guyana. The *Multi-Year Plan 2013-2017* budgeted for funding to ensure that the National Vaccine Cold Storage Facility is maintained in a timely manner and this has been done.

During 2016, the MOH worked with consultants from PAHO/WHO to ensure that the inventories of the current operational status of existing cold chain equipment was done. Procurement of additional pieces of equipment for the hinterland Regions are being addressed and it is expected that they will all have additional capacity to accommodate the HPV vaccine which will be introduced in 2017.

2.4.3 Human and Physical Resources and Operational Costs

The objectives for this programmatic area are to:

1. Allocate sufficient funds for required operational costs;
2. Ensure sufficient human and physical resources are available to manage and operationalize EPI optimally at all levels of the health system; and
3. Strengthen EPI management at central and regional levels.

There has not been any major change from the report of the *National Immunization Programme Financial Sustainability Plan* (2003) and the *Rapid Assessment of the System-wide Barriers and Good Practices in the Expanded Programme on Immunization* (2004), in regard to the EPI program and the severe challenges related to staff capacity. These challenges are related both to the inadequate number of staff available to implement the program and the capacity needs of existing personnel. Low salary levels stand as a primary obstacle to attracting and retaining qualified staff. Further, recently graduated health staff often lack critical clinical skills. The induction training required to fill this academic gap places additional human resource and financial burdens on the MCH/EPI Program. Moreover, staff attrition rates are high and there are few resources for new recruitment initiatives. This issue will be compounded in the near future as many resourceful and experienced staff members are nearing retirement. Despite these staffing shortages, the MCH/EPI Program must staff new facilities. This “spreads out” the health workforce and staff is required to prioritize clinical work at health facilities at the expense of community outreach activities.

The Government of Guyana has taken cognizance of these staffing issues and, in the *Health Vision 2020*, prioritizes workforce development and human resource management capacity building. Additionally, the President’s Emergency Program for AIDS Relief (PEPFAR) and UNICEF have provided additional staff for the MCH/EPI Program that can be used for vaccination outreach activities. However, with the transition of these initiatives, the GOG is faced with payments of additional staff. Over the last five years,

the MCH/EPI Program has attempted to create incentives to motivate existing staff. The incentives include an award program designed to recognize the efforts of hard-working staff and boost employee morale and motivation. These activities will be continued and expanded over the course of the *Multi-Year Plan 2017-2021.*

2.4.4 Training

The objective for this programmatic area is to:

1. Enhance the knowledge and skills of EPI health workers at all levels of the system on the following topics: vaccination policies and techniques, bio-safety, cold chain operation and maintenance, surveillance and supervision.

As provided in the *ten-Year Immunization Plan 2007-2017*, the EPI National Reference Manual was updated in 2009, 2013 and 2016. This new EPI manual has been updated with EVM recommendations of July 2014. The Community Health Worker Manual was produced in 2006 and reprinted in 2012.

The *Multi-Year Plan 2013-2017* included a plan to revise the EPI National Training Manual in 2015-201 and this has been accomplished. This manual will be used during the coming years to conduct training on the following topics in all regions: cold chain management; specimen collection and handling; computer literacy; and administrative skills for supervisors. This new CMYP focuses heavily on the introduction of the HPV vaccines to girls in the 11 year old cohort and the continued maintenance of the >90% coverage country wide for all antigens.

2.4.5 Social Mobilization and Coordination

The objectives for this programmatic area are to:

1. Enhance the coordination of EPI activities at the national, regional, and sub-regional levels;
2. Enhance coordination of EPI activities among all health care facilities;
3. Enhance the coordination of Guyana's EPI activities with its border countries (Suriname, Brazil);
4. Mobilize community participation in EPI initiatives; and
5. Raise public awareness on the importance of EPI initiatives through activities such as Vaccination Week in the Americas.

The EPI in Guyana has been very successful in raising public awareness of its activities and goals through a variety of public outreach activities using both print and non-print media. There is sufficient political will to continue such outreach and education initiatives, with policymakers seeking to highlight EPI activities and successes to the general public. EPI has also benefited from the Interagency Coordinating Committee on Immunization (ICC), which convenes meetings (on a quarterly annual basis) with donor agencies that have an interest in EPI-related activities. This committee will have an important role to play with the introduction nationwide of the HPV vaccine.

Over the past three years, Guyana has participated in the "Vaccination Week in the Americas," a hemispheric initiative to devote one week in the month of April every year to raise public awareness of the importance of vaccinations.

The *Multi-Year Plan 2017-2021* provides funding to continue the ICC meetings, which facilitate the planning and implementation of EPI. Additionally, the *Multi-Year Plan 2017-2021* budgets for Vaccination Week in the Americas activities, including promotional events and "mop-up" vaccination campaigns. Further vaccination outreach activities, media events and inter-sectoral meetings between regions will also be held on a regular basis to support continued public awareness-raising. In the upcoming roll out to a nationwide programme a much more aggressive set of marketing would have to be done to address the issues identified from the pilot. These will include:

- Increased sensitization and training for teachers, health staff and the parents. This would take the form of sessions held at schools for the PTA and teachers and to the community at large. These sessions would take the form of a delivery of a standardized set of messages, produced by health education specialists, and delivered by knowledgeable health staff from the area. Several such sessions could be held at the schools or at any forum that would be conducive to training.
- Endorsement by prominent persons. The president or the first lady, well known sports personalities or singing sensations, Ministers and religious persons could be used in the media to relay the need for the vaccine and the positive actions of prevention having it would have on cancer of the cervix
- The story of survivors or the children or relatives of cancer victims could be asked to relay their story on media and encourage parent to allow their children to be vaccinated.
- The use of public events e.g. fairs, cricket or other mass gatherings could be used to promote the vaccine
- Talks in churches or religious places of worship can be used to enlighten the public on the HPV and the benefits of the vaccine
- Family planning clinics, private health facilities and the government clinics can be sensitized and informed about the vaccine and how it plays a part in a cancer cervical programme. Leaflets and other material can be distributed in the clinics
- The religious organizations can be asked to identify any private schools that they may have affiliated with that religion and encourage the teachers and parents to take part in the sensitization package available by the MoPH
- CSO's can be brought on board to identify private schools or out of school girls in an attempt to capture them in the programme
- The CSO's could also assist with informing the public at the many functions that they have. The use of their members to help in the manpower or financial aspect of outreach activities into the hinterland could also be a role for the CSO's
- The child must also be sensitized and this can be done through the use of social media for those who have access to it. This is a powerful tool and can be very useful in identifying out of school girls and to encourage girls to have the vaccine

2.4.6 Surveillance and Information systems

The objectives for this programmatic area are to:

6. Strengthen national surveillance for vaccine preventable diseases;
7. Enhance communication and reporting between all levels of the health system;
8. Conduct timely outbreak control investigations;
9. Strengthen active surveillance, specifically for whooping cough, yellow fever, rubella, congenital rubella syndrome, acute flaccid paralysis, and measles; and
10. Strengthen the surveillance capacity of the national laboratory system.
11. Expand rotavirus surveillance activities to at least two more regions.
12. Introduce an active surveillance system for the incidence of genital warts in teenagers visiting the health clinics and the hospitals Casualty and OPD.

Even though there have been no reported vaccine preventable diseases in Guyana in the last five years, continued surveillance efforts and information exchange are crucial to maintaining this record. Active surveillance for rash with fever, yellow fever, congenital rubella syndrome, acute flaccid paralysis will continue to be conducted in all ten regions. Surveillance for rotavirus and pneumococcal vaccines should be extended to form part of the regular reporting and recording system of diseases.

2.4.7 Research

The objectives for this programmatic area are to:

1. Strengthen research capacity within the EPI Program by conducting assessments of the EPI Program's efficiency and efficacy; and
2. Conduct research to assess the validity and reliability of EPI data.

Due to the rapid turnover of staff, Guyana's EPI has faced challenges in undertaking research. Nevertheless, from 2003-2006, EPI has successfully completed the *EPI Situational Analysis of Regions 1,7,8,9* (2004) and the *Rapid Assessment of the System-wide Barriers and Good Practices in the Expanded Programme on Immunization* (2004). Furthermore, the EPI National Assessment in 2008 and the Effective Vaccine Management in 2014 also took place. It is planned that during 2017, another EVM should be completed.

These studies gathered critical information and provided a planning forum for future EPI initiatives. The *Multi-Year Plan 2013-2017* provides funding for further research initiatives to validate the extent of immunization coverage and the efficacy of the existing surveillance system. Additional research will be conducted to validate the coverage and also to determine the causes of low vaccination coverage rates in the hinterland regions.

2.4.8 Monitoring, Evaluation and Supervision

The objectives for this programmatic area are to:

1. Strengthen the capacity for program evaluation at all levels;
2. Conduct quarterly evaluations in each region;

3. Conduct semiannual evaluation at the national level and create appropriate feedback mechanisms for all evaluations; and
4. Strengthen capacity for supervision at the regional and district levels.

Over the last 10 years, meetings were conducted three times yearly for regional supervisors to evaluate regional EPI performance. At these meetings, regional supervisors present their regional annual report, commenting on all key programmatic areas. Oral and written feedback is given by central staff to highlight strengths and weaknesses. Central staff then compiles the regional data and use this to evaluate the performance of the national program.

Supervisory visits were also conducted by central staff at least once per year in each region. Regional supervisors are required to visit each facility at least once monthly, providing environmental conditions are favorable.

Over the course of the CMYP 2017-2021, the above activities will continue and EPI staff will make a concerted effort to ensure that adequate supervision continues to be provided at all levels of the system.

Part 3: Analysis of Costing and Financing

3.1 General Costing Strategy

In general, cost projections for the *Multi-Year Plan 2017-2021* were estimated based upon actual program costs in US dollars for the base year of 2015 (incremental costing). According the CIA World Fact Book, the Guyanese dollar growth stabilized around 203 per USD from 2008-2010 (i.e. 203.86 in 2006, 203.95 in 2009, 203.64 in 2010). Then, continued an upward trend in the last two years from 204.36 in 2012 to 205.9 in 2013. No adjustments were made to account for the slight variability in the exchange rate.[2] All recurrent costs were adjusted for inflation in subsequent years using the projected official rate of 5.6% provided by the Ministry of Health Planning Department.

3.2 Summary of Program Costs for the Multi-Year Plan 2017-2021

In keeping with the budget presented in Guyana's *Five-Year Immunization Plan 2013-2017*, the *Multi-Year Plan 2017-2021* divides EPI expenses into operational and capital costs (see Annex 1). Approximately 97.9% of the costs projected for 2017-2021 are classified as operational. Among these 2017-2021 operational expenses, the highest cost categories are vaccines and injections (44.7 %), personnel (30.8 % of total EPI projected costs), and transportation and maintenance (8.5 %). Among capital costs, the highest cost category for this same time period is vehicles and other equipment, accounting for 0.8% of total EPI costs each for the life of the plan. According to these cost projections, the Government of Guyana will be responsible for over 93.7 % of the total EPI costs for the 2017-2021 timeframe. The remainder of the costs will be divided between Ministry of

[2] Central Intelligence Agency, The World Factbook - Guyana. (2007); available at: https://www.cia.gov/cia/publications/factbook/geos/gy.html

Public Health partners including PAHO/WHO and other agencies .The relative financial contributions of these organizations were projected based on an analysis of past contributions, particularly in the baseline year of 2015.

3.2 Past and Projected Changes in Expenditure

Table 2 – Analysis of Routine Immunization Programme Costs [1 Unit Cost = 1,000 US $]

			Government support	Partners' support*		Existing GAVI HSS funding	Requested GAVI VIG
	Cost Category	TOTAL COST US$ [Year 1]	Amount US$	Name	Amount US$	Amount US$	Amount requested US$
1	1. Vaccines & Injections (biological/logistics)-Immunization supplies	$ 306,307	$ 252,605		$ -	$ -	$ 53,702
2	2. Personnel, program management and coordination, technical assistance	$ 90,852	$ 71,284		$ -	$ -	$ 19,567
3	3. Transportation & Maintenance	$ 25,064	$ 8,647		$ -	$ -	$ 16,417
4	4. Training – human resources and incentives, document production, other training and meetings	$ 39,856	$ 4,825	PAHO	$ 2,500	$ -	$ 32,531
5	5. Social Mobilization / Coordination – IEC and advocacy, planning and preparations	$ 12,011	$ 5,444	PAHO	$ 800	$ -	$ 5,767
6	6. Surveillance/ Information System-surveillance and monitoring, data management	$ 5,517	$ 1,076	PAHO	$ 1,100	$ -	$ 3,342
7	7. Research	$ 2,120	$ 367	PAHO	$ 500	$ -	$ 1,253
8	8. Monitoring & Evaluation	$ 12,465	$ 6,164		$ -	$ -	$ 6,300
9	9. Supervision	$ 1,908	$ 658		$ -	$ -	$ 1,250
10	10. Vehicles- transport for implementation and supervision, transportation and maintenance	$ 2,968	$ 1,024		$ -	$ -	$ 1,944
11	11. Cold Chain Equipment	$ 16,165	$ 3,527	PAHO	$ 2,050	$ -	$ 10,588
12	12. Other Equipment, waste management	$ 1,590	$ 549		$ -	$ -	$ 1,041
	Total	**$ 516,822**	**$ 356,170**		**$ 6,950**	$ -	**$ 153,702**

Source: EPI Plan of Action, 2017-2021, Costing Tables *MULTI-YEAR PLAN 2017-2021*and MOH Planning Department

The table above shows the cost to introduce the HPV vaccines and to fund the catch up programme. 50% of the cost of the HPV vaccines, syringes and safety boxes is being requested from GAVI which amounts to ($53,702), and providing VIG of $100,000. The total GAVI request is in the order of US$153,702.20

The government will contribute to 50 % of the cost of the HPV vaccines , in addition to fully funding the catch up campaign, total government cost for the year is $356,170 US (refer table 2 above).

Comparison between 2015 and 2017 projected expenditures reveals that the total cost of the EPI programme will increased by from US $2,129,740 to US $3,275,920. The most significant increase in relative expenditures during this time was for vaccines, increasing from 41.5% to 43.8% of total expenditures. This increase is likely the result of a Government incentive policy to do the catch up programme for the HPV cohorts from 11 to 13 years

Relative cost increases (as a percent of total expenditure) also occurred in the areas of vaccines and injection supplies and vehicles. Some of this increase resulted from fiscal prioritization of these program areas. However, the fluctuations of global market prices for fuel and capital equipment also contributed. There is a significant decrease in the cold chain equipment because only maintenance of the facility is needed since the cold chain equipment was procured in 2016.
The cost for vaccines continues to increase from 2017-2021 relative to the increase in the target population. The target population has moved from 8171 in 2017 to 8590 in 2021. The increase in the target population and increase cost for vaccines is also reflected in the increase cost for monitoring and evaluation, and training due to the priority focus of the program to train and equip staff members and to ensure the program is executed in the most efficient manner.

When 2017 costs are compared with the projected expenditures over the course of the *Multi-Year Plan 2017-2021*, the percentage of total expenditures allocated for each category of operational costs remains fairly constant. With regard to capital costs, there is a noteworthy increase in the percentage of total expenditures devoted to vehicles and other equipment. This is consistent with the programmatic goal of improving transportation and other supplies to hinterland and other areas.

3.3 Detailed Description of Costing Tables (Annex 1)

The following is a discussion of the main costs, and the methodologies used to derive these costs, for each of the major budget categories (see Annex 1). All percentages reported in the following discussion are for the 2013-2017 time period.

3.3.1 Operational Costs

Vaccines and Injections (p. 3 of Annex 1)

The procurement of currently utilized vaccines will account for approximately 98.3 % of the total expenditures in this category over the course of this plan. To estimate future costs, vaccine routine procurement expenditures for 2017 and onwards were calculated from actual doses received from PAHO revolving Fund in 2015. This figure was then adjusted for inflation over the subsequent years using the projected official 0.9 % inflation the figure provide by the MOH Planning Department.

It is important to note that Guyana intends to introduce Human Papilloma Virus vaccines in 2017 for children 10-12 years (approximately 64,924 doses per year). For the 10 year cohort 21,503 doses will be given and the remaining doses for the catch up at 11 and 1 years. This is estimated to cost US $306,307 dollars based on a unit price of US $ 4.50 plus service charge and freight. The Ministry of Public Health intends to continue in 2017 with the national programme with only the 10 year cohort

Personnel (p. 2 of Annex)

Staff salaries (plus traveling and subsistence) are projected to account for over 99.8% of the costs in this category. Of this 99.8%, 64.5 % will be used as a proportion of payment of salaries and 35.5 % will be used for travelling and subsistence for health workers. When 10.6 % of the estimated HPV cost was applied to the Personnel salaries (including travelling and subsistence, the government funding is $ 71,198 .Due to the present structure of the MCH/EPI Program, no staff works full-time on EPI activities. In some of the activities with particular reference to health workers in hinterland and remote areas entail travelling for hours to reach some locations to immunize children through hard terrain, mountains, water rapids and boats. During this time in their outreach, other health aspects of the MCH programme will be addressed as well.

This means that the EPI staff also assists with the overall coordination of MCH. To account for this, salary cost projections were made using regional salary figures from the Ministry of Finance.

The table 3 below shows the different approved salary scale in Guyana Public Services as at 1st January 2016. The Community Health Worker would fall Band 5, Midwife Band 6, Staff Nurse/Midwife Band 7, Medex Band 8 and Doctors Band 12. Other senior officials will fall into Band 13 and 14. These are the workers at the Primary and National Health Care level who runs the Maternal and Child Health Programme /Expanded Programme on Immunization.

Table 3: *Salaries Scale in Guyana Public Service as at 1 January 2016*

Band	Min G$/Month	MaxG$/Month	MinG$/Daily	MaxG$/Daily
14	349,473	648,823		
13	287,196	505,748		
12	226,892	399,564		

11	184,313	306,495		
10	146,549	239,887		
9	118,502	184,542		
8	97,894	146,755		
7	80,287	118,754	3,375	4,988
6	69, 717	87,853	2,923	3,686
5	60,565	76,267	2541	3,199
4	55, 289	62,850	2,258	2,635
3	52,876	59,879	2,161	2,514
2	50,000	56,683	1996	2,311
1	50,000	55,125	1831	2,067

Source: Public Service Ministry

These 2017 costs were adjusted for expected increases in estimated salary expenditures

Estimates for percentage of time spent on EPI for MCH/EPI staff were drawn from the data of FSP 2003 and Ministry of Finance records from 2005. The regional data was totaled to create a final estimate of salary costs for the 2017-2021 time periods. In addition, travelling and subsistence means" expenditure for official local travel, such as the cost of transportation (e.g., hiring of transportation (air), water or land), immunization outreach activities, hotel accommodation and meals.

27.9% of total salary cost is allocated to travel and subsistence. Of the total travelling and subsistence, 35.5% will be used from Central Ministry of Public Health, Expanded Programme on Immunization for the introduction of the HPV in all regions. The other 64.5 % would be used for the ten regions in order to ensure successful implementation of HPV into the national programme in the regions. Table 4 illustrates the proposed breakdown of US $23,851.

Table 4: Breakdown of Travelling and Subsistence

Particulars	Unit cost (Guyana Dollars	Quantity	Total cost (Guyana dollars)	US Dollars(210 exchange rate)
Hiring of boats	60,000	15	900,000	4,285.71
Air fares		3	1,380,000	6,571.43

	460,000			
Vehicle Hire	140,000	13	1,820,000	8,666.67
Per diem (meals)	7,000	50	350,000	1,666.67
Hotel Accommodation	9,000	50	450,000	2,142.86
Miscellaneous(overweight)			108,779	518.00
Total			5,008,779	23,851

`The unit cost of this travelling and subsistence is based on historical cost and patterns.

Transportation and Maintenance (p. 5 of Annex)

Fuel procurement, boat hires, and plane charters will constitute 43.7 % of the costs in this category over the duration of this plan. The remaining costs are divided among maintenance of cold chain equipment and the National Vaccine Cold Storage Facility (23.1 % and 2. 1% respectively) and overhead costs for health facilities (30. 8 %). The 2017 costs in this category were calculated by totaling actual and estimated regional costs for 2016, with appropriate adjustment for inflation. 2017-2021 estimated costs were created by adjusting this 2016 figure for inflation using the projected official inflation rate.

Training (p. 6 and 7 of Annex 1)

EPI Regional Taining Workshops (Area 4.1, 4.2 and 4.4) are expected to be the most costly activity in this category (constituting 47.2 % of the total projected costs for the duration of the plan). Projected costs for this activity were estimated using figures from the MOH *Planning Expenditure Report* (2016) that were adjusted for inflation.

Other substantial costs in this category include Training in school health component Ministry of Education. Again, these costs were based on estimated costs from 2016 with appropriate adjustments for inflation.

Social Mobilization and Coordination (p. 8 of Annex 1)

Development, printing, and dissemination of educational materials, vaccination week activities will also promote HPV introduction are projected to account for nearly 95.4% of the expenditures in this category for the 2017-2021 time periods. These costs were estimated based on an estimate of 2016 expenditures.

Annual Vaccination Week in the Americas is projected to account for approximately 70.4% of the overall costs in this category; this is because it is slated to do HPV health promotion activities. This figure was estimated based on 2016 expenditures for this activity with appropriate adjustments for inflation.

Surveillance/Information Systems (pp. 9 and 10 of Annex 1)

The highest cost in this category is to review, update and surveillance, other new vaccines surveillances which accounts for 20.9 %. Updating the child health records, and creating database for HPV will account for 9.8 % of this category The projected expenditures for these three activities are all based on estimated 2016 costs appropriately adjusted for inflation.

Research (p. 11 of Annex 1)

The primary research-related expense is for the validation of the accuracy of the information system and conduct reach on health seeking behavior as relates to cervical cancers. This will account for 100 % of the total expenditures in this category over the duration of the plan. Again, the projected cost of this activity is based on estimated 2016 costs with appropriate adjustments for inflation.

Monitoring and Evaluation (p. 12 of Annex 1)

Conduct semiannual evaluations/training for regional EPI supervisors on HPV will account for 33.5 % of the costs in this category. Cost projections for these two activities are based on estimated 2016 expenditures with appropriate adjustments for inflation. However, updating standardized evaluation tools (2.5%) and conducting a second EVM assessment in 2017 (64%) will absorb a fair amount of the total cost.

Supervision (p. 13 of Annex 1)

By far, supervisory visits to the 10 Regions in Guyana constitute the largest cost in this category (100 % of total projected expenditures for supervision). The costs for this activity were projected using estimated 2016 expenditures adjusted for inflation.

3.3.2 Capital Costs

Vehicles (p. 14 of Annex 1)

The costs in this category are divided among procurement of nine boats and ninety lifejackets will account for 100 % of the cost in this category.

For boat procurement (Area 10.1), the cost was projected on current market prices in 2016. There was no cost associated with the procurement of road vehicles since this will covered under the Government of Guyana-MCH budget.

Cold Chain Equipment (p. 15 of Annex 1)

In this category, the primary costs for the 2017-2021 time period includes updating inventory of the cold chain system and development of a regional cold plan for maintenance this accounts for 24.1 % and 75.9 % respectively in this category.

The procurement of ice chests, vaccine carriers, and thermometers and replacing and procuring cold chain equipment (solar system), no cost was associated with this category since funding of these items is expected to be of the GAVI transitional grant in 2016.

Other Equipment (p. 16 of Annex 1)

Review and update regional waste management plan is projected at 100 % of the total cost in this category. The 2017 cost figure is the estimated remaining cost to upgrade the waste disposal systems in the regions for EPI.

3.4 Overview of Government and EPI Spending

The Government of Guyana has typically financed the majority of the costs for the NIP, e.g.88.8%, allocating a total of US$1,890,980 dollars in 2015, according to the UNICEF Joint Reporting Form), and has consistently demonstrated political and financial commitment to the Program. . As the national budget has increased, public spending on health as a percentage of total government expenditure has also risen to 9.5% in 2015.The primary source of funding for the public sector is government taxation.

3.5 Central Budget Processes

At present, the capital and recurrent budgeting processes are handled by two separate teams within the Ministry of Finance. Vaccine procurement is provided for in the recurrent budget while the purchase of cold chain and other equipment is in the capital budget. The budget process starts each year in August when the various Ministries begin to prepare their respective budget proposals. These proposals are submitted to the Ministry of Finance in October.

In the Ministry of Public Health, separate budgets are submitted by the central administration and by each of the ten regions. The national budget is, as a requirement of Parliament, passed in the first three months of the year. However, this built in delay requires that the Ministry of Health prioritize activities until the entire budget is

approved. Specific provisions are made for payment of salaries and health emergencies to ensure that no gaps in financing for these crucial activities occur.

With specific reference to immunization, pre-budgeting and planning are done on the same schedule. All activities in the EPI Plan of Action have to be executed on a timely basis after the budget is passed. Monitoring and evaluation of the budget are done on a quarterly basis by the Ministry of Finance.

In the recent past, the Government has moved toward program budgeting by some Ministries, including the Ministry of Public Health. Under this system, EPI activities are provided for within the budget of the Maternal and Child Health program, with a specific line item created for EPI in 2015. Vaccines and supplies are included in the national budget under Drugs and Medical Supplies and are obtained on an annual basis by means of the PAHO Revolving Fund for Vaccine Procurement. There is written cabinet approval for this procurement process. Payment for vaccines is made by the MOPH within sixty days of shipment. No tax is levied on vaccines and vaccination supplies for public use.

3.6 Spending Authority for MCH/EPI Program

The MCH/EPI Officer makes a request to the Permanent Secretary for funding for vaccines and other supplies. The Permanent Secretary then consults with the planning department of the Ministry of Health, with final approval given by the Ministry of Finance.

3.7 Regional Budget Processes

The regions are executed by a Regional Democratic Council (RDC) overseen by a Regional Chairman. A Regional Executive Officer (REO) acts as the chief accountant. Each region is provided funds for its capital works and recurrent expenditure by the Ministry of Finance. The Ministry of Health meets with the regions before the regional budget proposals are approved; however, it has no authority to set the budgets of the regional administrations

The regional administrators report to the Ministry of Regional Development, and although a Regional Health Officer (RHO) is attached to each region, the RHO has limited administrative control over regional health resources. The main control rests with the RDC through the REO, where the disbursement of resources takes place. The possibility therefore exists for budgetary resources earmarked for health to be diverted to alternative regional priorities. In an effort to minimize this problem, MOPH staff has held continued discussions with the Regional Executive Officers to emphasize the importance of the immunization program. This was done most recently in Regions 1 and 7 in the first half of 2014. The new Health Sector Reform process will ensure that the Ministry of Health plays an active role in strengthening supervision of the budgetary process, as well as utilizing indicators for monitoring EPI implementation, performance and resource allocation

3.8 Reliability and Efficiency of Government Financing

Despite the systemic changes described above, funding for EPI has traditionally been quite reliable. Budgetary support to the Ministry of Public Health for the MCH/EPI is secured by the government through the European Commission and the Heavily Independent Poor Countries Initiative of the International Monetary Fund. This has ensured a steady supply of vaccines and financing for maintenance, transportation and other overhead costs. In addition to reliably funding routine immunization services, the government has also covered the cost of expanding EPI with the introduction of MMR in 1995, Yellow Fever in 1998, Hepatitis B for health workers and other high risk groups in 1999, and pentavalent (DPT/HepB/Hib)vaccine in 2000.

The example of pentavalent vaccine is particularly noteworthy. Starting in 2001, Guyana received approximately one million U.S. dollars of support from GAVI for the provision of biologics and logistics over a five-year period. The Expanded Programme on Immunization used these funds to successfully integrate the pentavalent vaccine (DPT/Hepatitis B/Hib) into the country's routine vaccination services. According to plan, the Government of Guyana assumed total responsibility for the cost of this vaccine at the end of 2005, becoming the only GAVI-funded country to assume independent financial management of a new vaccine in the scheduled time-frame. For the year 2006, there have been no interruptions of vaccine supply following the cessation of GAVI New Vaccine Support. This example clearly demonstrates the Government of Guyana's commitment to strengthening the EPI program for continued long-term success.

Despite this overall financial reliability, there have been some constraints, particularly in the acquisition of cold chain equipment. Gavi transitional funding will assist the Ministry of Public Health in the acquisition of cold chain equipment. This funding will address the problem which mainly affects the hinterland regions (1, 7, 8 and 9) where providing immunization services is much more costly. However, there are multiple opportunities to address this constraint via collaboration with the many programs emerging in the hinterland to address the health and social disparities of Amerindians.

Over the past five years, UNICEF has provided consistent and reliable funding for the MCH/EPI Program. This funding has been used for training and cold chain supplies. For 2017-2021, PAHO/WHO will provide funding for Vaccination Week in the Americas activities.

As Guyana continues to improve economically several of these funding opportunities may become less available. Already GAVI has designated Guyana a graduating country for its EPI programme and as such the EPI budget will have to reflect the decrease in these funds. Fortunately GAVI has agreed to consider assistance to Guyana for the introduction nationwide of the HPV vaccine to girls. A proposal for this funding has been prepared and submitted and a decision is expected with the next coming months. This programme will be commenced in September 2017 using mainly a school based strategy.

Part 4: Plan to Reduce Vaccine Wastage

Vaccine needs are calculated based on: the size of the target population, the total number of doses to be administered to each individual, and the standard wastage factor for each antigen (refer to Table 5).

Table 3 - Estimated wastage for specific antigens and comparison of percentage wastage 2011 and 2013

Antigen	Standard Wastage Factor	% wastage in Guyana (2011)	% wastage in Guyana (2013)
BCG	2	50	45
OPV	1.3	10	10
*Pentavalent (DPT/Hep.B/Hib)	0	0	0
MMR	1.3	15	10
Yellow Fever	1.3	50	25

* Pentavalent vaccines come in single dose vials; therefore it is one vial per client, and thus no wastage.

Vaccine wastage depends on the vial size and cold chain efficiency. For example, yellow fever vaccine is packaged in 10 dose vials and BCG vaccines in 10 dose vials. The Government of Guyana has a "no turn away" policy, which requires that any individual presenting for vaccination must be vaccination regardless of how many doses per vial will be wasted as a result. While this policy promotes increased immunization coverage, it can also result in high levels of vaccine wastage, particularly in areas of low population.

Guyana's EPI will take a two-pronged approach to minimizing vaccine wastage:

1. Reduce the vial dosage size (e.g., for yellow fever from 10 doses/vial to 5 doses/vial); and
2. Coordinate vaccination scheduling to ensure that groups of children are available to receive particular vaccines on the same day. However, the cost of using smaller dose vials (higher cost and less wastage) for specific locations, such as in the rural interior, will have to be weighed against the lower cost of larger dosage vials.

Over the last three years, in an effort to reduce waste, EPI has requested 5-dose vials of yellow fever vaccine and attempted to use single-dose MMR vaccines in less populated areas. EPI staff have already begun to coordinate vaccination scheduling to ensure that groups of children are available to receive particular vaccines on the same day. This has greatly reduced the wastage rate of the vaccines (refer Table 5). The *Multi-Year Plan 2017-2021* continues to emphasize the implementation of these activities and the development of an operational review of the impact these activities have on vaccine wastage. Depending on the results of this review, further programmatic changes will be instituted to continue to reduce wastage.
With the introduction of the HPV a single dose preparation sed in an effort to reduce wastage. Although single dose preparations are usually more expensive but by reducing the wastage it reduces the vaccine costs.

Part 5: Plan to Reduce Dropout Rate

This plan to reduce the vaccination dropout rate in Guyana is a modification of the previous plan reported in the *Rapid Assessment of the System-wide Barriers and Good Practices in the Expanded Programme on Immunization* (2004):

Any areas with the Regions with low coverage due to drop out rates will be targeted and given additional attention. The following protocol will be used by health facilities to address this problem:

1. Complete a list of defaulters using the under one and under five registers kept at each health facility;
2. Use outreach workers to locate these defaulters;
3. Perform house-to-house vaccination of defaulters;
4. Review EPI coverage on a monthly basis and implement mop-up vaccination campaigns as necessary;
5. Develop a short questionnaire for parents to determine why their child was not appropriately vaccinated or missed clinic appointments; and
6. Develop and implement an action plan to address the findings of the questionnaire responses.

These activities will be implemented throughout the years. Specific emphasis will be placed on reducing dropout rates during Vaccination Week in the Americas

Part 6: Strategy for Improving Immunization Safety

6.1 National Injection Safety Policy

The Ministry of Health(now renamed the Ministry of Public Health), through the U.S. Agency for International Development, launched the Guyana Safer Injection Project (GSIP) in 2004. This PEPFAR funded initiative was created to "prevent the medical transmission of HIV by reducing unsafe and inappropriate injections in Guyana." The following excerpt from the *GSIP Contract Synopsis* describes the specific objectives and activities of this initiative. "Specifically, Initiatives (GSIP) and its subcontractors are:

1. Producing concrete national strategies, policies, standards, guidelines and work plans related to reducing unsafe and unnecessary injections in Guyana that are accepted by government and adopted by the government, key cooperating partners and the public;
2. Improving provider skills in administering safe injections, preventing infections, and health care waste management;
3. Developing and implementing an advocacy and social mobilization strategy for increased awareness of managers, communities, providers and clients regarding the rational use of injections, effective supply chain management, universal precautions, and appropriate waste management;
4. Putting in place a system to ensure delivery and use of sufficient safe injection supplies at all medical facilities nationwide;
5. Establishing monitoring and evaluation systems to inform policy and practice related to safe injection practices and health care waste management; and

6. Developing resource mobilization/sustainability strategies for injection safety & medical waste management"

With regard to policy development, GSIP has assisted the MOPH with the development of a national level policy that outlines guiding principals for injection safety and waste management. GSIP then conducted an injection safety assessment in Regions 6, 7 and 9 to determine the strengths and weaknesses of the current system. Using the information collected in this exercise, GSIP worked with key stakeholders at the MPH to translate the national level policy into a national plan for immunization safety. This plan provides specific standards and recommendations in the following areas: waste minimization, segregation and containment; waste handling, storage and transport; waste disinfection and disposal; health worker safety; training and supervision for waste management; equipment and supplies; and communication and behavior change.

Interagency Immunization Coordination committee oversees the EPI activities and includes coordinating resource use, setting standards, developing action plans, and ensuring that all health facilities have adequate amounts of safety boxes.

Over the next five years, the MOPH will focus future efforts on expanding current injection safety activities to all other regions on a phased basis. In addition, the national committee will continue to develop action plans to successfully implement the recently developed national plan for injection safety.

6.2 Program Level EPI Policies and Initiatives for Immunization Safety

At the program level, the MCH/EPI Program plans to address the issue of immunization safety by including updated biosafety information in its revised EPI National Training Manual (2015). Subjects will include: protocols for safe use and disposal of needles and syringes; use of safety containers for the disposal of used syringes, needles, and other sharps; protocols for transport and disposal of contaminated sharps; and protocols for the incineration of medical wastes.

In addition, EPI has set a standard policy that each health post must have, at a minimum, one new safety box per month and that those health centers with a higher vaccination volume must have more than one box per month. This policy will be continued and enhanced monitoring for compliance will be performed.

Guyana is committed to single-use needles/syringes. To this end, EPI budgets for one needle/syringe for every dose of vaccine plus a five percent needle/syringe wastage factor. This practice will be continued over the course of the *Multi-Year Plan 2017-2021* . Using GAVI funding, EPI has piloted the use of auto-disposable (AD) syringes throughout Guyana, after training health workers in their use. Given the success of this pilot program, EPI intends to continue to use AD syringes.

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ANNEX 1: *Multi-Year Plan 2017-2021* Costing Tables