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Uganda's Increasing Dependence On Development Partner's Support For Immunization – A Five Year Resource Tracking Study (2012 – 2016)

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Abstract

Background: In Uganda, there are persistent weaknesses in obtaining accurate, reliable and complete data on local and external investments in immunization to guide planning, financing, and resource mobilization. This study aimed to measure and describe the financial envelope for immunization from 2012 to 2016 and analyze expenditures at sub-national level.

Methods: The Systems of Health Accounts (SHA) 2011 methodology was used to quantify and map the resource envelope for immunization. Data was collected at national and sub-national level from public and external sources of immunization through key informant interviews coupled with document reviews. Data were coded using the SHA, categorized and disaggregated to detail the expenditure on immunization activities.

Results: Over a five-year period, funding for immunization increased fourfold to US$ 85.6 million in 2016. The Ugandan government was the main contributor (55%) to immunization resources from 2012 to 2014. However, Gavi, the Vaccine Alliance contributed the majority (59%) of the resources to immunization in 2015 and 2016. Majority (66%) of the funds were managed by the National Medical Stores. Over the five-year period, 80% of the funds allocated to immunization activities were spent on facility based routine immunization (expenditure on human resources and outreaches). At sub-national level, districts allocated 15% of their total annual resources to immunization to support supervision to lower health centers (including distribution of vaccines). Health facilities spent 5.5% of their total annual resources on immunization to support outreaches.

Conclusion: Development partner support has aided the improvement of vaccine coverage and increased access to vaccines. However, there is an increasing dependence on this support for a critical national program raising sustainability concerns alongside other challenges like being off budget and unpredictable. To ensure financial sustainability, there is need to operationalize the immunization fund, advocate and mobilize additional resources for immunization from the Government of Uganda and the private sector, increase the reliability of resources for immunization as well as leverage on health financing reforms like the National Health Insurance.

Background

Immunization is a cost-effective intervention that has played a vital role in controlling and eliminating vaccine-preventable diseases. Globally, immunization is estimated to avert approximately 2-3 million deaths each year as access to immunization services has improved especially among the hard-to-reach and vulnerable populations (1). Uganda is a low-income country with a population of 34.9 million people (2). In line with the Sustainable Development Goal 3.2 that seeks to end preventable deaths of newborns and children under 5 years of age (3), the Uganda National Expanded Program on Immunization (UNEPI) has increased access to immunization services nationally through the introduction of new vaccines and improvement in vaccine coverage with support of its partners (4–6). Coverage estimates show high performance for Diphtheria, tetanus and pertussis (93%), measles (87%), Polio 3 (92%) and Pneumococcal Conjugate (92%) vaccines (4).

The Global Vaccine Action Plan highlights the need to increase the total amount of funding for immunization from countries and development partners even though financing for immunization is primarily the responsibility of governments (7). In order to ensure predictable and sustainable funding for immunisation, resource tracking efforts are needed to guide governments and partners (7). Resource tracking in Uganda has been possible through the institutionalization of the National Health Accounts (NHA) that has provided evidence to monitor health financing since 1997 (8). Findings from the NHA show that the Government of Uganda's (GOU) expenditure on health in 2015 was US$1.8 billion representing 1.1% of the Gross Domestic Product (9). However, Uganda's budget allocated to health (8.7%) is below the Abuja declaration target of 15% (9,10). Additionally, the health expenditure per capita (US$56) is also lower than US$84 per capita recommended by the World Health Organization (WHO) (9). The current health expenditure estimates also highlight an increase in public and private funds but a decrease in funding from development partner funds (from 43.4% to 41.7%) within the same time period (9). In addition to NHA, WHO/UNICEF have also jointly captured various domains on performance, planning, financing and quality indicators from member states through the Joint Reporting Form (JRF) so as to track implementation of the Global Vaccine Action Plan (GVAP) (11). From the JRF, GOU's spending on routine immunization per surviving infant has increased from $3 (2006) to $11 (2014)(12). More recent estimates in 2017 show that the GOU contributes approximately 35% of the total expenditure on immunization (13). Nevertheless, Uganda has not consistently reported on JRF indicators and therefore exacerbating the need for resource mapping exercises.

A mapping of financial flows for immunization in 2009 showed an increase in financing for routine immunization in Uganda from $24.2 million to $32.9 million in 2009/10 and 2010/11 respectively with GOU contributing approximately half of all the resources (14). There is a dearth of evidence in the financial flows specific to immunization especially in light of the newly introduced vaccines. Additionally, persistent weaknesses have been noted in obtaining accurate reliable and complete data on local and external investments in immunization and yet these are critical to estimate costs, resource needs and resource gaps. It is vital to have accurate data on funding flows and expenditure to aid country level planning, financing and also resource mobilization.

Gavi, the Vaccine Alliance (Gavi) commissioned a prospective evaluation of its support in four countries including Uganda with an aim of generating evidence regarding the relevance, effectiveness, impact and efficiency of their support. A key evaluation question was centered on identifying how Gavi resources are utilized and their relationship with domestic and development partners resources. This paper presents findings from the resource tracking sub-study that traced the flow of immunization resources from national to sub-national levels. The objectives were: 1) To measure and describe the financial envelope for immunization activities at national level in Uganda from 2012 to 2016, and 2) To conduct an expenditure analysis of the resources received and utilized in 2015 and 2016 at sub-national level.

Methods

Study site and population

This study was conducted at both national and sub-national levels in Uganda. At national level, we studied immunization stakeholders from public entities, development partners and international non-governmental organizations. In order to capture the role of decentralization, we studied districts and health facilities. As such, District Health Offices (DHO), Chief Administrative Officers, health facility managers and Expanded Program on Immunization (EPI) focal persons at districts and health facilities were included in the study.

Quantifying the resource envelope at national level

Approach

To quantify the total resource envelope for immunization, a resource mapping methodology was used. This approach maps both financial and non-financial (commodity and equipment) resources for immunization. As such, we identified initial key immunization stakeholders through document review and additional respondents were identified by key informants who had been interviewed. These stakeholders were broadly categorized as public entities, development partners, and international non-governmental organizations. Stakeholders were then grouped into financing sources, financing agents and service providers in line with the System of Health Accounts (SHA) 2011 classifications (15). Financing sources, agents, service providers, functions, and line items were coded using the SHA 2011 classification system. The SHA codes for health care functions for immunization (HC.6.2) were further disaggregated to allow for greater detail on the types of immunization activities.

Scope

The scope of analysis included all public and external sources of financing or commodities in Uganda. The study covered the following financial years: 2011/12 (2012), 2012/13 (2013), 2014/15 (2014), 2015/16 (2015), and 2015/16 (2016). The timelines for this study were purposively selected based on the EPI's plan to introduce new vaccines. Data were collected in three phases: 2013, 2014 and 2016.

Estimation

To estimate the total envelope of immunization funds, we summed the a) total funds directly to support immunization (funds from development partners + GOU contribution at national level) and b) GOUs expenditure on salaried labor (% attributed to immunization) and proportion of Primary Health Care (PHC) funds spent on immunization at sub-national level. PHC funds in Uganda are part of the health sector grants provided to local governments and health facilities in order to facilitate the provision of health services with emphasis on access, quality and affordability (16). These funds include wage conditional grants, non-wage conditional grants, transitional development-sanitation and transitional development (16). PHC funds are released on a quarterly basis from the ministry of finance to district local governments (district health offices and hospitals) and to health facilities.

Expenditure analysis at sub-national level

The main objective of the expenditure analysis at district level was to estimate and describe what immunization resources were received and how they were utilized over two financial years - 2015/16 (2015) and 2015/16 (2016). Data was collected from districts and health facilities.

District and health facility selection

Seven districts were included in the study. Districts were purposively selected based on the Reach Every District (RED) classification of districts which includes vaccine coverage performance (17) and geographic representation. Using this criterion, the following districts were sampled: Lamwo, Abim, Masindi, Mitooma, Nakaseke, Kween and Iganga. Data was collected from thirty-one sites (health facilities and district health offices). In each of the sampled districts, the District Health Office (n=7) and three health facilities were studied. These health facilities (n=24) were purposively selected based on their immunization performance/coverage of the third dose of Diphtheria, Pertussis Tetanus vaccine (DPT3), level of care (Hospital, Health Centers IV, III and II) and ownership (public and private-not-for-profit facilities).

Estimation of Government of Uganda's support at sub-national level.

Estimation of GOUs contribution can be under-estimated if expenditures on vaccines and operational costs is considered without the investment in human resources responsible for service delivery and other infrastructure. The estimation of GOUs expenditure on human resources was outside the scope of this study. Nevertheless, the study used findings from the EPIC study to estimate GOUs contribution to salaries for immunization (labor and Primary Health Care funds) and adjusted the estimates for inflation (18).

Data Collection and Analysis

Being a retrospective quantitative study, this study relied on a combination of face-to-face key informant interviews, using structured data collection tools, and review of documents provided by respondents. Data was collected by research assistants trained on the SHA methodology and in the use of the data collection tools. Data was first captured using hard copies of the tools and then entered into pre-coded MS Excel® spreadsheets. Level one data cleaning and verification was conducted on data entered in the Excel spreadsheets. Thereafter, data were entered into an excel-based analysis screen and coded using the SHA (2011). Data were categorized according to stakeholder function (source, agent or provider) and further disaggregated into expenditure by program area as well as by immunization line items. Data was captured in Ugandan shillings and later converted to US dollars using an exchange rate of 1 US dollar to 3443 Ugandan shillings (US $1: UGX 3443).

Results

Overview of financing for immunization in Uganda.

In Uganda, there are two financing schemes through which immunization funds are channeled: the government and “rest of the world” schemes. The government scheme represents public funds that are comprised of GOU funds and on-budget funds from development partners. Financing agents for the public funds are Ministry of Health (MOH) / Uganda National Expanded Program on Immunization (UNEPI) and National Medical Stores (NMS). Providers of services for the public funds are: MOH / UNEPI, DHOs, government health facilities, and Private Not for Profit (PNFPs) health facilities. On the other hand, the “rest of the world” scheme is funded by development partners including United Nations agencies, bilateral agencies, and international Non-Government Organizations (NGOs). Development partners manage the bulk of their funds, with a few exceptions (e.g. World Health Organization and Gavi) whose bulk of the funds are managed by UNEPI and NMS (for vaccines, supplies procurement and handling). Service providers for development partner funds are UNEPI, DHOs, government health facilities, and non-government health facilities. In some cases, the development partners also provide services.

Resource envelope for immunization

Financing sources

Over the five-year period, funding for immunization increased fourfold from US$20.4 million in 2012 to US$ 85.6 million in 2016. (Figure 1). The main contributors to the resource envelope were the Government of Uganda and Gavi. The Ugandan government was the greatest contributor to the immunization resources (55%) from 2012 to 2014. However, in 2015 and 2016, Gavi contributed more resources (59%) to immunization. Other sources of funding over the five-year period included WHO (9%), UNICEF (6%), CDC (2%) and other partners (1%).

Financing Agents

Notably, these immunization funds were managed by several public and non-public stakeholders including NMS, Ministry of Health, UNICEF, African Field Epidemiology Network (AFENET), PATH, Maternal and Child Health Integrated Program (MCHIP), Africa Medical Research Foundation (AMREF) Uganda, Catholic Relief Services, SABIN Vaccine Institute and Clinton Health Access Initiative (CHAI). Figure 2 highlights that NMS has progressively managed more immunization funds from 36% (US$ 7 million) in 2012 to about 66% (US$ 52 million) in 2016. Similarly, UNEPI managed more funds from 6% (USD 1, million) in 2012 to 17% (13 million) in 2016.

Providers of immunization services

Providers of immunization services included government owned facilities at different levels including hospitals, DHOs, NMS, UNEPI and the multinational agencies. Government health facilities provided 70% (USD$ 31million) of the immunization services over the five- year period. District Health Offices, administrative agencies (NMS and UNEPI) and developmental partners provided 15%, 12% and 3% respectively.

Health Care Functions/Immunization activities

Immunization resources were further categorized by health care function that is to say immunization activities/programs. Over the five-year period, 80% of the funding was spent on facility-based routine immunization which includes expenditure on human resources and outreaches. The second largest expenditure (14%) was on immunization programs which includes expenditure on supplemental immunization activities, family health days and research. Immunization surveillance and activities that could not be disaggregated (expenditure on health system strengthening grant and new vaccine Introduction) took up 2%. Other immunization activities like training, social mobilization and advocacy only took up 1% of the expenditure over the study period.

Table 1: Funding flows for immunization activities from 2012 to 2016.

	Expenditure in US$				
alth Care Function	**2012**	**2013**	**2014**	**2015**	**2016**
nunization (Facility based)	18,210,863	17,659,018	18,762,707	52,860,877	70,113,273
on programs	929,422	4,676,155	4,821,377	10,920,709	9,613,709
anagement	58,089	29,044	261,400	203,311	290,444
ance	377,578	232,356	580,889	464,711	1,336,044
	377,578	377,578	435,667	232,356	726,111
egated	-	987,511	435,667	842,289	3,456,288
	-	-	145,222	290,444	
lization and advocacy	464,711	87,133	29,044	232,356	145,222
	20,418,241	**24,048,795**	**25,471,973**	**66,047,053**	**85,681,091**

Expenditure analysis at District and Health Facility Levels

The study conducted an expenditure analysis to quantify and describe the immunization resources received and utilized at district level and health facility levels for financial years -2015/16 (2015) and 2015/16 (2016). The expenditure analysis presents expenditures for immunization activities at district and health facility level both by program area and by line item classification.

Expenditure analysis at district level.

At district level, immunization activities were funded by two key players including the Government of Uganda through the PHC non-wage fund and development partners (including international NGOs). Over the two-year period, total funds received by districts varied. WHO (57%) and UNICEF (23%) provided the largest proportion of funding in the selected districts. Government funding through PHC grant accounted for about 3% of the total resource envelope in the sampled districts.

Table 2: Sources of funding for immunization at district level.

ict	Ugandan Government (PHC) (US$)		Gavi, the Vaccine Alliance (US$)		WHO (US$)		UNICEF (US$)		Other (AFENET) (US$)	
	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016
	960	960	-	3,726	-	37,954	11,266	-	-	-
a	1,191	1,191	11,418	18,335	29,671	58,474	40,513	66,617	-	-
a	1,949	1,227	4,834	14,285	53,991	54,202	2,109	4,650	-	-
o	-	-	-	7,443	29,820	59,661	-	7,931	474	7,886
di	1,917	1,685	8,246	19,262	-	13,814	7,570	7,178	-	-
ma	1,296	1,481	4,990	16,512	24,451	37,772	-	6,596	-	-
eke	1,874	2,007	5,340	-	-	-	-	5,799	-	-
	9,187	8,551	34,828	79,563	137,933	261,877	61,458	98,771	474	7,886

Expenditure of public funds (Primary Health Care Grant) at district level

Public funds (PHC grant) from the Ugandan government allocated to immunization specific activities greatly varied by district. On average, district health offices spent 15% of their total annual resources on immunization activities. More than half of the districts (4 out of 7 districts) allocated less than 15% of their total funds (proportion of their PHC grant) to support immunization activities. The proportion of funds allocated to immunization ranged from 0% to 45% over the two years. By program area, the bulk of funds were spent on supervision accounting for 78% in 2015 and 86% in 2016. Cold chain maintenance took up 18% in 2015 and 10% in 2016. The rest of the funds were spent on outreaches. By line item, the bulk (33%) of funds were spent on fuel for vehicles to transport health workers for outreaches and distribution of vaccines. Allowances for outreaches took up 20% and 15% of the total PHC funds in 2015 and 2016. Activities relating to supervision and cold chain maintenance ranged between 15% and 19% in both 2015 and 2016.

Expenditure of funds from development partners

Funds from development partners were mainly spent on routine immunization accounting for 54% and 48% in 2015 and 2016. This included expenditure on vaccine collection and per-diems/allowances to support outreaches. Other expenditures included supervision to lower health centers, training, social mobilization, supplemental immunization activities, surveillance, cold chain maintenance and vaccine delivery and program management.

Expenditure analysis at health facility level.

The study further analyzed expenditure at health facility level to determine what proportion of the annual public funds were spent on immunization activities and what the expenditure drivers were.

Health services in Uganda are decentralized with districts and health sub-districts. Health services are structured into national hospitals, regional hospitals, general hospitals, Health Center (HC) IVs, HC IIIs, HC IIs and village health teams (19). Hospitals provide technical back up for referral and support functions to district health services. The health sub-districts are housed at HCIV's whose responsibility is to plan, organize, budget and manage health services at the facility but also responsible for lower health center levels(19). HCIIIs provide preventive, promotive and curative care while HCIIs provide the first level of interaction between the health sector and communities (19). In the districts visited, the annual average expenditure for immunization across all levels of care was 5% in 2015 and 6% in 2016 (Table 3). Hospitals spent 5% and 6% of their total immunization budget on immunization related activities as a proportion of average annual PHC funds received in 2015 and 2016 respectively. On average, HCIV's, HCIIIs and HCIIs spent 26%,13.5% and 44% on immunization related activities respectively. Furthermore, the total PHC expenditure for each level of health facility was estimated according to program area. Outreaches consumed the bulk of immunization resources accounting for 87% and 88% in 2015 and 2016 respectively. Social mobilization and collection of vaccines separately accounted for 7% in 2015 and 6% in 2016 of the PHC funds. By line item, majority of the funds were spent on allowances accounting for 67% in 2015 and 78% in 2016. This was followed by transport and fuel expenditures that accounted for 21% and 25% in 2015 and 2016 respectively. The remaining 12% in 2015 and 14% in 2016 was spent on social mobilization activities, cold chain maintenance and facilitation of vaccinators.

Table 3: Health facility average annual expenditure on immunization

Facility type	Average annual PHC US$	Average annual immunization expenditure US$	Average annual PHC US$	Average annual immunization expenditure US$
	2015	2016	2015	2016
Health Centre II (N=7)	633.65	280.65	746.18	375.44
Health Centre III (N=8)	4,566.52	625.49	4,752.09	613.46
Health Centre IV (N=6)	4,130.29	649.54	9,851.28	1,021.21
Hospital (N=3)	41,279.29	1,019.27	40,685.70	1,592.95
Overall average	50,609.76	2,574.95	56,035.24	3,603.05

Discussion

This study presents trends in the resource envelope for immunization and expenditure analysis at sub-national level. In Uganda, the resource envelope for immunization increased fourfold since 2012 to 85.6 million in 2016 with the biggest increment in 2015 and 2016. The Ugandan Government was the greatest contributor (55%) to the immunization resources from 2012 to 2014. However, in 2015 and 2016, the government contribution decreased to 24% while Gavi contributed the majority of the resources (59%) to immunization. Estimates from a similar study conducted in 2010 showed a 50% contribution from the Government of Uganda (14). In comparison with our findings, there has been a 26% reduction in the Government's contribution to the resource envelope for immunization. Analyses from country multiyear plans (cMYPs) also estimate the government contribution to account for about 54% of the total routine program financing and non-vaccine financing respectively (20). It is apparent that there is still a substantial contribution of development partners in supporting the immunization program especially for operational EPI activities.

The increase in the resource envelope for immunization can be explained two factors. Firstly, Gavi lifted the ban on its funding to Uganda in 2012. Uganda was approved for Immunization Services Support (ISS) of US$ 9,230,520 in 2000 however, in 2006, Gavi suspended cash transfers to the Government of Uganda following misuse of funds (21,22). This ban was later lifted following the institutionalization of fiduciary risk management approaches such as strengthening government oversight mechanisms, internal and external audits, establishment of a fiduciary agent within the government system to manage Gavi risks, and channeling of funds through country partners (23,24). Secondly, the increase in the resource envelope can be attributed to new vaccine introduction. Since 2013, Uganda has introduced several new vaccines in quick succession; including Pneumococcal Conjugate Vaccine (PCV) in 2013, Human Papilloma virus vaccine (HPV) in 2015, Meningitis A in 2016 and Injectable Polio Vaccine (IPV) in 2016 (25). Gavi disbursed US $97 million to support the introduction of PCV, HPV and IPV (26). In addition to the new vaccine introductions, the EPI conducted Meningitis A vaccine campaigns, shifted from the trivalent (tOPV) to the bivalent (bOPV) polio vaccine while implementing the Health Systems Strengthening (HSSI) grant from Gavi during the study period (26).

The expansion of immunization schedules through introduction of new vaccines increases program and system costs of national immunization programs (20,27,28). Evidence shows that resource requirements for routine immunization continue to increase due to higher prices of new vaccines and in some countries program budgets have doubled and tripled (31). Experiences from countries graduating from Gavi support have shown that a substantial increase in government expenditure is required to maintain and sustain the immunization program and is difficult to achieve especially due to high costs of vaccines (30). As such, the magnitude of domestic funding required by EPI programs to sustain gains is heavily driven by the number of new vaccines introduced into the program (30). The increase in costs and resource requirements during and after new vaccine introduction should be commensurate with increases in government expenditure on immunization, however this is not always the case as government budgets may not easily absorb the portfolio of vital vaccines financed by Gavi (31,32). During the study period, the Government of Uganda's contribution decreased tremendously despite the introduction of additional vaccines. In light of the decrease in support from development partners in Uganda, challenges in fulfilling previous co-financing obligations (9,25), and the magnitude of support from Gavi and other development partners, this raises sustainability concerns of a critical national program. Our findings are similar to experiences from other poor countries that also show a significant contribution by Gavi to meeting the increasing needs of EPI programs to introduce and scale up vaccines (29). However, these countries showed limited signs of the ability to transition to other sources of financing outside Gavi support with evident financing gaps to sustain the current immunization gains (29). In Uganda, the sustainability concerns are exacerbated by a 90% (US$ 487.5 million) financial gap in the immunization resources required for Uganda over a five-year period (2016-2020) when Gavi's contribution is excluded (33).

The achievement of sustainable immunization however, needs to be considered in the context of the broader health system financing landscape. Financing for health in Uganda is largely inadequate with the a decreased budget for health expenditure from 8.9% in 2010/11 to 6.9% in 2015/16 (9,34). The immunization financing in Uganda, is not sustainable to maintain high coverage rates and is exacerbated by expensive new vaccines that have been and are planned to be introduced. Inadequate financing for immunization coupled with the heavy reliance on development partner support not only raises sustainability concerns but also highlights other challenges of external funding. Majority of the funding from development partners is 'off-budget' making it difficult for the Ministry of Health to plan for, coordinate and track expenditures and efforts of development partners coupled with a lack of alignment to key country priorities (35). The predictability of funding from development partners is challenging due to the difficulty in making multi-year commitments (27). Evidence also shows that support from development partners is often unevenly targeted in terms of its developmental impact given that it is mainly focused on financing recurrent costs (vaccines and supplies) rather than long term improvements (infrastructure) (36). Development partner support is expected to increase allocation of developing country resources towards health programs/immunization or even result into the same degree of benefit however, this cannot be guaranteed due to several complexities of the ability and willingness of governments to pay for health care (29,37–39). Despite the challenges of relying on development partner support, low income countries have been able to introduce new vaccines at a faster rate than middle income countries due to support from development partners (40).

Since its inception in 2000, Gavi has facilitated the vaccination of 760 million children from 17 infectious diseases through routine immunization programs (41). Support from Gavi has not only increased access to lifesaving and underutilized vaccines, but also improved immunization coverage especially for new vaccines like pentavalent, pneumococcal, measles and rotavirus vaccines in over 120 countries Uganda inclusive (42). In order to qualify for Gavi's support, a country's three year average Gross National Income (GNI) per capita has to be equal to or below the eligibility threshold (43). Gavi's support is phased out in a gradual transition process that starts after countries exceed the World Bank's threshold for status as a low-income country(44). Uganda is considered a low-income country, currently in the initial self-financing phase and is projected to stay in this phase for the next 5 years before the preparatory transition phase (13). The Government of Uganda finances the traditional EPI vaccines and co-finances 20% of the new vaccines including Penta, PCV, HPV and Rota virus vaccines (35).

In light of its support to countries, Gavi has prioritized financial sustainability especially at country level despite the challenges and limitations in its approaches (29). This has been through its policies on eligibility, transition and financing to enable countries fully finance immunization programs beyond the time limited contribution from Gavi (27,29,44,45). Also, National Immunization Technical Advisory Groups have been established as independent technical bodies to guide immunization programs and ensure evidenced based decision making especially on new vaccine introduction (13,46). The co-financing policy has proven to be an affordable and innovative mechanism that has fostered country ownership of vaccine financing and sustainable financing of vaccines (47). Conversely, Gavi's transition policy has its limitations as it is unable to identify system wide constraints to sustainability and sector wide approaches to overcome them due to its focus on immunization (30).

Alongside Gavi's initiatives to ensure sustainability at country level, EPI programs need to prioritize financial sustainability planning for immunization as it has been shown to have a positive impact on mobilization of resources despite its limitations (48). In order to be able to domestically fund their immunization programs, countries need to fully comprehend the cost of immunization, identify financial gaps and develop detailed projections of vaccine funding requirements to guide projections on government spending and assess the feasibility of meeting the additional costs (29,30). Additionally, countries need to pay attention to their public funding for health as a proportion of their Gross Domestic Product (49). Closing funding gaps for immunization and achieving financial sustainability does require a significant increase in the public sector budget, increase in government commitments for immunization, greater commitments from development partners and a reduction in vaccine prices in the context of Gavi funding so as to allow countries to transition (29,49).

Findings on immunization spending on program activities, showed that there was a spike in expenditure (274%) for facility based routine immunization from US$ 18 million in 2014 to US$ 70 million accounting for 80% of the immunization expenditure by activity. The increase in expenditure was mainly driven by expenditure on human resources which includes salaries for health workers. These findings are similar to earlier costing estimates that showed that facility based routine costs took up majority (45%) of the immunization expenditure driven by expenditure on human resources (43%) (29,50). Personnel expenditure is a key driver especially for program resources after the expenditure on vaccines and supplies (27). Our findings also highlighted a change in management of funds at national level. The amount of funds managed by National Medical Stores increased by 78% since 2010 (50). This change can be explained by organizational changes and the increase in funds from Gavi in 2015 and 2016. In 2013, the responsibility for supplies vaccine logistics management and vaccine quality and safety was shifted from UNEPI to NMS in April 2012 (52). As such this meant less financial flow of funds to UNEPI. However, due to the Health System Strengthening grant and several new vaccine introductions, UNEPI is also managing more funds (17%) despite the organizational changes when compared to the 8% it was managing in 2010 (50).

At district level, the district health office receives immunization funding from two sources including public funds (PHC grant) and funding from development partners including Gavi, UNICEF and WHO. From the seven districts visited, findings show that WHO provided the largest proportion (57%) of the funds followed by UNICEF that provided about a quarter of the resources. Gavi provided an average of 15% of funds at district level. Under the PHC grant, more than half of the districts allocated less than 15% of the total annual resources to immunization activities which translates to US$ 1,452 annually per district. Considering that the PHC grant is sent on a quarterly basis and is meant to support all the activities conducted by the health office, including immunization activities as well as support routine supervisions to the health facilities, deliver vaccines to the health facilities, maintain the cold chain systems at the health facilities and facilitate immunization meetings (16), these funds are inadequate. Due to the decentralized system in Uganda, the allocation of the PHC grant to immunization varies by district and is highly dependent on the degree of prioritization of immunization activities and availability of additional resources from development partners. For instance, in Lamwo district, public funds were completely re-directed to fund other activities as such, there was a 0% allocation of PHC funding to immunization. The 0% allocation to immunization was attributed to the availability of funds from development partner to support immunization activities. These findings highlight the challenges of inadequate funding at district level to support immunization activities and emphasize the significant contribution of resources from development partners at district level.

At health facility level, the overall annual average expenditure on immunization (PHC grant) across all levels of care was 5.5% over the two-year period. This allocation is lower than the Ministry of Health recommendation that stipulates at least 10% allocation of the PHC grant should be allocated to immunization activities. Majority of the facilities spent their PHC grant on outreaches (88%) specifically on per-diems/outreach allowances (73%) for staff to conduct the outreaches. These findings show an increase in resources allocated to outreaches when compared to an earlier costing analysis in 2011 that showed that health facilities (all levels) were allocating only 28% of their resources to outreaches (50). In terms of service provision, majority of services are being provided by government health facilities of which the bulk of the funding supports facility based routine immunization activities (80%). This is consistent with similar study that also showed that the largest proportion of funding in 2011 was devoted to routine facility based immunization with an average of 40% across all levels of care (14). Therefore, majority of the funds are still spent at the level of service delivery. Despite the fact that health facilities and district health offices provide the largest proportion of immunization activities, it is important to note that they do not manage an equally large proportion of funds as illustrated by the existing financing agents. This implies that the financing agents make decisions on how the funds should be utilized while service providers implement what has been decided upon.

This study had limitations but, they are unlikely to affect the findings and conclusions. The district level expenditure analyses only purposively sampled seven districts due to budget constraints and therefore findings cannot be generalized to all districts. Despite this, the study ensured that the district selection accounted for performance in line with RED strategy, geographically representation and vaccine coverage performance. Also, the study triangulated findings at national, district and health facility levels. Further, the Government of Uganda resources at sub-national level could have been underestimated given that we did not include the cost of salaried labor, purchase, storage, and distribution of vaccines. Despite this, this contribution was accounted for at national level using previous costing estimates (50).

Conclusions

The resource envelope for immunization has increased fourfold since 2012 to a total of US$ 85.6 million in 2016 and is mainly attributed to new vaccine introduction and the lift of the ban of Gavi funding to Uganda in 2012. The Ugandan Government was the greatest contributor of immunization resources but Gavi, the Vaccine Alliance is now the greatest contributor of the immunization envelope in Uganda. At sub-national level, districts allocated 15% of their total annual resources to immunization to support supervision of lower health centers and distribute vaccines. Health facilities spent about 5.5% of their total annual resources to support outreaches mainly.

Although the support from development partners has facilitated the improvement of immunization coverage and new vaccine introduction in Uganda, with Gavi and other development partners contributing the bulk of funding for immunization, it raises sustainability concerns of a critical national program. Additionally, development partners support is often off-budget and unpredictable. The immunization financing in Uganda is not sustainable to maintain high coverage rates and this is exacerbated by high costs of newly introduced vaccines. To ensure financial sustainability of the immunization program, findings from this study emphasize the need to operationalize the immunization fund in the immunization act, advocate and mobilize additional resources for immunization from the ministry of health and private sector, increase the reliability of resources for immunization as well as leverage on health financing reforms like the National Health Insurance. Additionally, on budget funding from development partners would guide national programs plan adequately. At district and health facility level, there is need to ring-fence and protect resources for immunization. This study calls for continuous tracking of resources for immunization.

Abbreviations

cMYP	Country Multi Year Plans
DHO	District Health Officer
EPI	Expanded Program on Immunization
Gavi	The Global Alliance for Vaccines and Immunizations
GOU	Government of Uganda
HC	Health Center
MOH	Ministry of Health
NGOs	Non-Government Organizations
NHA	National Health Accounts
NMS	National Medical Stores
PHC	Primary Health Care Grant
SHA	System of Health Accounts
UNEPI	Uganda National Expanded Program on Immunization

Declarations

Ethical Considerations and consent to participate

Largely, this study posed no more than minimal risks to participants; nonetheless, ethical approval was obtained for the broader study (Gavi, Full Country Evaluation) from School of Medicine Research Ethics Committee in Uganda and the Uganda National Council of Science and Technology. In addition, permission was sought from the MOH, UNEPI, District Health Officers and health facility's managers for each of the sampled districts. All participants were enrolled in the study after providing written informed consent.

Consent for publication

Not applicable.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interest.

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Figures

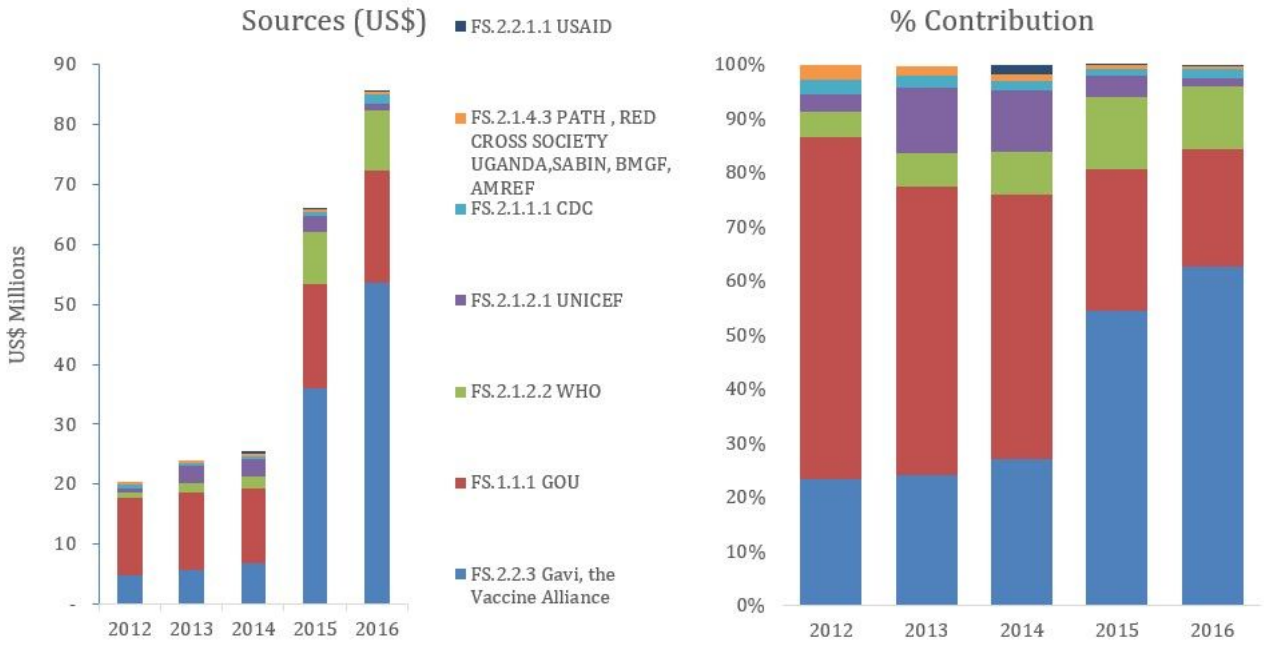


Figure 1

Sources of funding and their percentage contribution from 2012 to 2016.

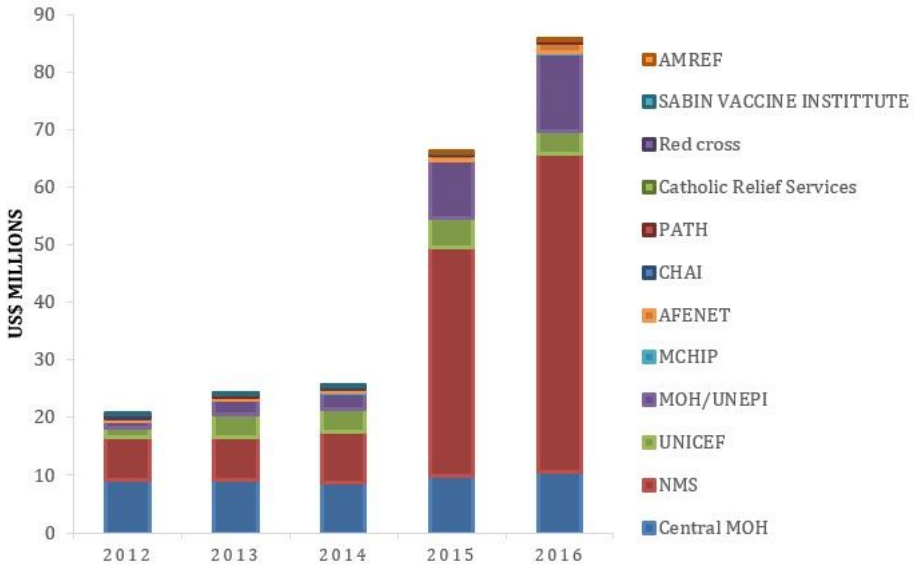


Figure 2

Trends in financing agents for Immunization funds in Uganda from 2012 to 2016.

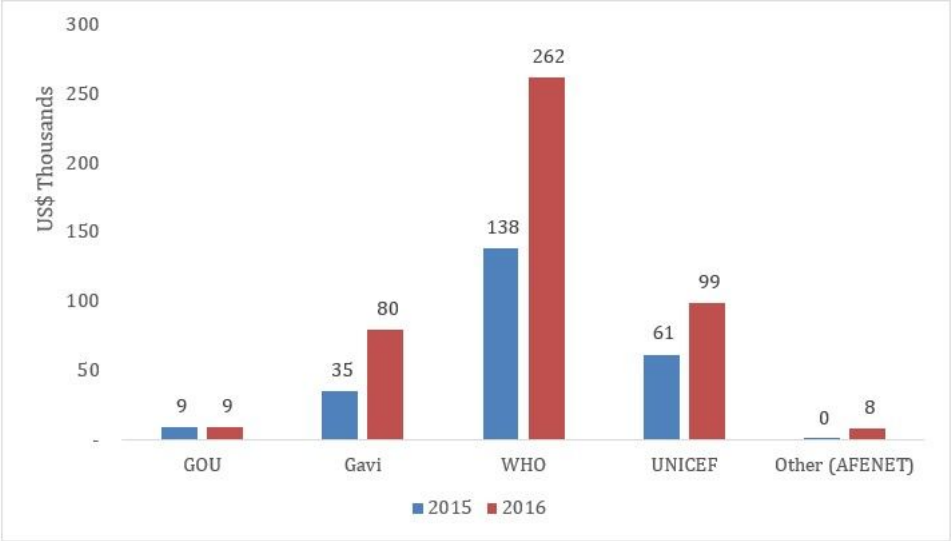


Figure 3

Sources of funding for immunization at district level.

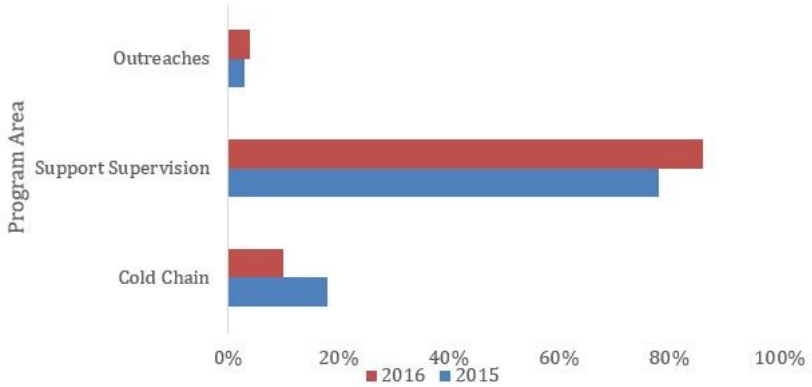


Figure 4

District Expenditure of Public funds on immunization (by program area)

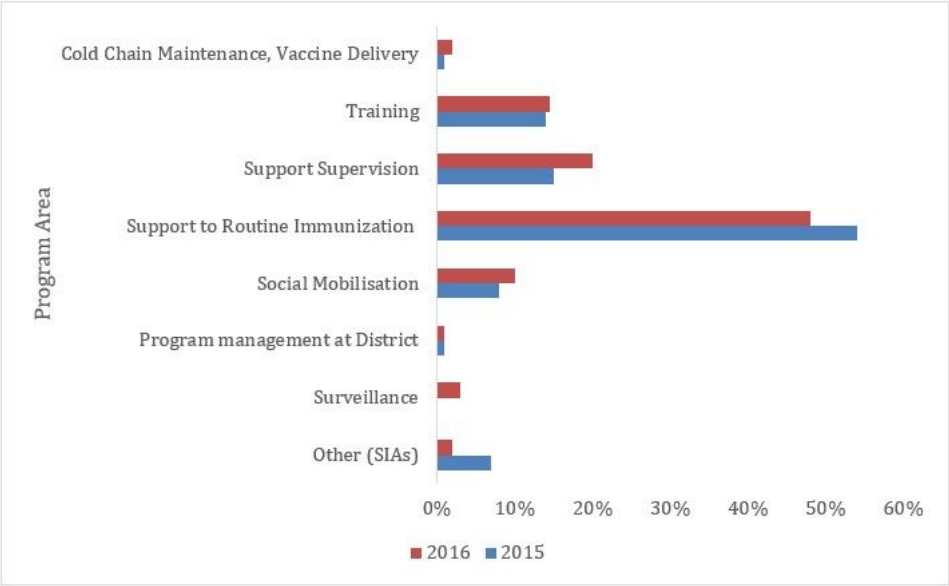


Figure 5

District Expenditure of development partner funds (by program area)

Supplementary Files

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- s1.jpg