# First Report of the Gavi Full Country Evaluations

## Phase 2

# Uganda

2017-2018

IDRC INFECTIOUS DISEASES RESEARCH COLLABORATION

PATH

Gavi The Vaccine Alliance

# Acknowledgements

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# Evaluation team

This report presents findings from year 1 of the Gavi Full Country Evaluations (FCE) phase 2, prepared by the Infectious Diseases Research Collaboration (Uganda) in collaboration with PATH (United States). This work is intended to inform evidence-based improvements for immunization delivery in FCE countries and, more broadly, in low-income countries, with a focus on contributions from Gavi. The contents of this publication may not be reproduced in whole or in part without permission from the Gavi FCE team at PATH.

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Infectious Diseases Research Collaboration
2C Nakasero Hill Road
PO Box 7475
Kampala, Uganda
Telephone: +256-312-281479
Telephone: +256 (0) 414 530 692
Email: Prof. Moses Kamya, PhD
mkamya@idrc-uganda.org
www.idrc-uganda.org

PATH
Health Systems Innovation and Delivery
2201 Westlake Avenue, Suite 200
Seattle, WA 98121 USA
Telephone: 206-285-3500
Email: Jessica Shearer, PhD
jshearer@path.org
www.path.org

Gavi Secretariat
Monitoring & Evaluation
2, Chemin des Mines, 1202
Geneva, Switzerland
Telephone: 00 41 22 9096542
Email: Abdallah Bchir
abchir@gavi.org
www.gavi.org

# Executive summary

## INTRODUCTION

Gavi commissioned a second phase of the Gavi Full Country Evaluations (FCE) from 2017 to 2019 in Zambia, Mozambique, and Uganda. The FCE is a prospective study that aims to evaluate the new policies, programs, and processes implemented as part of the Gavi 2016-2020 strategy. In year 1 of the evaluation (2017-2018) the FCE aimed to answer five evaluation questions under the themes of coverage and equity, health systems strengthening (HSS), human papillomavirus (HPV) vaccine, Gavi Alliance systems/processes, and immunization partnership. The specific evaluation questions were:

1. What are the drivers of vaccine coverage and equity?
2. What is the effect of an interruption in Gavi HSS funding on routine service delivery, highlighting the Government of Uganda and other partner funding?
3. What are the demand-side reasons for the low coverage of HPV vaccine second dose in Uganda?
4. What are the positive and negative consequences of the new/updated Gavi processes (e.g., program capacity assessments (PCAs) and grant performance frameworks)?
5. What is the composition of the immunization partnership in the country at national and district levels?

## METHODS

The FCE employed qualitative and quantitative research methods using primary and secondary data sources. Data were collected at global, national, and subnational levels. To understand the drivers of immunization coverage, a district case study (DCS) approach was used and data were collected from four districts. To understand the effect of an interruption in Gavi HSS funding on routine service delivery, data were collected from 18 districts. District selection for the above evaluation questions was based on immunization coverage for 2017, presence or absence of inequities (based on the equity report), and regional representation. To understand the structure of immunization partnerships in Uganda, data were collected from 116 districts. To understand the demand-side reasons for low coverage of HPV vaccine second dose, data were collected from four districts: two with high performance and two with low performance according to 2017 data from the district health information system (DHIS) 2. To evaluate the consequences of the Gavi Alliance processes on implementation of Gavi support in Uganda, the FCE focused on the PCA as a case study. Data were analyzed using Tableau for quantitative data and Atlas.ti 8.0 for qualitative data.

## FINDINGS AND RECOMMENDATIONS

Based on the DHIS2 data from 2014 to 2017, there has been an increase in coverage for HPV and IPV vaccines; however, there is a general decline in coverage of BCG, DPT, OPV, and measles vaccines, particularly in 2017. Possible explanations for the observed decline in coverage include:

1. Reporting of more accurate data by health workers due to the Data Improvement Teams strategy.
2. The observed decline in the number of outreaches conducted due to the gap in Gavi HSS support.
3. Strong focus by the Uganda National Expanded Programme on Immunization (UNEPI) team on recurrent applications for Gavi support, rollout of new vaccines, and implementation of campaigns at the cost of routine immunization activities.
4. From a district case study approach:
    a. The emerging barriers to immunization coverage were: i) inadequate primary health care (PHC) funds to conduct routine immunization, especially outreaches, ii) unclear denominators for target immunization populations, and iii) presence of religious sects that are resistant to immunization.
    b. The emerging drivers of immunization coverage were: i) strong leadership, management and coordination attributes of the District Health Officer, and ii) leveraging partner-planned activities to push the immunization agenda both at district and facility levels.
    c. *About the immunization partnership*: Ninety-three partners (one to twelve per district) were mentioned to be supporting immunization in Uganda. Many of these partners were not supporting immunization as their core mandate, but they support some immunization activities as part of integrated service delivery. However, at both national and subnational levels, there is no clear coordination mechanism of partners in relation to geographical distribution, reporting, and supervision.

Emerging demand-side reasons for the low coverage of HPV vaccine included: (1) low awareness of HPV vaccine among parents, teachers, and health workers, (2) inadequacy in the follow-up system for HPV2, (3) presence of a communication gap between health workers and teachers, (4) confusion on the target age group among health workers, and (5) school-based constraints (boys bullying girls and limited time for vaccination due to busy school programs).

Finally, as a result of the decision by Gavi to channel HSS2 funds through UNICEF, there has been a prolonged interchange between Government and Gavi on the most suitable modality to implement HSS2. As a result, there has been delayed implementation of HSS2. Furthermore, based on insights from key informants and learnings from countries with similar experiences in funding modality, future consequences from this decision may include (1) limited country ownership of the HSS2 implementation, (2) lack of clarity in roles and responsibilities, (3) high management fees incurred, (4) implementation delays due to an additional layer of bureaucracy, and (5) challenges with coordination of funds flow and activity implementation at the district level.

## CONCLUSION

Findings from this evaluation show that there is need for intense social mobilization to address demand-side barriers to HPV2 coverage. This evaluation also shows that strong leadership, management and coordination at both district and health facility levels are key to improving and sustaining immunization coverage. Furthermore, this evaluation shows a strong dependence of the immunization program on Gavi funding, thus raising a concern about the program's financial sustainability in the absence of Gavi support. The presence of immunization partners countrywide presents an opportunity for UNEPI to push the immunization agenda at both national and district levels. However, in order to realize the desired results from partnerships, there is a need for better coordination of partners by UNEPI in relation to geographical distribution, reporting, and supervision.

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# Abbreviations

| | |
|---|---|
| **AFENET** | African Field Epidemiology Network |
| **BCG** | bacille Calmette–Guérin |
| **CAO** | chief administrative officer |
| **CCEOP** | Cold Chain Equipment Optimization Platform |
| **CDP** | Child Days Plus |
| **DHO** | district health officer |
| **DHT** | district health team |
| **DQIP** | Data Quality Improvement Plan |
| **DIT** | Data Improvement Teams |
| **DPT** | diphtheria, pertussis, tetanus |
| **EPI** | Expanded Programme on Immunisation |
| **FCE** | Full Country Evaluations |
| **FMA** | fiduciary management agent |
| **GMR** | grant management requirement |
| **HFS** | health facility survey |
| **HMIS** | health management information system |
| **HPV** | human papillomavirus |
| **HSS** | health systems strengthening |
| **ICC** | Interagency Coordinating Committee |
| **IDI** | Infectious Diseases Institute |
| **IFMIS** | Integrated Financial Management Information System |
| **IPV** | inactivated poliovirus vaccine |
| **ISS** | immunization services support |
| **KII** | key informant interview |
| **MJAP** | Makerere University Joint AIDS Program |
| **MOFPED** | Ministry of Finance, Planning and Economic Development |
| **MOH** | Ministry of Health |
| **NGO** | nongovernmental organization |
| **NITAG** | National Immunization Technical Advisory Groups |
| **OPV** | oral poliovirus vaccine |
| **PCA** | program capacity assessment |
| **PCV** | pneumococcal conjugate vaccine |
| **PEF** | Partnership Engagement Framework |
| **PHC** | primary health care |
| **PIE** | post-introduction evaluation |
| **TCA** | targeted country assistance |
| **TCC** | Technical Coordination Committee |
| **UNEPI** | Uganda National Expanded Programme on Immunisation |
| **VIG** | vaccine introduction grant |
| **UDHS** | Uganda Demographic Health Survey |

# Introduction

The Gavi Full Country Evaluations (FCE) phase 1 was commissioned by Gavi from 2013 to 2016. The goal of the Gavi FCE phase 1 was to understand and quantify the barriers to, as well as the drivers of, immunization program improvement, with emphasis on the contribution of Gavi. The second phase (FCE2) is a two-year evaluation commencing 2017–2019 in Zambia, Mozambique, and Uganda with an aim to evaluate the new policies, programs, and processes implemented by the Gavi 2016–2020 strategy. FCE phase 2 will also use a mixed-method approach that includes qualitative and quantitative methods to understand the full results chain.

## BUILDING ON FCE1

FCE2 builds on FCE1 in many ways. The consortium is largely the same, building on the skills, capacity, knowledge, and relationships built in FCE1. The overall evaluation design remains prospective and mixed-methods but has shifted from a largely descriptive emphasis in FCE1—when shedding light on Gavi and country processes was needed—to a more targeted hypothesis-testing approach in FCE2. FCE2 uses data collected in FCE1 where possible to ensure value for money; yet FCE2 will collect substantial sub-national qualitative data to fill gaps in the quantitative household-, facility-, and district-level data collected during FCE1. Over the course of this six year endeavor we have made significant progress in developing, testing, and refining hypotheses related to whether, why, and how immunization programs are improving and that is reflected throughout this report.

## THE FCE CONSORTIUM

FCE2 is implemented by a consortium of multidisciplinary evaluators and researchers in collaboration with the national immunization programs. FCE2 is funded by Gavi, the Vaccine Alliance. The implementation of FCE2 is guided by a number of principles to ensure the usefulness, relevance, and quality of FCE2's findings and of the sustainability and transferability of the platform beyond FCE2. A central principal of FCE2 is to strengthen in-country capacity of evaluation teams and local stakeholders such that country teams can increasingly lead and implement all aspects of the evaluation. Progress towards this goal is impressive.

In Uganda, this evaluation is being led by the Infectious Diseases Research Collaboration, which is affiliated with Makerere University College of Health Sciences with Professor Moses Kamya as the principal investigator. Health Alliance International and Universidade Eduardo Mondlane lead the work in Mozambique; University of Zambia leads the work in Zambia; and PATH in the United States.

## EVALUATION QUESTIONS

Uganda aims to answer 14 evaluation questions during FCE2, nine of which are cross-country. Uganda-specific evaluation questions for phase 2 were identified by country and global stakeholders through continuous interaction with EPI stakeholders throughout FCE phase 1 and the consultative workshop held in 2017. The aim of the workshop was to sharpen and prioritize the long list of already identified evaluation questions. The consultation included participants representing the Uganda National Expanded Programme on Immunisation (UNEPI), the Ministry of Health (MOH), WHO, Clinton Health Access Initiative (CHAI), PATH, Maternal and Child Survival Program, and UNICEF. Table 1 below shows the list of evaluation questions to be answered throughout phase 2 of the evaluation and the period within which they will be answered, illustrated by green. In year 1, evaluation questions 1-3, 6-12, and 15 have been answered in the Uganda and Cross-country reports. In phase 2 of the evaluation, we shall continue to track questions on coverage and equity (1-3).

**Table 1. Evaluation questions to be answered during FCE2.**

| EVALUATION QUESTIONS | YEAR 1 | YEAR 2 |
|---|---|---|
| ***Coverage and Equity*** | | |
| 1. What are the drivers of vaccine coverage and equity? (cross-country) | | |
| 2. Whether, how, and why is Gavi support contributing to changes in vaccination coverage and equity (with an emphasis on gender)? (cross-country) | | |
| 3. What are the major factors influencing the achievement of these results? (cross-country) | | |
| ***Health Systems Strengthening*** | | |
| 6. What is the effect of an interruption in Gavi HSS funding on routine service delivery, highlighting the Government of Uganda and other partner funding? (Uganda, proposed by country stakeholders) | | |
| ***Use of Evidence and Program Learning*** | | |
| 7. Whether, why, and how is an analysis of the lessons learned from previous support being taken into consideration? (cross-country) | | |
| ***HPV Vaccine*** | | |
| 8. What are the demand-side reasons for the low coverage of HPV second dose in Uganda? (Uganda, proposed by country team) | | |
| ***Sustainability*** | | |
| 9. Whether, why, and how are country decisions (including NITAG's role) to apply for new Gavi support, taking into account the programmatic and financial sustainability aspects (e.g., current country Gavi eligibility status, cofinancing requirements, budget impact analysis)? (cross-country) | | |
| ***Alliance Systems and Processes*** | | |
| 11. What are the positive and negative consequences of the new/updated Gavi processes (e.g., PCAs and grant performance frameworks)? (cross-country) | | |
| 12. What positive and negative unintended consequences occur as a result of Gavi support? (cross-country) | | |

| | | |
|---|---|---|
| 13. To what extent are the Gavi-supported activities to enhance performance management practices of the EPI effective in strengthening the ICC and accountability across the program? (Uganda TOR question) | | |
| ***National EPI Program*** | | |
| 14. Why and how is the new Immunization Act affecting implementation (e.g., demand generation) and outcomes of Gavi support? (Uganda TOR question) | | |
| 15. What is the composition of the immunization partnership in the country at national and district level? (Uganda, proposed by country stakeholders) | | |

## METHODS OVERVIEW

### *Data Collection Approach*

We employed a mixed-methods approach and triangulated the emerging results across different data sources. Primary and secondary data collection approaches were employed starting with secondary data whenever possible to maximize efficiency. The key documents used for secondary analysis were solicited through routine distribution channels such as emails and websites or directly requested from the responsible persons. Additionally, the FCE team attended in-country immunization-related planning or decision-making meetings and the observations noted were also analyzed. Based on the evaluation question, key informant interviews (KIIs) were also conducted among global stakeholders, national-level stakeholders, and subnational-level stakeholders, as indicated below:

- Global stakeholders: members of the Gavi Secretariat and Gavi partners
- National-level stakeholders: Government of Uganda officials responsible for liaising with Gavi and/or planning, managing, and implementing immunization programs; in-country staff of Alliance partners; and leaders of private-sector health organizations.
- Subnational-level stakeholders: district health officers (DHOs), immunization program managers, cold chain managers/logisticians, health facility managers, parents/guardians of girls aged 9–14 years eligible to receive HPV vaccine, teachers of primary 4 children, and frontline providers of immunization services.

Table 2 below summarizes the methods used to collect and analyze data for each evaluation question included in this report. Detailed methods are discussed in Table 12 in the appendix.

**Table 2. Summary of methods employed per evaluation question.**

| EVALUATION QUESTION | METHODOLOGY |
|---|---|
| **Coverage and equity (EQ1-3):** What are the drivers of changes in coverage and equity? | ***District Case Study approach (DCS):*** **Grounded theory approach:** We sought to generate hypotheses, and were open to all emerging themes **Aim:** To understand why some districts perform better than others |

| EVALUATION QUESTION | METHODOLOGY |
|---|---|
| What is the relative contribution of Gavi support to changes in coverage and equity? | > Four districts purposively selected i.e. two that showed an increase and two that showed decrease in DPT3 coverage in 2017<br>> Other selection criteria considered:<br>> Geographical distribution of districts using the UDHS sub-regions.<br>> The presence of immunization inequities according to the Uganda Immunization Equity Assessment conducted in 2016.<br>**Increase in vaccine coverage:** Kibaale (Bunyoro), Mpigi (South Central).<br>**Decrease in vaccine coverage:** Pader (Acholi), Manafwa (Bugisu).<br>> In each of the districts, three health facilities from HCIV, HCIII, HCII levels were randomly selected and visited.<br>> KIIs were conducted with DHOs, EPI focal persons, health unit in-charges, and health workers responsible for immunization.<br>**Data analysis:**<br>> Trends of immunization coverage were analyzed using Tableau. Source of data was HMIS.<br>> KII information was analyzed in Atlas.ti 8.0 using thematic analysis |
| **Health systems strengthening (HSS) (EQ6):**<br>What is the effect of an interruption in Gavi HSS funding on routine service delivery, highlighting Government of Uganda and other partner funding? | ***Hypothesis***: Interruption of HSS could have negative effects on coverage.<br>> 18 districts that changed (increased or decreased) DPT3 coverage slope during 2017 were purposively selected.<br>> Other selection criteria considered:<br>> Geographical distribution of districts using the UDHS sub-regions.<br>> The presence of immunization inequities according to the Uganda Immunization Equity Assessment conducted in 2016.<br><br>***Increase in vaccine coverage***:<br>Arua (West Nile), Nakaseke (North Central), Kibaale (Bunyoro), Yumbe (West Nile), Lira (Lango), Bukedea (Teso), Mpigi (South Central), Kanungu (Kigezi), Buliisa (Bunyoro).<br><br>***Decrease in vaccine coverage***:<br>Abim (Karamoja), Pader (Acholi), Rubirizi (Ankole), Manafwa (Bugisu), Dokolo (Lango), Kasese (Tooro), Isingiro (Ankole), Hoima (Bunyoro), Amudat (Karamoja).<br><br>In each of the districts, 3 health facilities representing all the levels of care were also randomly selected and visited. (HCIV, HCIII, HCII)<br><br>KIIs were conducted with the DHO's, Chief Administrative Officers (CAOs), EPI focal persons, Health unit in-charges and health workers responsible for immunization. |

| EVALUATION QUESTION | METHODOLOGY |
|---|---|
| | ***Data analysis:***<br>> Trends of immunization coverage were analyzed using Tableau. Source of data was HMIS.<br>> Interrupted time series analysis |
| **Human papillomavirus (HPV) vaccine (EQ12):**<br>What are the demand-side reasons for the low coverage of HPV second dose in Uganda? | ***Grounded theory approach***: We sought to generate hypotheses, and were open to all emerging themes<br>> Four districts were purposively selected.<br>> From analysis of DHIS2 data for 2017;<br>> Two districts with a higher HPV2 coverage were purposively selected: Arua (West Nile)—128% and Rubirizi (Ankole)—36%.<br>> Two districts with low HPV2 coverage were also purposively selected: Buliisa (Bunyoro)—22% and Wakiso (Central)—18%.<br>> In each of the districts:<br>> Three health facilities representing all the levels of care were also randomly selected and visited. (HCIV, HCIII, HCII)<br>> Three schools were visited in each of the districts.<br>> KIIs were conducted with the DHOs, EPI focal persons, health unit in-charges, health workers responsible for immunization, teachers, caretakers of girls aged 9–13 found at the health facility, and the district education officer.<br>***Data analysis:***<br>> Based on the causal loop framework for demand (Rwashana 2009)<br>> Trends of immunization coverage were analyzed using Tableau using HMIS data.<br>> KII information was analyzed in Atlas ti using thematic analysis |
| **Alliance systems and processes (EQ17):**<br>What are the positive and negative consequences of the new/updated Gavi processes (e.g., PCAs and grant performance frameworks)? | ***Data collection:***<br>> Observation of meetings<br>> Conducted document review. Documents reviewed include the PCA report, communication letters between Gavi and MOH/MOFPED<br>> KIIs were conducted with UNEPI-MOH, WHO, Edes & Associates, and the Gavi global level. |
| **Partnership (EQ21):**<br>What is the structure of the immunization partnership in the country at national and district level? | ***Data collection:***<br>> All 116 districts in DHIS2 were visited<br>> KIIs were conducted with DHO's office, CAO's office, representatives of partners supporting immunization per district. |

### *Data Analysis*

Some of the methods employed for data analysis included thematic analysis, regression analysis, network analysis, and district case study approaches to analyze and synthesize the findings. These were applied to different evaluation questions. Specifically, for the qualitative data, we employed thematic analysis in which we systematically categorized the data in order to make sense of them.

Categories were largely derived from the data, applied to the data through close reading, and analyzed solely qualitatively.[1]

Table 3 shows the robustness ranking scale, which was used to assess different robustness dimensions for the evidence related to the evaluation questions. Considering the robustness dimensions, a strength of evidence rating was assigned using a four-point scale as a general guide for ranking findings and describing the rationale behind the ranking. The ranking process helped identify which findings needed additional triangulation and validation. The FCE team underwent a validation process that included adding data, if any, and reassessing the overall finding statement, robustness, and strength of evidence.

**Table 3. Robustness of rankings scale.**

| RANKING | RATIONALE |
|---|---|
| **A** | The finding is supported by multiple data sources (good triangulation) that are generally of good quality. Where fewer data sources exist, the supporting evidence is more factual than subjective. |
| **B** | The finding is supported by multiple data sources (good triangulation) of lesser quality, or the finding is supported by fewer data sources (limited triangulation) of good quality but perhaps more perception based than factual. |
| **C** | The finding is supported by few data sources (limited triangulation) and is perception based, or generally based on data that are viewed as being of lesser quality. |
| **D** | The finding is supported by very limited evidence (single source) or by incomplete or unreliable evidence. In the context of this prospective evaluation, findings with this ranking may be preliminary or emerging, with active and ongoing data collection to follow up. |

Table 4 describes key strengths and limitations of the methods applied to inform the findings covered in this report. Additional details on the methods for data collection and analysis are included in Appendix 1.

**Table 4. Strengths and weaknesses of the Gavi FCE phase 2.**

| STRENGTHS |
|---|
| • Mixed-method approach allowed for triangulation of findings across evaluation components to increase robustness of findings and provide more in-depth understanding. Findings from one data source also informed the design and implementation of other data collection.<br>• The targeted approach in the second phase of the FCE allowed for a more in-depth examination of issues to answer evaluation questions.<br>• Data collection built on/complemented other surveys and activities so as to minimize duplication.<br>• Prospective approach allowed for collection of information in real time so that key issues could be identified as they arose, allowing for the opportunity to inform the implementation process and implement corrective action.<br>• Flexibility to prioritize country-specific questions.<br>• Given that both phase 1 and phase 2 of the evaluation were conducted by the same team, implementation of phase 2 has leveraged on the team's capacity and the strong relationships built in country. |
| **LIMITATIONS** |
| • In-depth qualitative data collection relied heavily on KIIs that are prone to recall and respondent bias.<br>• Absence of a prospective observation mechanism at the regional or global level and at subnational levels.<br>• Use of secondary data analyses are subject to the availability and quality of the underlying data source (e.g., HMIS, surveys). |

## SUMMARY OF FINDINGS AND RECOMMENDATIONS

A summary of the findings and recommendations from this first report of the FCE phase 2 is included in Table 5. The findings and recommendations are explained in more detail in the findings sections of this report.

**Table 5. Findings and recommendations.**

| FINDINGS | RECOMMENDATIONS |
|---|---|
| **Theme: Coverage and equity**<br>**Evaluation questions:** What are the drivers of changes in coverage and equity?<br>1b. What is the relative contribution of Gavi support to changes in coverage and equity? | |
| **Finding 1:** Analysis of DHIS2 data from 2014 to 2017 shows an increase in coverage for HPV and IPV vaccines; however, there is a general decline in coverage of BCG, DPT, OPV and Measles vaccines. PCV3 coverage, however, did not fluctuate. Factors that may explain the observed decline in coverage are described in the findings below. | |
| **Finding 1.1:**<br>From a district case study approach; | > In light of sustainability of the immunization program, UNEPI should establish a strong coordination system |

| FINDINGS | RECOMMENDATIONS |
|---|---|
| • Barriers to vaccine coverage include; inadequate primary health care (PHC) funds and poor documentation of service delivery, unclear denominators, and presence of religious sects.<br>• Drivers of vaccine coverage include leveraging on partner-planned activities to push the immunization agenda and a strong management, especially by the DHO. | to leverage on existing partners in the districts to push the immunization agenda in terms of conducting integrated outreaches, support supervision, and other related activities.<br>> UNEPI should encourage DHOs to prioritize immunization coverage as a key health indicator in their districts and increase their vigilance in monitoring immunization performance, as this can directly influence health workers' immunization data quality and service delivery.<br>> UNEPI should study further the role of leadership and management in improving immunization coverage. |
| **Finding 1.1.1:**<br>Immunization partnerships<br>Ninety-three partners were mentioned to be supporting immunization in Uganda. Many of these were not supporting immunization as their core mandate but they support some immunization activities as part of integrated service delivery. This presents an opportunity for UNEPI to leverage on partner activity for sustainability of the immunization program. However, at both national and subnational levels, there is no clear coordination mechanism of partners in relation to geographical distribution, reporting, and supervision. | > UNEPI should leverage partner-planned activities to push the immunization agenda both at district and facility levels<br>> UNEPI should establish a coordination mechanism for immunization partners at both national and district levels |
| **Finding 1.2:**<br>Data quality improvement;<br>• Some key informants at national level attribute the observed decline in coverage to data-cleaning exercises under the Data Improvement Teams (DIT) strategy. Health workers are now reporting more accurate data, thus bringing down the coverage figures. | > UNEPI should make efforts to strengthen and institutionalize data quality checks and improvements |
| **Finding 1.3:**<br>Gap in Health Systems Strengthening (HSS) cash support;<br>• The gap in Gavi cash support to districts may have contributed to the observed decline in the number of outreaches conducted and consequently the | > As the country plans for implementation for HSS2, the MoH should:<br>> Ensure more consistent disbursement of HSS funds to districts to sustain HSS-supported activities and consequently realize impact.<br>> Devise a system of tracking funds flow up to the end user to better realize implementation of HSS-supported activities. |

| FINDINGS | RECOMMENDATIONS |
|---|---|
| observed drop in DPT3 coverage from 2014 to 2017. | |
| **Finding 1.31:**<br>Districts adapted to the gap in HSS 1 funding differently. The most common ways of adaptation were to use PHC funds and to rely on existing partnerships. Other factors facilitating adaptation to the gap in fund included strong leadership and management of facility in-charges and DHOs, having a dedicated health workforce, finding alternative sources of funding (from the district or community), riding on the high community demand for outreaches, conducting outreaches at specific locations, and giving false hope to health workers regarding future availability of HSS funds | > Ministry of Health should develop a grant closeout strategy entailing a proper communication plan in order to ensure the continuity of HSS funded activities following the end of HSS support |
| **Finding 1.4:**<br>Strong focus by the EPI team on recurrent applications for Gavi support, rollout of new vaccines, and implementation of campaigns, thus sidelining routine immunization activities | > Even as the country plans to introduce more vaccines, UNEPI should pay more attention to routine immunization |
| **Finding 2:** To measure equity by geography, Gavi requires coverage of greater than or equal to 80% in all districts and a pass in a data quality check. FCE analysis of administrative data shows that immunization coverage for DPT3 in all districts is not yet above the recommended minimum coverage required by Gavi. Further, there is a lot of variation in coverage by sub region in Uganda (which is a proxy for geographical equity) as efforts to achieve equity are most often overshadowed by the desire to increase national coverage | |
| **Theme:** Human papillomavirus vaccine<br>**Evaluation question:** What are the demand-side reasons for the low coverage of HPV second dose in Uganda? | |
| **Finding 1:**<br>The demand-side reasons for the low coverage for HPV2 are;<br>> Low awareness of HPV vaccine among parents, teachers, and health workers | **Act now**<br>1. UNEPI should conduct intensified social mobilization for HPV vaccine to raise awareness of HPV among the population. Social mobilization should specifically target: |

| FINDINGS | RECOMMENDATIONS |
|---|---|
| > Inadequacy in the follow-up system for HPV2<br>> Presence of a communication gap between health workers and teachers<br>> Confusion on the target age group among health workers, and<br>> School-based constraints (boys bullying girls and limited time for vaccination due to busy school programs). | a. Girls, to increase their acceptability and demand for the vaccine.<br>b. Boys, to reduce stigmatization of girls and offer support.<br>c. All teachers in the school, not just primary 4 teachers. This could help in follow-up of girls for HPV2, especially if they have changed classes.<br>d. Religious leaders, to encourage their followers to access the vaccine.<br>e. Parents, so they can consent and encourage their children to obtain vaccination.<br>2. UNEPI should strengthen the communication between schools and health workers regarding HPV vaccination to facilitate smooth planning and implementation of HPV vaccination in schools. Planning would include scheduling of school visits and making sure the girls are informed and available. This would also facilitate follow-up of the girls who received the first dose.<br>3. UNEPI should involve the Ministry of Education in planning for implementation of HPV vaccination at both national and district levels. |
| **Theme:** Gavi Alliance systems/processes<br>**Evaluation question:** What are the positive and negative consequences of the new/updated Gavi processes (e.g., PCAs and grant performance frameworks)? | |
| **Finding 1:**<br>> Recommendations from the Uganda Program Capacity Assessment (PCA) and Country Program Audit (CPA), both conducted in 2016, informed the Grant Management Requirements (GMRs), which had to be addressed before disbursement of the first tranche of HSS2 funds. Despite the country's efforts to implement the GMRs, Gavi changed course and made a decision to channel HSS2 funds through UNICEF. This decision has already resulted in a delay in implementation of the HSS2 grant.<br>> Furthermore, based on insights from key informants and learnings from countries with similar experiences in funding modality, future consequences from this decision may include (1) limited country ownership of the HSS2 implementation, (2) lack of clarity in roles and responsibilities, (3) high management fees incurred, (4) implementation delays due to an additional layer of bureaucracy, and (5) challenges with coordinating funding flows and activity implementation at district level. | |

# Summary of Gavi Support in Uganda

Uganda has received support from Gavi, the Vaccine Alliance since 2001, beginning with immunization services support (ISS) in 2001 and support for the introduction of hepatitis B. A total of US$463,783,811 has been committed and $337,474,933 disbursed since 2001 to support vaccine introductions, HSS, injection safety support, Cold Chain Equipment Optimization Platform (CCEOP), and specific immunization campaigns. Vaccine introduction grants (VIGs) have included Haemophilus influenzae (Hib) vaccine in 2001, pneumococcal conjugate vaccine (PCV) in 2013, HPV vaccine in 2015, and injectable polio vaccine in 2016. Other planned VIGs include measles in 2018 and rotavirus in 2018–2019.

Relatedly, Uganda started applying for HSS2 in November 2015 and submitted the application in April 2016. Following the approval, implementation was scheduled to start in 2017, but this has been delayed due to several reasons, as discussed in the HSS section of this report.

Table 6 provides an overview of all streams of Gavi support, including the period of support, corresponding funding amounts, and the percentage that has been disbursed as of March 28, 2018.

**Table 6. Overview of Gavi support in Uganda, 2011-Present.**

| TYPE OF GAVI SUPPORT | PERIOD OF FUNDING | TOTAL AMOUNT OF FUNDING (US$) | % DISBURSED AS OF MARCH 28, 2018 |
|---|---|---|---|
| **HSS1** | Approved in 2008, disbursed in 2012 (2013 funds were reprogrammed for use in 2014–2017) | $19,242,000 | 85% |
| **HPV (NVS)** | 2015–2016 | $28,557,521 | 90% |
| **IPV** | 2015–2017 | $8,716,415 | 58% |
| **Immunization services support** | 2001–2004 | $9,230,520 | 100% |
| **Injection safety support** | 2002–2004 | $1,207,299 | 100% |
| **VIGs** | 2002, 2013, 2015, 2018 | $5,672,000 | 100% |
| **Men A campaign (NVS)** | 2016 | $5,538,937 | 100% |
| **Men A campaign operational costs** | 2016 | $4,552,647 | |
| **Penta (NVS)** | 2002-2019 | $177,338,366 | 99% |
| **Pneumo (NVS)** | 2013 - 2019 | $138,209,683 | 96% |
| ***NEW GRANTS*** | | | |
| **Cold Chain Equipment Optimisation Platform (CCEOP)** | 2017-2018 | $6,648,068 | 30% |
| **Health Systems Strengthening (HSS 2)** | 2017-2019 | $30,600,000 | 0% |

SUMMARY OF GAVI SUPPORT

| TYPE OF GAVI SUPPORT | PERIOD OF FUNDING | TOTAL AMOUNT OF FUNDING (US$) | % DISBURSED AS OF MARCH 28, 2018 |
|---|---|---|---|
| **Measles (NVS)** | 2018 | $85,000 | 0% |
| **Measles Catch up campaign (NVS)** | 2018 | $109,500 | 0% |
| **Injections Safety Devices (NVS)** | 2017-2019 | $2,286,500 | 92% |
| **Operational Costs (OPC)** | 2018 | $349,355 | 0% |
| **Penta campaign (NVS)** | 2018 | $765,000 | 0% |
| **Pneumo Campaign (NVS)** | 2018 | $3,287,000 | 0% |
| **Rotavirus (NVS)** | 2018-2019 | $21,387,500 | 55% |

# SECTION 1. Coverage and equity

**EQ 1–3: What are the drivers of changes in coverage and equity? What is the relative contribution of Gavi support to changes in coverage and equity?**

## *Finding 1.1*

Analysis of DHIS2 data from 2014 to 2017 shows an increase in coverage for HPV and IPV vaccines however there has been a general decline in coverage of BCG, DPT, OPV and Measles vaccines. PCV3 coverage however, did not fluctuate. Factors that may explain the observed decline in coverage include:

1. data quality improvement,
2. the gap in Gavi cash support,
3. findings from a district case study approach that highlight inadequacy of PHC funding, data quality [poor documentation and unclear denominators], and the presence of religious sects opposed to immunization), and strong focus by the EPI team on recurrent applications for Gavi support, rollout of new vaccines, and implementation of campaigns, thus sidelining routine immunization activities.

**ROBUSTNESS RANKING** **A**

This finding is supported by multiple data sources, including HMIS data, KIIs, and documented evidence.

The Gavi vaccine goal in the 2016–2020 strategy aims to accelerate equitable uptake and coverage of vaccines through increasing coverage and equity, supporting countries to introduce and scale up new vaccines, and also responding with flexibility to the special needs of children in fragile countries. This is in line with UNEPI's goal to ensure that every child and high-risk group is fully vaccinated with high-quality and effective vaccines against the target diseases according to recommended strategies. Gavi's predominant focus and documented successes have been in addressing between-country inequities in access to vaccines and it has recently put greater emphasis and resources toward addressing within-country inequities in utilization of immunization services.

Despite the success of Gavi in improving access to new and underutilized vaccines, many children still do not receive these vaccines due to incomplete coverage within countries. The Sustainable Development Goals make a commitment to "leave no one behind," a goal which requires that inequalities are effectively measured, monitored, and addressed. In line with Gavi's goals and objectives, Uganda conducted an equity assessment in 2016 to establish communities affected by

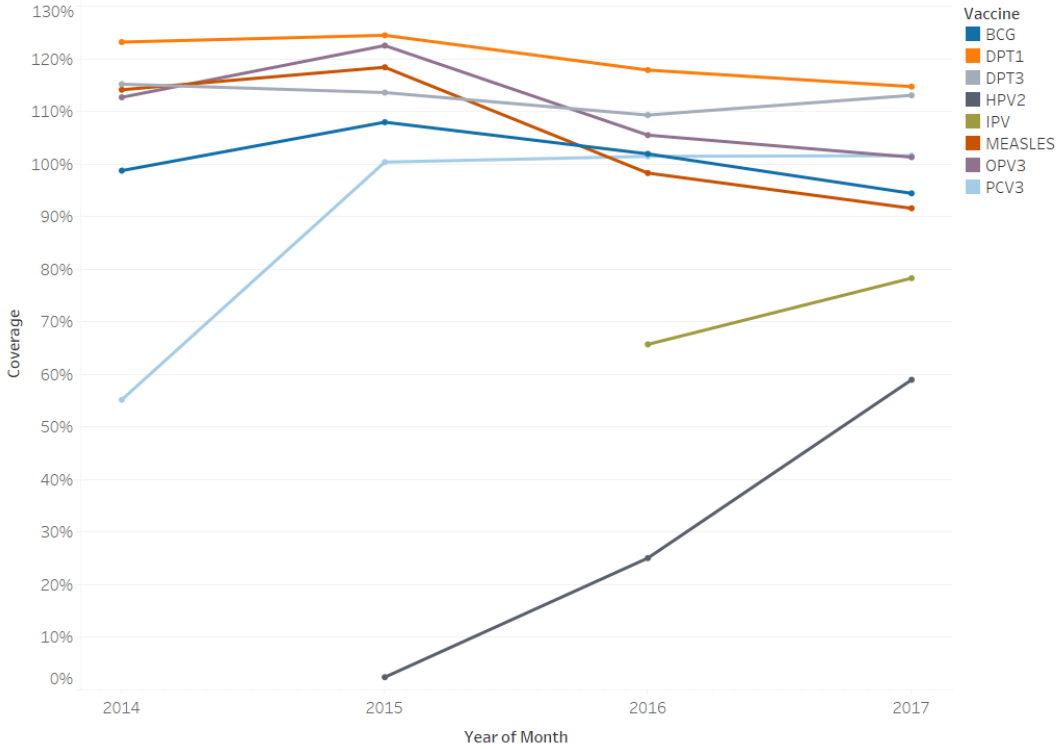
inequities and identify barriers to access and use of immunization services so as to inform programming to reduce immunization inequities.

As reported in the Gavi FCE report in 2016, Uganda has introduced several vaccines into the routine immunization schedule, including PCV in April 2013, HPV vaccine in November 2015, and IPV in April 2016. Other planned vaccine introductions include rotavirus in 2018, measles-rubella in 2019, and meningitis A and yellow fever beyond 2019. Phase 1 of the Gavi FCE monitored vaccine coverage and equity through analysis of data from household surveys, Health Management Information System (HMIS) data, and small area estimates. In phase 2 of the evaluation, we have leveraged HMIS data and other secondary data sources such WHO/UNICEF (WUENIC) estimates, assessments/studies like: the equity assessment by UNICEF, an HPV vaccine assessment in Karamoja region conducted by CHAI, the HPV vaccine Post Introduction Evaluation (PIE), and other data sources to monitor these trends. In phase 2, we set out to understand the drivers of changes in coverage and equity and the relative contribution of Gavi support to these changes. To do this, we assessed national-level coverage and equity using HMIS data from 2014 to 2017. HMIS data included target population per antigen and the number of doses administered per antigen. Tableau was used to generate the figures presented.

Figure 1 shows a gradual increase in national coverage for the majority of antigens in 2015 however, there was general decline in coverage over 2016 and 2017.

In 2017, there was an increase in HPV2 (by 34%) and IPV (by 12.6%) coverage from 2016. Despite the increase in coverage for these new vaccines, coverage remains lower than routine vaccines, and HPV2 still remains particularly low at 59% coverage nationwide (Figure 1). HMIS data also show that there has been a general decline in coverage for BCG, DPT, OPV, and Measles over 2014 to 2017. A decline in coverage from 2016 to 2017 was noted for BCG (by 9.1%), DPT3 (by 7.6%), Measles (by 8.0%), and OPV3 (by 7.6%). Additionally, PCV3 coverage has had an increasing trend from 2014 at 51.4% to 93.2% in 2016 however it decreased to 89.4% in 2017. (PCV was introduced in 2013 but was still being scaled up in 2014–2015.)

**Figure 1. Trends of immunization coverage from 2014 to 2017.**



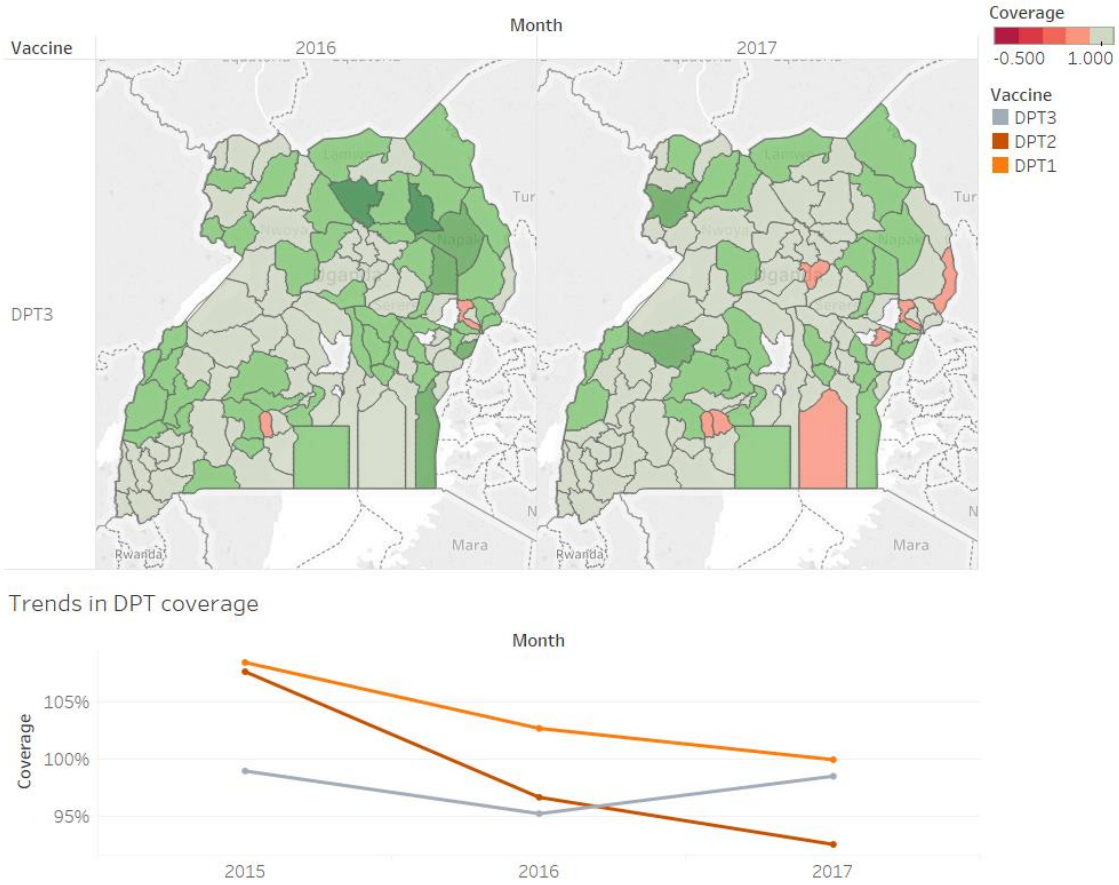

Given the limitations of HMIS, it is critical to compare HMIS coverage estimates to other coverage data sources as is shown in Table 7 below. Comparison of 2016 estimates across DHIS2, WUENIC and the Uganda Demographic and Health Survey (UDHS) highlights differences in the coverage estimates with DHIS2 reporting higher coverage compared to the other data sources.

**Table 7. Comparison of coverage estimates across DHIS-2, WUENIC and UDHS estimates.**

| ANTIGEN | DHIS2 DATA (2016) | WUEINC ESTIMATES (2016) | UDHS (2016) |
|---|---|---|---|
| BCG | 102% | 93% | 96% |
| DPT1/Penta 1 | 118% | 89% | 95% |
| DPT3/Penta 3 | 109% | 78% | 79% |
| IPV | 66% | 60% | - |
| OPV 3 | 106% | 82% | 66% |
| PCV3 | 102% | 78% | - |
| Measles | 98% | 82% | 80% |

Figure 2 shows the change in DPT3 coverage from 2016 to 2017 (map of Uganda) at the district level. From Figure 2, districts show varying patterns of DPT3 coverage with several districts showing a decline in DPT3 coverage.

**Figure 2. Map of Uganda comparing annualized coverage for DPT3 in 2016 versus 2017.**




## *Explanations for observed trends*

This section of the report explains the decreasing trend in immunization coverage. Possible explanations discussed in this section include the gap in HSS funding, data quality improvement, existence of partnerships at subnational level, and the EPI team's focus on recurrent applications for Gavi support, rollout of new vaccines, and implementation of campaigns. Based on data analysis to date, and consistent with input from KIIs, the observed coverage trends are a result of various reasons with no definitive single root cause. Below are possible explanations from our findings.

## *District case study findings*

To explain the varying trends in coverage and equity, the FCE applied a district case study approach to compare districts with varying immunization performance in order to identify the drivers and barriers to coverage and equity. This approach was used to understand the complex social phenomenon surrounding the major drivers of district-level changes in vaccine coverage and equity by allowing the FCE to retain the "holistic and meaningful characteristics of real-life events." Despite the several advantages of the district case study approach, it has methodological limitations given that findings from the selected districts cannot be generalizable to all districts in Uganda. Even though findings may not be generalizable, the findings explore and account for contextual differences.

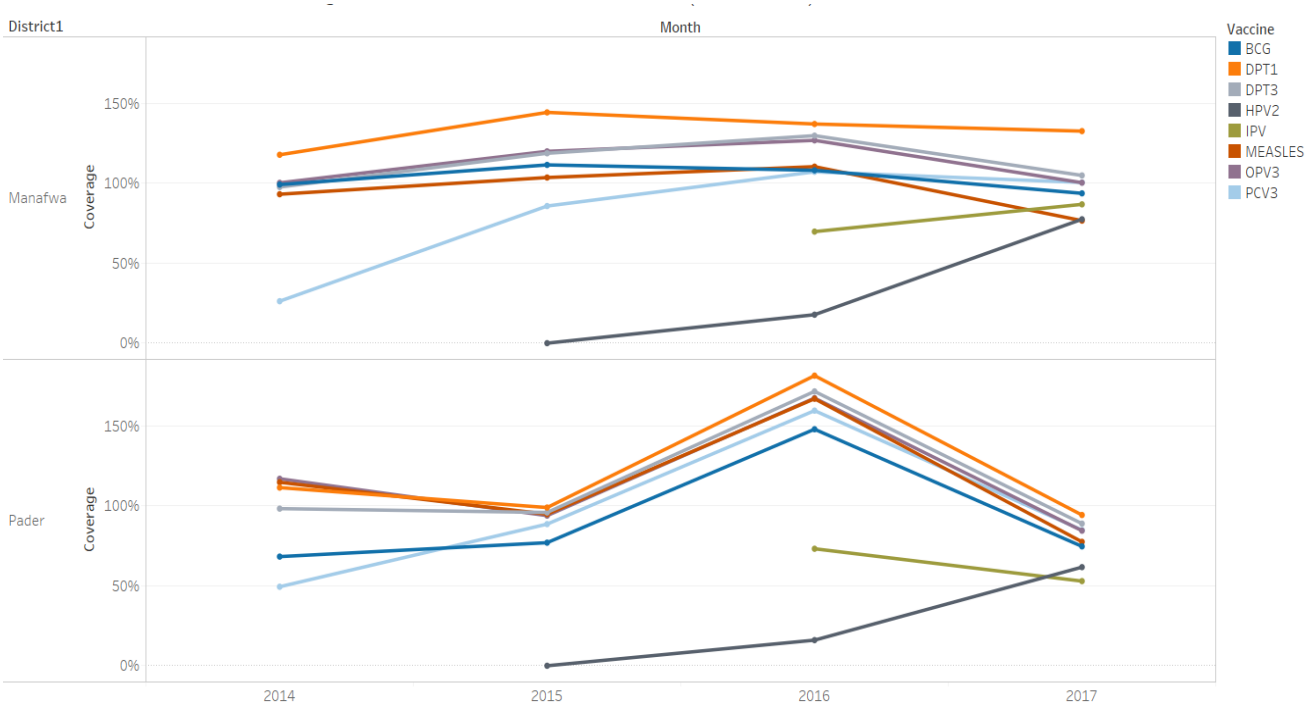
## *Finding 1.1*

***From the district case study approach, barriers to vaccine coverage include inadequate PHC and poor documentation of service delivery, unclear denominators, and presence of religious sects. Drivers of vaccine coverage include leveraging partner-planned activities to push the immunization agenda and strong management, especially by the DHO.***

### *Factors contributing to the decrease in vaccine coverage: A case study of Pader and Manafwa districts*

Following analyses of DPT3 coverage, 2 districts - Manafwa and Pader were purposively selected for the case study approach to understand the reasons for the decline in coverage. Other considerations for their selection included geographical distribution, and the presence of immunisation inequities. According to the equity assessment report, Manafwa was one of the districts reported to have immunisation inequities. Figure 3 below shows the declining trend in coverage for the majority of the antigens in both districts.

**Figure 3. Trends in immunisation coverage in Manafwa and Pader districts from 2014 to 2017.**



Inadequate PHC funds to support immunization outreaches was perceived to have contributed to the decline in immunization coverage. Manafwa and Pader districts both reported challenges in the disbursement and receipt of PHC funds with varying contextual factors and challenges. Manafwa district was split to create Namisindwa district, which became operational in July 2017. In 2016–2017, eight additional new districts were created in Uganda but four districts—Pakwach, Butebo, Rukiga, and Namisindwa—became operational on July 1, 2017. Since the district split in 2017, Manafwa has received minimal PHC funds for the last year, which have been prioritized to facilitate district activities.

> *"The lack of PHC especially at health facilities has paralyzed immunization, especially in terms of facilitating the vaccinators and health workers to conduct outreaches. Health units run on the PHC funds, and once they are not there, activities do not run as smoothly. For example, vaccinators have not been paid for a year now and so they are unmotivated, which has affected the outreaches for immunization." —Subnational-level KII, MOH*

In phase 1 of the evaluation, the FCE conducted a resource tracking expenditure analysis at district level in 2016 where seven districts were sampled in five regions using the Reach Every District (RED) categorization of poor versus good performing districts . Results showed that on average, a District Health Office spent about 15 percent of its total annual resources on EPI activities. However, in terms of the absolute amounts, the 15 percent represented about UGX 5 million ($1,500 USD) annually per district, which is insufficient when spread over a year. Furthermore, looking at each of the districts individually, findings showed that more than half of the sampled districts (four out of seven districts) were allocating less than 15 percent of their total PHC funds to support immunization activities, which has been consistent over the past five years. This finding is irreconcilable with the fact that immunization funding has increased four-fold over the last 5 years. This implies that the increase in funding at national level may not necessarily translate into increases in funding at the sub-national level, where the bulk of immunization service delivery happens.

Furthermore, poor documentation of immunization service delivery by health workers and unclear denominators for target immunization populations have led to data discrepancies and over- and underreporting of coverage estimates; this may partially explain the decrease in vaccine coverage. Specific to Manafwa district, respondents pointed out that the majority of the outreaches are conducted by vaccinators who are usually overwhelmed by the number of children to immunize, thus affecting the quality of data that are captured. Further, the district health team (DHT) also noted that data entry errors have caused discrepancies in the health facility data (normally recorded in tally sheets) and in the data entered into DHIS2. Due to these discrepancies, the district has begun to clean data on a quarterly basis, enabling its use for monitoring progress.

> *"We have also started reviewing and cleaning data on a quarterly basis and already we have registered varying figures when we compare what is at the health facility to what is entered in DHIS2." —KII*

Key informants in Pader district also highlighted data discrepancies as a possible reason for the decrease in immunization coverage.

> *"There is a discrepancy between the actual district population figure and the one presented by [the] statistician, which may have an effect on the overall coverage reporting. In the planning we use projection and yet in most cases this is not very accurate. But the figures collected from the facilities are fairly accurate and when you bring the two together to compute immunization coverage, you may find a lower figure." —KII*

Other district-specific issues attributed to decreasing coverage include the following.

### *Manafwa district*

Presence of religious sects within the district that do not support immunization is contributing to the low coverage. Because of these strong religious sects, several children are not immunized or if immunized once, they are hard to follow up for the subsequent doses.

> *"During immunization outreaches or campaigns, these religious sects hide their children or flee to Kenya and only return once the activity is done." —KII*

As noted in phase 1 of the FCE, findings from the household survey and UDHS highlighted that religion (especially the sects like Bisaka and Triple Six) was one of the factors that was found to affect not only health care seeking but also the capacity for communities to access and utilize immunization services.[2]

### *Pader district*

Nonfunctional cold chain equipment at particular health facilities has also been attributed to the decline in immunization coverage. According to the UNEPI dashboard, as of 2017, Pader district has a cold chain equipment coverage of 91% in the 23 facilities offering immunisation services. Despite this score, some health facilities in Pader were reported to have non- functional refrigerators due to the fact that they have not been repaired. For this reason, vaccines for some health facilities are stored in the nearest health facility or at the district. Additionally, health workers also sighted their inability to pick vaccines on a weekly basis to carry out immunization due to lack of transport means thus affecting the frequency of the immunization. The lack of transport has also affected the supply of gas at the health facilities since they are unable to transport the gas cylinders to the district to be refilled by National Medical Stores.

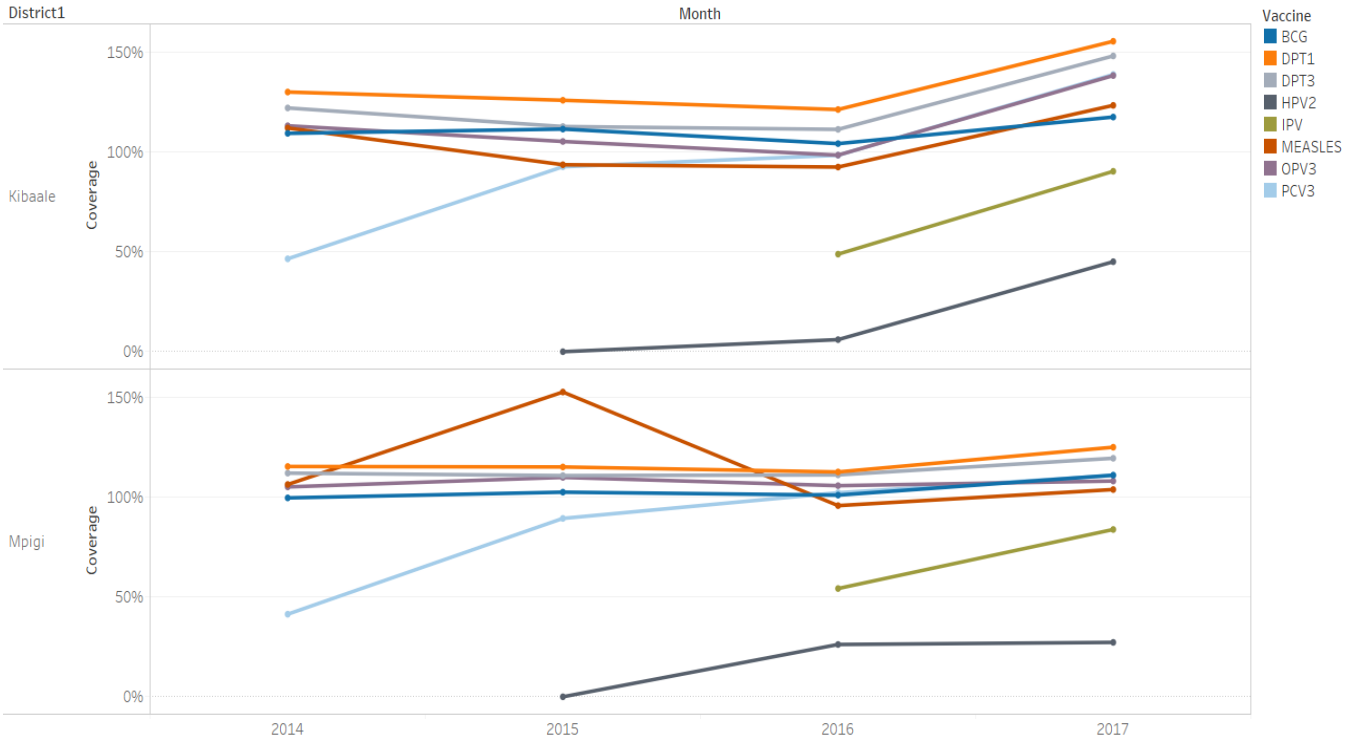
> *"The non-functionality of fridges and presence of gas is a big problem because it means that immunization is not conducted on a daily basis, so mothers who come for static services are referred to the nearest health center with a fridge but it is possible that they do not go there because of the distance." —KII*

## *Factors contributing to the increase in vaccine coverage: A case study of Kibaale and Mpigi districts*

Based on DPT3 coverage across districts, 2 districts - Kibaale and Mpigi districts were purposively selected for the case study approach to understand the reasons for the increase in coverage. Other considerations for their selection included geographical distribution, and the presence of immunisation inequities. According to the equity assessment report, Kibaale was one of the districts

reported to have immunisation inequities. Figure 4 below shows the increase in vaccine coverage for majority of the antigens in both districts.

**Figure 4. Trends in immunization coverage in Kibaale and Mpigi districts from 2014 to 2017.**




***Existing partner support in the districts was reported to have contributed to the increase in vaccination coverage through leveraging partner-planned activities to push the immunization agenda both at district and facility levels.***

The presence of partner support has been one of the reasons attributed to the increase in vaccine coverage. In addition to UNICEF and WHO, the Infectious Diseases Institute (IDI) and the Uganda Catholic Medical Bureau in Kibaale district, and the Makerere University Joint AIDS Program (MJAP) and the African Field Epidemiology Network (AFENET) in Mpigi district, have indirectly supported immunization.

IDI and MJAP's primary role is to strengthen the national health systems with a focus on infectious diseases, specifically HIV/AIDS and TB prevention, care, and treatment services. The Uganda Catholic Medical Bureau and AFENET provide health services for the underprivileged in rural areas and strengthen field epidemiology and public laboratory capacity to address epidemics and other public health problems, respectively.

The districts leveraged on the planned activities by partners and resources to also conduct immunization-related activities. For example, when other district partners facilitated support supervision visits by the DHT every quarter to health facilities, these visits were leveraged upon to also push the immunization agenda in both districts. During these supported visits to all health facilities, the DHT ensures that immunization targets are routinely monitored.

Specifically, in Kibaale, the DHT has also used the mentors stationed at the health facilities supported by IDI to push the immunization agenda, thus supporting the close monitoring of immunization. Further, IDI has also provided their vehicles, which have facilitated the health workers to conduct immunization outreaches and also supervisory meetings.

> *"In my view, the reason why our coverage is high is because of the several activities that we have been able to conduct because of the presence of IDI in the district—these include support supervision, outreaches, and mentorship." —Subnational-level KII, MOH*

Similarly, in Mpigi district, the presence of the performance review meetings supported by MJAP to review HIV/AIDS progress has also provided a platform to review progress specific to immunization. AFENET has also supported Mpigi in data management and use, which has included cleaning and analyzing immunization data specifically, thus continually informing the DHT on progress to inform planning accordingly. Therefore, the effective partnership between DHTs and existing partners has contributed to the observed increases in vaccination coverage.

Moreover, the active engagement of partners in Kibaale contributes to sustained high community demand for immunization. Demand for immunization by the community is generally high. The high demand was attributed to the frequent integrated mobilization campaigns that were conducted by partners during the year. The existing frequent mobilization campaigns have been attributed to the increase in immunization coverage.

> *"Demand for vaccines is very high in that if outreaches are not conducted in the villages, the people actually come to the facilities to ask for the vaccine." —Subnational-level KII, MOH*

### *Strong management and leadership, especially by the DHO, has led to a motivated workforce and thus close monitoring of immunization coverage indicators.*

Perceptions of key informants highlighted that vaccine coverage can be attributed to the strong leadership of the DHOs. In both districts, the DHOs have promoted immunization even in activities that are not related to immunization in order to leverage existing resources and planned activities. This has included leveraging on partners' activities like support supervision visits, mentorship, outreaches, and involvement of the village health teams.

Specific to Mpigi district, progress in terms of key indicators are tracked through performance review meetings where in-charges present their facility performance every quarter. Performance is also categorized using Reaching Every District categorization so that prioritization of immunization activities is targeted to poorly performing sub-counties. In addition, key informants noted that the DHO looks at DPT3 coverage as one of the key performance indicators in every presentation and also follows up during support supervision to the health facilities.

> *"These [quarterly performance review] meetings help us keep track of how the district is performing using particular indicators and whenever there is a gap, the DHO calls for emergency meetings in addition to the quarterly meetings where each in-charge has to explain*

*their performance. . . . But when performance is good, we are also recognized in the meetings for our good performance." —Subnational-level KII, MOH*

Key informants in Mpigi district also highlighted that the gratitude and recognition received from the DHO on good performance has motivated health workers to improve or increase their efforts. Gratitude is usually in the form of recognition during the scheduled meetings, especially when all health facilities are present.

## Recommendations

- **Act now:** In light of sustainability of the immunization program, UNEPI should establish a strong coordination system to leverage on existing partners in the districts to push the immunization agenda in terms of conducting integrated outreaches, support supervision, and other related activities.
- **Act now:** UNEPI should encourage DHOs to prioritize immunization coverage as a key health indicator in their districts and increase their vigilance in monitoring immunization performance, as this can directly influence health workers' immunization data quality and service delivery.
- **Act now:** UNEPI should study further the role of leadership and management in improving immunization coverage.

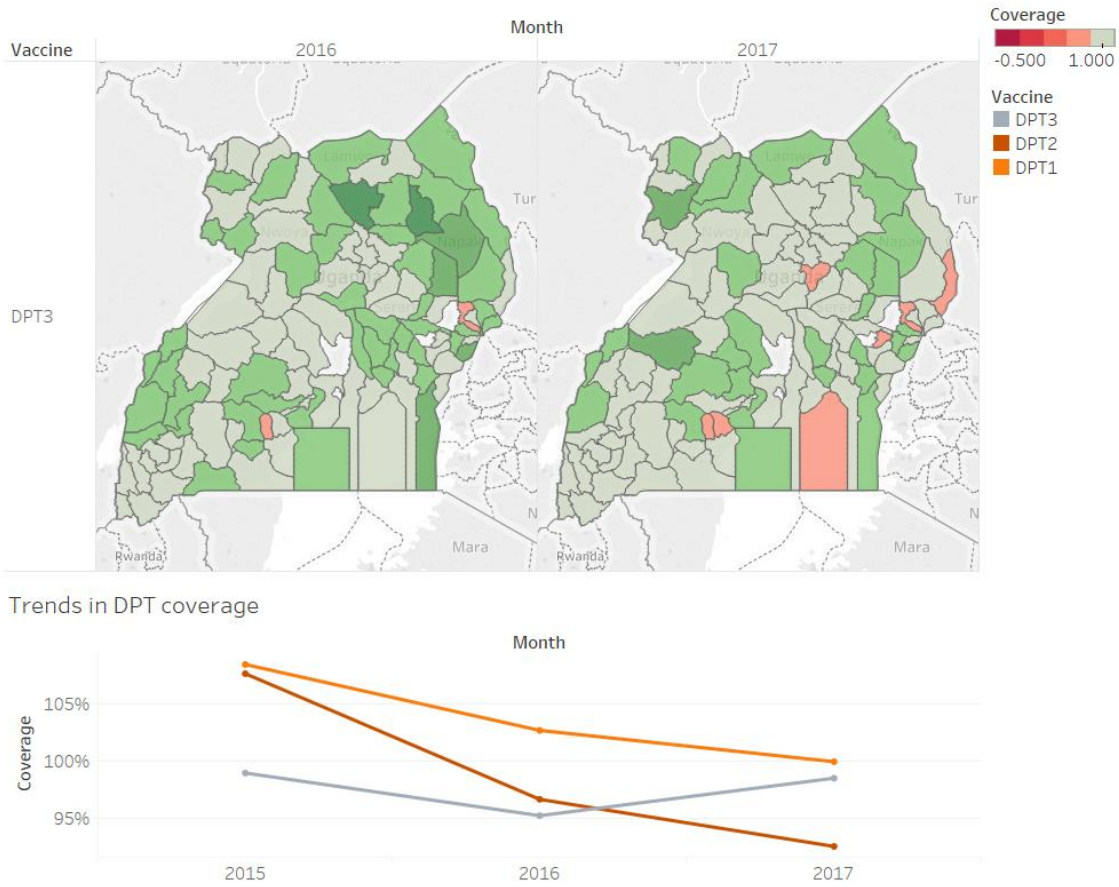
### *Countrywide partnership analysis*

> Given the increasing number of immunization partners, lack of coordination, and unclear roles and unknown areas of operation, UNEPI and other immunization stakeholders requested that the FCE team conduct a detailed countrywide partnership analysis. This is reflected as evaluation question 21: What is the structure of the immunization partnership in the country at national and district level?

> With this background, we visited 116 districts and conducted KIIs with DHOs, EPI focal persons, CAOs, and representatives of partners. In order to describe the immunization partnership, we collected data on a number of partners, areas of operations, and the activities they support.

> Given that partnership emerged as a key theme in the district case study, findings from the partnership mapping are discussed below in relation to their role in increasing coverage.

**Figure 5. Map of Uganda comparing annualized coverage for DPT3 in 2016 versus 2017.**




## EXPLANATIONS FOR OBSERVED TRENDS

This section of the report explains the decreasing trend in immunization coverage. Possible explanations discussed in this section include the gap in HSS funding, data quality improvement, existence of partnerships at subnational level, and the EPI team's focus on recurrent applications for Gavi support, rollout of new vaccines, and implementation of campaigns. Based on data analysis to date, and consistent with input from KIIs, the observed coverage trends are a result of various reasons with no definitive single root cause. Below are possible explanations from our findings.

### *District case study findings*

To explain the varying trends in coverage and equity, the FCE applied a district case study approach to compare districts with varying immunization performance in order to identify the drivers and barriers to coverage and equity. This approach was used to understand the complex social phenomenon surrounding the major drivers of district-level changes in vaccine coverage and equity by allowing the FCE to retain the "holistic and meaningful characteristics of real-life events." Despite the several advantages of the district case study approach, it has methodological limitations given that findings from the selected districts cannot be generalizable to all districts in Uganda. Even though findings may not be generalizable, the findings explore and account for contextual differences.

## IMMUNIZATION PARTNERSHIP

### *Finding 1.11*

***Ninety-three partners were mentioned to be supporting immunization in Uganda. Many of these were not supporting immunization as their core mandate but they support some immunization activities as part of integrated service delivery. This presents an opportunity for UNEPI to leverage on partner activity for sustainability of the immunization program. However, at both national and subnational levels, there is no clear coordination mechanism of partners in relation to geographical distribution, reporting and supervision.***

An immunization partner was defined as any partner supporting immunization regardless of their primary mandate (including non financial support). Across 116 districts, 93 partners were mentioned to be supporting immunization activities in Uganda, the predominant partners being UNICEF, WHO, RHITES, and World Vision. The number of partners per district ranges from 1 to 12, as shown in Figure 6 below.

Partners were categorized by development partners (present in 99 districts), local nongovernmental organizations (NGOs) (present in 54 districts), international NGOs (present in 60 districts), and faith-based organizations (present in 13 districts) (see Figure 7 below).

**Figure 6. Map of Uganda showing number of partners per district.**

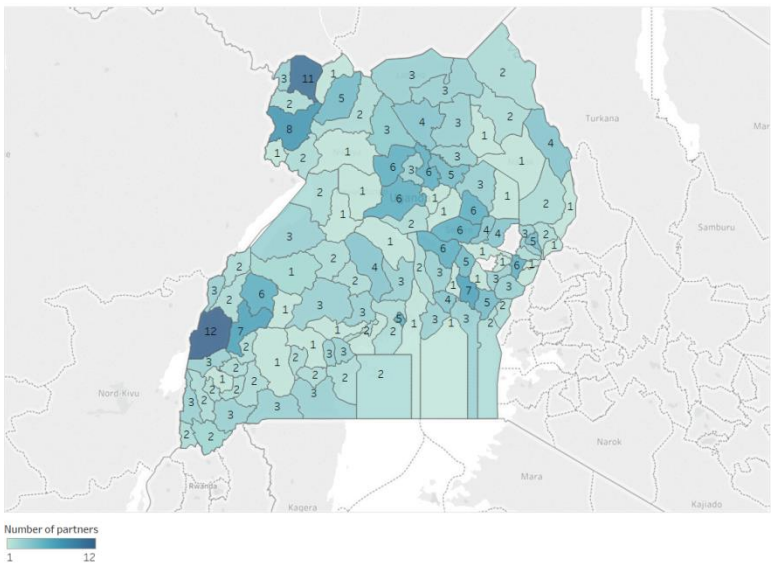
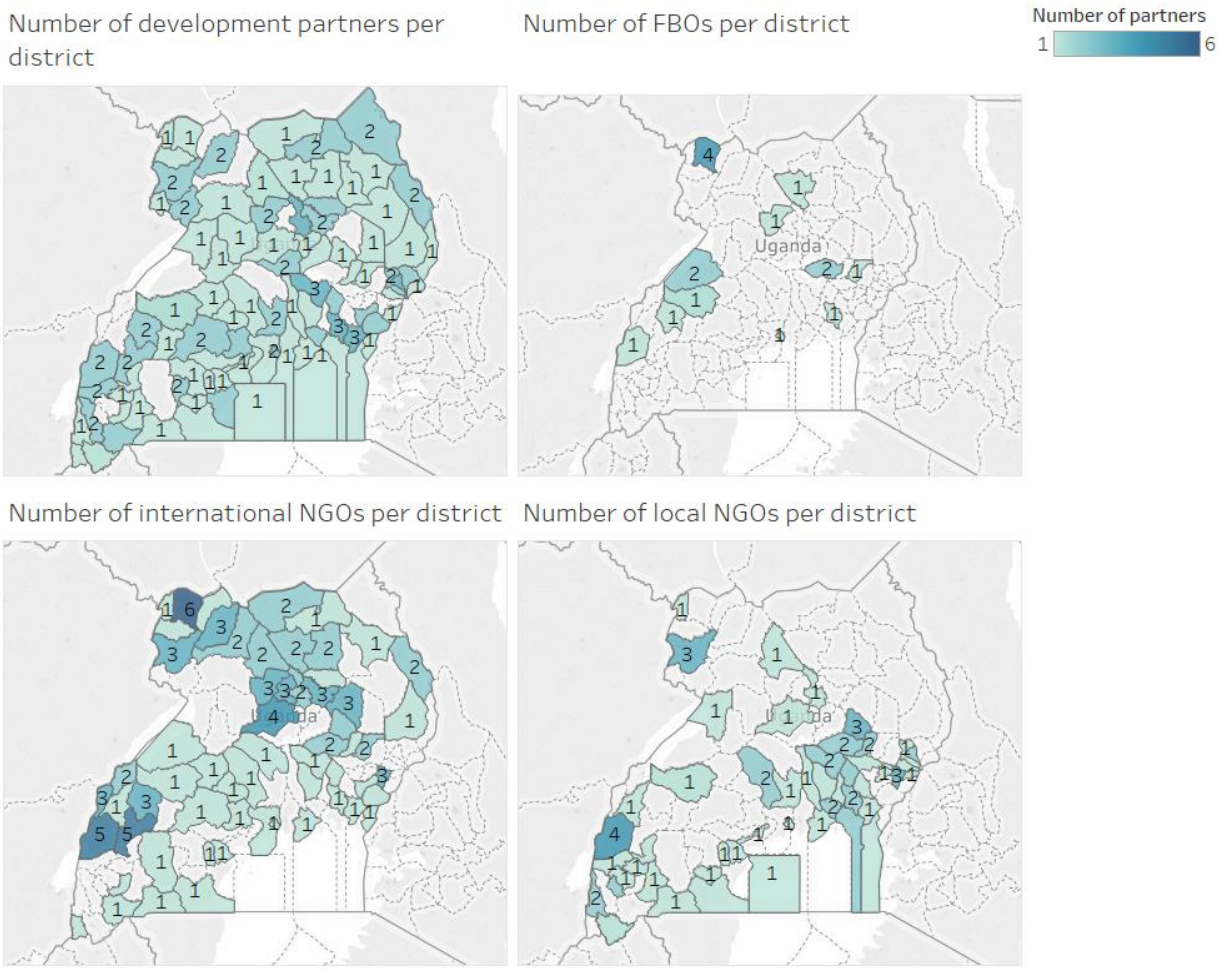
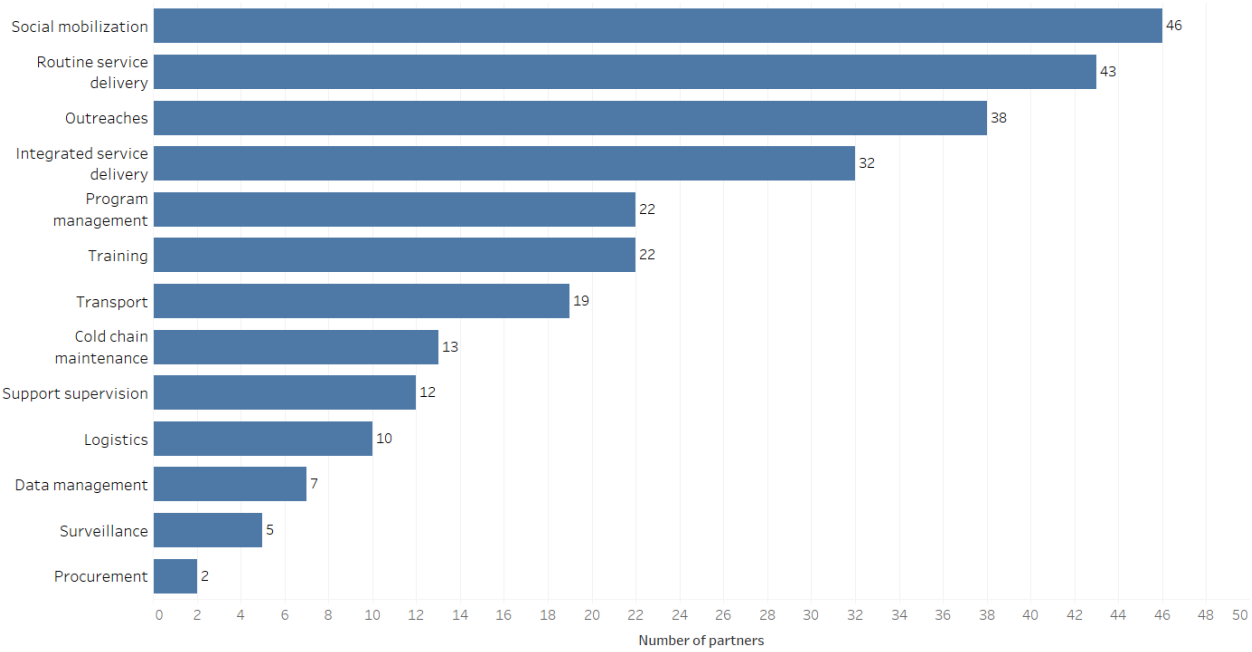


**Figure 7. Number of partners per district by category.**



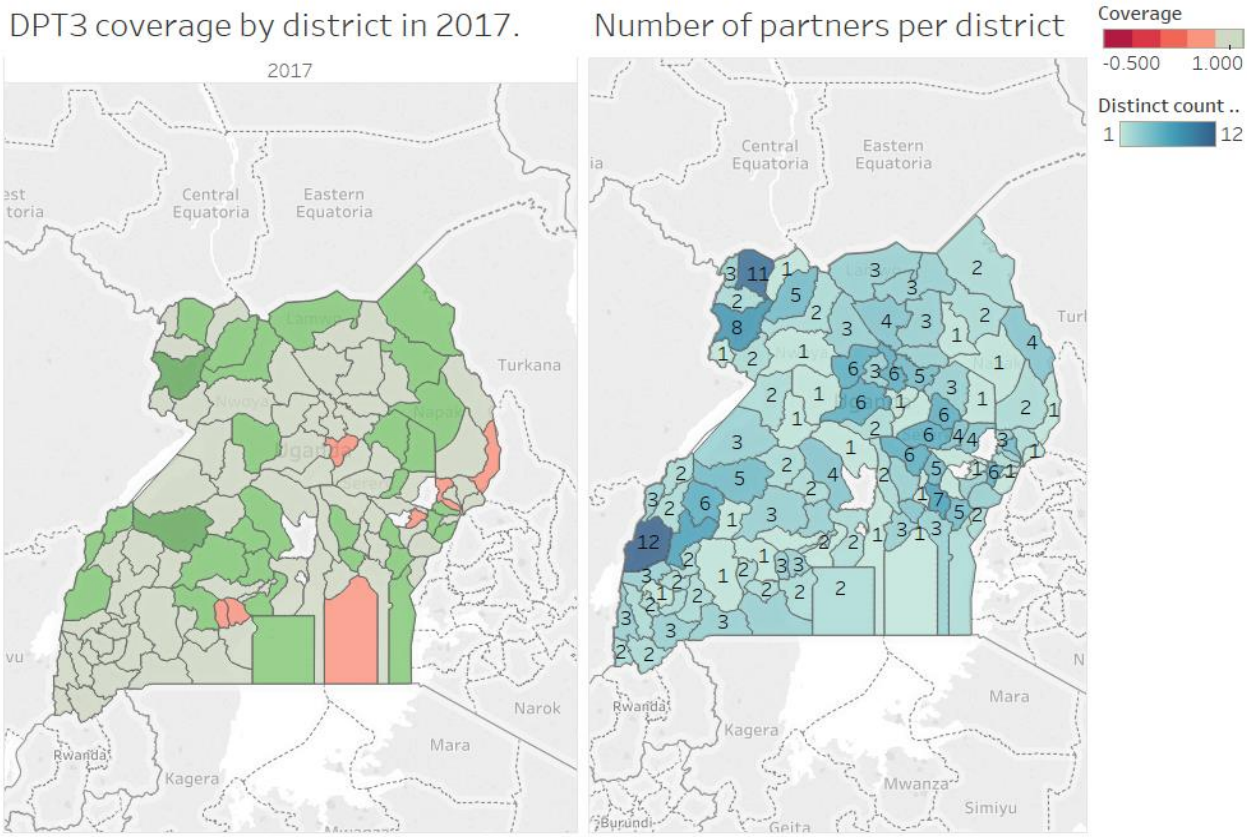

Partner-supported activities were grouped under sub-themes, as shown in Figure 9 below. Findings from this analysis show that the activities most commonly supported by partners are social mobilization, routine service delivery, outreaches, and integrated service delivery.

**Figure 8. Number of partners supporting each activity category.**




From the district case study, districts with increased coverage in 2017 reported to have leveraged on resources or activities from partnerships to facilitate immunization activities. To explore this, we compared the number of immunization partners in each districts with the DPT3 coverage as shown in Figure 9 below.

**Figure 9. DPT3 coverage by number of partners (2016–2017).**




From the figure above, there is not a clear correlation between the number of partners per district and immunization coverage. However, the figure shows that immunization partners are disproportionately distributed across districts. Nevertheless, majority of the districts have at least one immunization partner. This is an opportunity that UNEPI can leverage to support immunization activities in districts

### *Challenges faced by districts while working with partners*

Key informant at district level cited several challenges they face working with partners. These include;

> **Unpredictability of partner funding and lack of a sustainability plan**. Several key informants reported irregularity in partner funding leading to delays in implementation of planned activities. These activities may not be implemented in the long run. In addition, respondents cited lack of a clear close out strategy by several partners which poses challenges with sustainability of partner supported activities.

*"Their funding is not consistent that is they spend some time without disbursing funds and yet activities are supposed to be conducted" - Subnational-level KII, MOH*

> **Rigidity of partner support**. Partners have predetermined areas of support which may not be consistent with the district immunization workplans and are many times not willing to realign them with the district health needs.

*"They are very specific in the activities they support in that you cannot work outside their interest areas" - Subnational-level KII, MOH*

- **Lack of coordination mechanism for planning between partners and the district.** Several key informants cited inconsistencies in the planning period where many partners follow a calendar year as opposed to the financial year system. As such, there is a mismatch in the planning period which may have a negative impact on the timely implementation of activities due delays in funds disbursement. Also, several partners are not transparent in declaring their budgets thus making it difficult to plan in line with the proposed partner support:

*"They do not disclose their budgets. If you say you are working with me, I should know how much you are willing to give and on what items" - Subnational-level KII, Local Government*

## Recommendations

- **Act now:** UNEPI should leverage partner-planned activities to push the immunization agenda both at district and facility levels
- **Act now:** UNEPI should establish a coordination mechanism for immunization partners at both national and district levels

### Data improvement

## Finding 1.2

***Some key informants at national level attribute the observed decline in coverage to data-cleaning exercises under the Data Improvement Teams (DIT) strategy. Health workers are now reporting more accurate data, thus bringing down the coverage figures.***

*"Previously, we had coverages of up to 150%, which is poor math! But because of DIT, people have started disciplining themselves. And instead of forging data, they are now reporting the truth. Since we are now getting fairly correct results, coverage is also coming down." — National-level KII, MOH*

The DIT strategy, a multi-stakeholder initiative under the MOH, UNEPI, and partners (WHO, CDC, Gavi, UNICEF), was conceptualized following the completion of a 2013 data quality self-assessment that identified gaps in immunization data quality at all levels including reporting, record archiving, data analysis, and use. In 2016 and 2017, the PEF-TCA included the implementation of the Data Quality Improvement Plan (DQIP) in all districts, which was led by CDC.

Initial implementation of the DIT strategy commenced in October 2014 with a phased implementation plan starting in two districts in 2014 and expanding to 14 districts by end of October 2016 as part of

the PEF-TCA for 2016. The second round of implementation (2017 to 2019) is embedded in the PEF-TCA for 2017 and is being led by CDC and WHO. The second round is centered on continuation of the DQIP with key activities including:

- Conducting data quality activities at district and health facility level using the respective checklists and the data quality improvement tool;
- Collaborating with district and health facility staff to identify, document and implement site-specific data quality improvement activities based on assessment findings;
- Reporting shortages of national immunization guidelines and tools and ensuring that the tools used are up-to-date; and
- Mentoring and supporting district-level staff to implement data supervisory activities and to take over ownership of the activities. [3]

Preliminary findings from some performance indicators for the two rounds of the DIT implementation as of October 2017 are shown in Table 8 below. [4]

**Table 8. Performance Indicators of DIT implementation.**

| INDICATORS | ROUND 1 | ROUND 2 *(DATA FROM REGIONS DEPLOYED AS OF OCT. 2017)* |
|---|---|---|
| **No. (%) of health facilities that knew their target population <1 years old** | 1595 (47%) | 540 (75%) |
| **No. (%) of health facilities charting AND displaying Penta 3 coverage** | 1110 (32%) | 245 (34%) |
| **No. (%) of health facilities charting AND displaying measles coverage** | 792 (23%) | 126 (17%) |
| **No. (%) districts with documented evidence that routine immunization data are used for action** | 79 (68%) *(*n=116)* | 20 (77%) *(*n=26)* |
| **No. (%) health facilities with documented evidence that routine immunization data are used for action** | 1503 (39%) *(*n=3810)* | 384 (53%) *(*n=723)* |

***Note***: that Round 2 data only consists of regions that have deployed as of October 2017 and does not yet represent the whole country.

Data quality is important to address so that health workers have accurate, timely, and complete data that they can use to inform decision-making. While it is clear that many data quality activities are being implemented across districts in Uganda, there is not sufficient evidence to attribute changes in coverage to these DIT activities. Based on the KIIs and preliminary findings from the DIT implementation, data improvement may partially explain the observed decrease in national coverage in 2017.

## *Recommendations*

- **Act now:** UNEPI should make efforts to strengthen and institutionalize data quality checks and improvements.

## HEALTH SYSTEMS STRENGTHENING

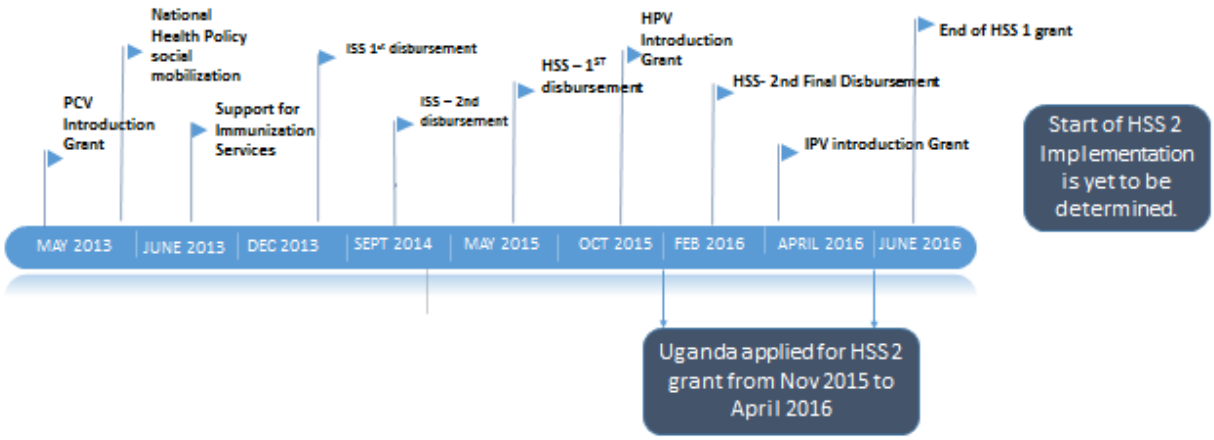
### *Finding 1.3*

***The gap in HSS cash support to districts may have contributed to the observed decline in the number of outreaches conducted and consequently the observed drop in DPT3 coverage from 2016 to 2017.***

In phase 1, the FCE evaluation established that districts depended on HSS1 funding for immunization activities such as outreaches, maintenance of cold chain, and support supervision. Given that HSS1 funding disbursements to districts ceased in February 2016 and HSS2 implementation has not started as of April 2018, it was unclear how immunization activities previously funded by HSS1 were being supported. In light of this, the FCE sought to examine the effect of the interruption of the Gavi HSS funding on routine service delivery in Uganda in specific districts. This is reflected as evaluation question 6: What is the effect of an interruption in Gavi HSS funding on routine service delivery, highlighting Government of Uganda and other partner funding?

However, during data collection, we realized that key informants at the subnational level could not differentiate between Gavi disbursements by grant. Therefore, these findings examine the effect of the gap in HSS funding while taking into consideration the additional ISS cash support to the districts from 2013 to 2016. Figure 10 shows a timeline of major Gavi funding disbursements to districts between 2013 and 2016.

**Figure 10. Timeline of major Gavi disbursements to districts between 2013 and 2016.**



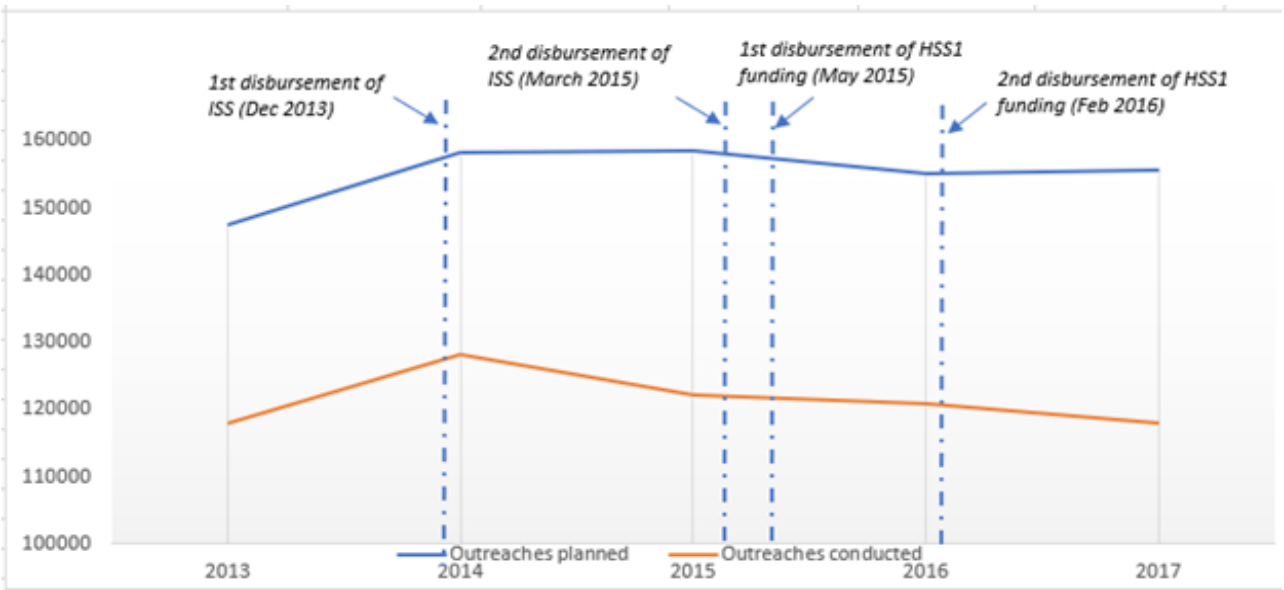

### *Change in frequency of activities supported at district level*

HSS1 funds were primarily supporting micro-planning, supervisions, and logistics at the district level and outreaches at the facility level. Generally, districts continued to implement these activities even after they stopped receiving HSS1 funding. However, respondents reported a change in frequency of implementation of these activities. For example, there was a general drop in the number of outreaches conducted following the cessation of HSS1 funding.

The activities supported by HSS1 funding at district level were (1) DHT facilitation for micro-planning, (2) DHT supervision and logistics, (3) outreach mobilization, and (4) outreach functionality for health workers.

Given that outreaches have a direct effect on immunization coverage, we focused on the outreach cash support component of the HSS1 grant. From KIIs at subnational level, several respondents reported a reduction in the number of outreaches conducted following the cessation of Gavi cash support. In this vein, we analyzed national-level DHIS2 data on EPI outreaches conducted from 2013 to 2017 to determine if there was a change in frequency during and after the HSS1 implementation period. The analysis shows a general decline in the number of outreaches conducted, despite the presence of Gavi HSS1 funding, as shown in Figure 11 below.

**Figure 11. Planned outreaches versus reported number of outreaches conducted.**




The observed reduction in the number of outreaches conducted despite availability of HSS1 funding to districts could be due to the following reasons:

1. Disbursement of funds was planned to be on a quarterly basis. However, due to several challenges, actual disbursements did not follow this sequence and therefore it was difficult to sustain the number of outreaches conducted as shown in Figure 11 above. For example, there were delayed accountabilities from several districts. In addition, some districts would change their account numbers and this further delayed funds disbursement.
2. Even when funds were accessed, in several districts the persons who received the money were different from the ones who implemented the activities. As such, health workers had limited morale to conduct outreaches.

## Recommendations

- **Act now:** As the country plans for implementation for HSS2, the MoH should:
  a. Ensure more consistent disbursement of HSS funds to districts to sustain HSS-supported activities and consequently realize impact.
  b. Devise a system of tracking funds flow up to the end user to better realize implementation of HSS-supported activities.

## ADAPTING TO THE CESSATION OF HSS1 FUNDING BY DISTRICTS

### Finding 1.3.1

***Following cessation of HSS1 funding, the common ways in which immunization activities were continued across all the 18 visited districts was through the use of PHC funding and partnerships. Other ways in which districts adapted to the funding gap included strong leadership and management skills of facility in-charges and DHOs, having a dedicated health workforce, finding alternative sources of funding, riding on the high community demand for outreaches, and conducting outreaches at specific locations.***

***Use of PHC funds.***
Several health facilities are using PHC funds to facilitate immunization activities, though they report that these funds are minimal.

> *"We are using the little PHC funds we get to do the work. It's just that Gavi funds were topping up allowances but we are still doing the work." —Subnational-level KII, MOH*

*Partnerships.* In several districts, partners have stepped in to fill the funding gap. Some partners fund immunization activities as a standalone program (e.g., Save the Children, Stronger Systems for Routine Immunization, AMREF). However, several partners integrate immunization in their other activities. For example, in Mpigi district, MJAP supports performance review meetings for the HIV program for all facilities in the district every month. The district health office uses this as an opportunity to review performance on other health indicators as well, including immunization. Thus, during these meetings, the in-charges present their performance on immunization, and the HMIS focal person and the district biostatistician use this as an opportunity to do support supervision on several health programs, including immunization.

***Strong leadership and management skills of facility in-charges and DHOs.***
Respondents in several districts emphasized the strong leadership of the DHOs and health facility in-charges as a key contributor to their adaptation to the gap in HSS1 funding. For example, in Mpigi district, the DHO prioritizes immunization during support supervision visits to health centers, encourages the use of PHC funding to support immunization activities at health facilities, motivates health workers with a thank-you, and calls for meetings to review immunization performance.

Furthermore, respondents cited good management skills of the facility in-charges as key to encouraging health workers to work even with limited resources. An example is an in-charge at a health center who encourages health workers to work with limited resources and also borrows fuel from a nearby petrol station to fuel the health facility motorcycle and pays using PHC funds.

***Having a dedicated health workforce.***

In several districts the health workers continue to conduct outreaches even without facilitation, as they view service delivery as their mandate. Again, strong leadership from the DHO and health facility in-charges can help motivate and sustain a dedicated health workforce at the facility level.

***Finding alternative sources of funding.***

In Manafwa district, there was lobbying for funds from the district administration to support immunization activities.

> *"When Gavi money stopped, we didn't have to sit; lucky enough we maintained a good relationship with the CAO so we approached him and the district finance department to request for support to the DHO office and immunization. They were able to support us and the activities kept on going." —Subnational-level KII, MOH*

In Kasese district, some health workers borrow money for outreaches from a SACCO (savings and credit cooperative) and refund it using PHC funds.

***High community demand.***

The high community demand for outreaches in some areas in Kasese district encourages health workers to keep going for outreaches.

> *"The mothers also encourage us by their coming to the outreaches in good numbers. If you go for outreaches and don't find mothers, you get discouraged. Our mothers have been sensitized; when they know the day of the outreach, we find them waiting for us." —Subnational-level KII, MOH*

***Conducting fewer, more targeted outreaches at specific locations.***

Due to limited funding in Abim district, health workers aren't able to go to far-off villages for outreaches. Outreaches are mainly conducted at schools, health facilities, churches, and markets.

## *Recommendations*

- **Act now:** Ministry of Health should develop a grant closeout strategy entailing a proper communication plan in order to ensure the continuity of HSS funded activities following the end of HSS support.

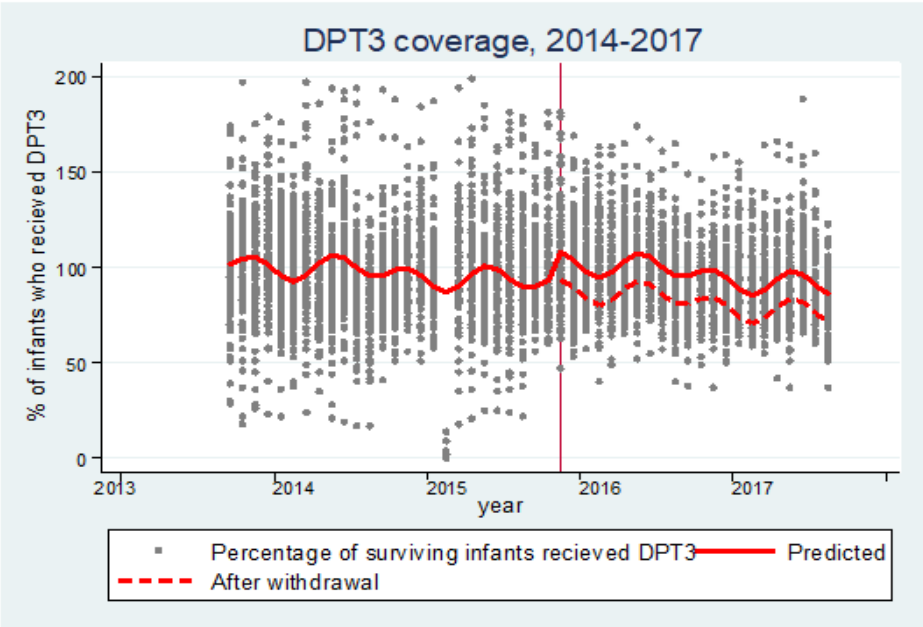
## EFFECT OF GAP IN GAVI CASH SUPPORT ON DPT3 COVERAGE: INTERRUPTED TIME SERIES ANALYSIS

Stakeholders at national and subnational levels have varying perceptions on the effect of the gap in Gavi HSS funding on immunization coverage. At national level, key informants did not attribute the observed national coverage decline to the gap in HSS funding. However, from key informants at visited health facilities and districts, there is a general perception that immunization coverage decreased following the cessation in HSS funding. On this basis, we ran an interrupted time series analysis from 2013 to 2017 to examine the effect of the cessation of Gavi cash support on DPT3 coverage.

An interrupted time series analysis using DHIS2 data shows that there was a decrease in Penta 3 coverage following the cessation in Gavi cash support.

We ran a mixed effects model in which we were interested in identifying whether there is variation in DPT3 coverage in the post-HSS withdrawal period compared with prior to its withdrawal. In this case, HSS funding withdrawal is the "interruption" that occurred in February 2016. Our findings indicate a reduction in the DPT3 coverage after the HSS withdrawal (Figure 12). In this model we adjusted for time lapse between the disbursements, amount of disbursement of Gavi cash support, and interaction between withdrawal and time between the disbursements but centered at the time of withdrawal.

**Figure 12. HSS-interrupted time series analysis results.**



## UNEPI'S FOCUS ON APPLICATIONS AND INTRODUCTIONS

### *Finding 1.4*

***Strong focus by the EPI team on recurrent applications for Gavi support for new vaccines and cash support, rollout of new vaccines, and implementation of campaigns has side-lined the focus on coverage and equity of routine immunization activities.***

Since 2013 to date, Uganda has introduced several new vaccines in quick succession and is planning for more new vaccine introductions. Furthermore, the country has been involved in application processes for HSS2 and CCEOP grants as shown in Table 9 below.

**Table 9. Timeline for new vaccine introductions and applications for Gavi cash support.**

| EPI ACTIVITY | ACTUAL / EXPECTED TIMING |
|---|---|
| **PCV introduction** | April 2013 |
| **HPV vaccine introduction** | November 2015 |
| **HSS2 and CCEOP grant application** | November 2015-May 2016 |
| **IPV introduction** | April 2016 |
| **Meningitis A campaign** | January 2017 |
| **Rotavirus introduction** | 2018 |
| **Switch from PCV10 to PCV13** | 2018 |
| **Switch from adult tetanus toxoid to tetanus-diphtheria vaccine** | 2018 |
| **Measles/Rubella introduction** | 2019 |

Given that all of the activities shown above require considerable amounts of time for planning and implementation, UNEPI may have directed more of its focus to planning for and implementation of these activities and less attention to routine immunization thus contributing to the observed decline in coverage.

> *"It is difficult to get the EPI to talk about coverage and equity, because they are more focused on new vaccine applications." —KII, Global level*

### *Finding 2*

***To measure equity by geography, Gavi requires coverage of greater than or equal to 80% in all districts and a pass in a data quality check. FCE analysis of administrative data (HMIS) shows that immunization coverage for DPT3 in all districts is not yet above the recommended minimum coverage. Further, there is a lot of variation in coverage by sub region in Uganda (which is a proxy for geographical equity) as efforts to achieve equity are most often overshadowed by the desire to increase national coverage.***

**ROBUSTNESS RANKING** **B**

This finding is factual but mainly supported by DHIS2 data.

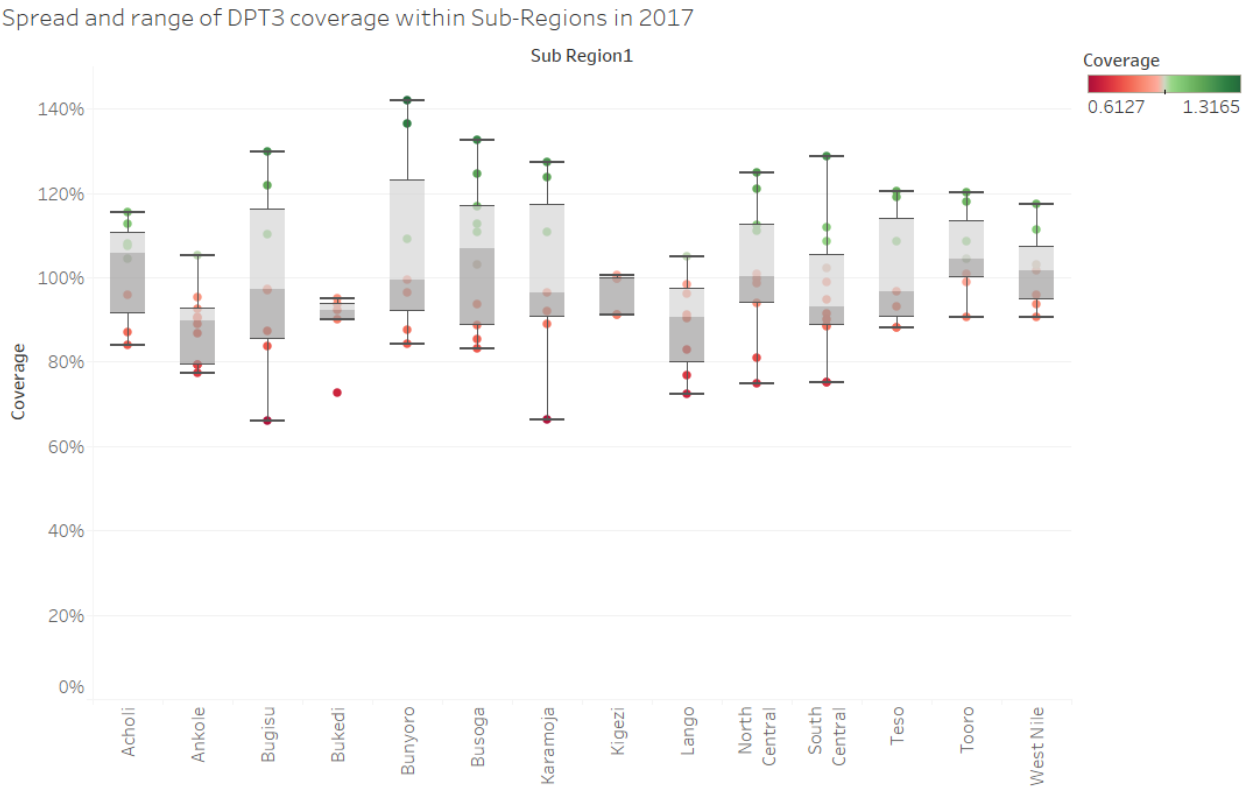
Equity in immunization generally refers to the fair distribution of immunization services among different groups. According to Gavi's indicator definitions, equity is defined in relation to gender, geography, and wealth. Using HMIS data, the FCE has the ability to measure equity by geography but not by other dimensions of wealth and gender. Gavi defines equity by geography as the percentage of supported countries with greater than or equal to 80% coverage with third dose of pentavalent vaccine in all districts and a pass in a data quality check.[5] To this effect, district-level distribution is assessed through data reported by countries to WHO and UNICEF in the Joint Reporting Form, which directly measures geographic inequalities using existing in-country data.

The Global Vaccine Action Plan calls for Reaching Every District, now recast as Reaching Every Community. In order to implement Reaching Every Community, the national immunization program and stakeholders needed to identify "high-risk" communities whose social and/or economic characteristics are associated with the lowest rates of infant immunization. Analysis of existing information, including the HMIS data and the Gavi FCE household survey findings, showed existing immunization inequities, with many districts having a high dropout rate of more than 10% and DPT coverage of below 90% as of 2015. On this basis, Uganda set out to conduct an immunization equity assessment with an overall objective of establishing the communities affected by inequities so as to understand barriers to access and use of immunization.

Findings from this equity assessment identified 36 districts out of 112 (32%) with immunization inequities, contributing to 53% of the underimmunized children for DPT3 for the period of 2013 to 2015.[6] Further, the assessment identified factors associated with effects of health care–seeking behavior including tribe, religion, mother's education status, and wealth status as defined by wealth index categories. Other associated factors related to access included place where the mother received skilled antenatal care, where the child was born, gender of the child, and indicators of proximity to health facility (assessed using travel time to the nearest facility and transportation costs). In the recently concluded DHS survey, only 55% of the children aged 12-23 months were recorded to have received all basic vaccinations at any time before the survey while only 49% received the basic vaccinations by the appropriate 1 months leaving 1% who received no vaccinations at all[7].

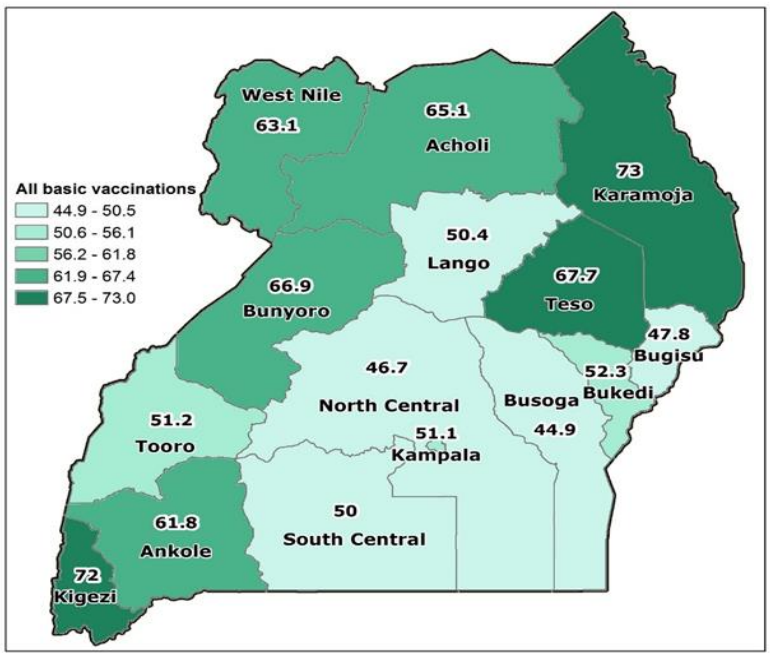
Given the limitations of HMIS data towards equity indicators, the FCE focused on geographical equity using HMIS data. To illustrate this, the spread and range of DPT3 coverage across districts was analyzed and categorized by the Demographic Health Survey sub-regions in Uganda shown by Figure 13 below. In general, the median coverage of each sub-region greatly differs from each other, illustrating the variation in immunization coverage by sub-region. That is to say, there is varying spread in DPT3 sub-region coverage with the median coverage ranging from 83% to 100%. The highest observations is seen in Bunyoro (Kibaale district) with a coverage of over 100%. The lowest observations are seen in Bugisu (Bulambuli district) and Karamoja (Amudat district) regions, with districts reporting an average coverage of 60%.

**Figure 13. Spread and range of DPT3 coverage within sub regions in 2017.**




Drawing from UDHS 2016, regions with the fewest children between 12-23 months who received all basic vaccinations were Busoga (44.9%), followed by North Central (46.7%), and Bugisu (47.8%). The highest number of children was found in Karamoja region at 73%. This is shown in Figure 14 below.

**Figure 14. Map showing children 12-23 months that received all basic vaccinations from UDHS 2016.**



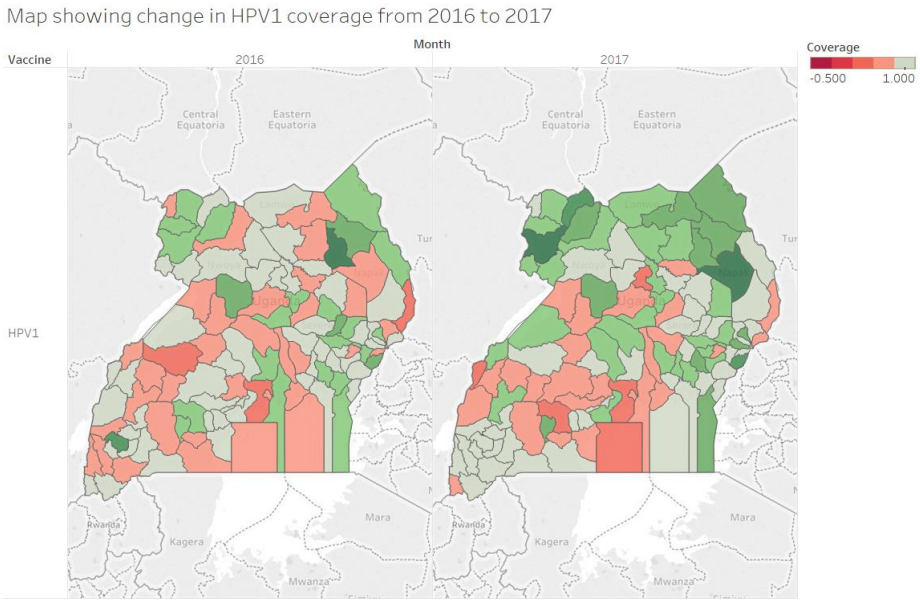
# HPV Vaccine

**EQ 12: What are the demand-side reasons for the low coverage of HPV second dose in Uganda?**

As reported in the Gavi FCE phase 1 report, Uganda introduced HPV vaccine in November 2015. HPV vaccine national rollout was slow with a coverage of 80% for the first dose of HPV (HPV1) and 22% for the second dose of HPV (HPV2) by the end of 2016. The main reasons for the slow national rollout were mismatches between the launch date and the school calendar and the delayed rollout in several districts due to late receipt of vaccines and reporting tools.

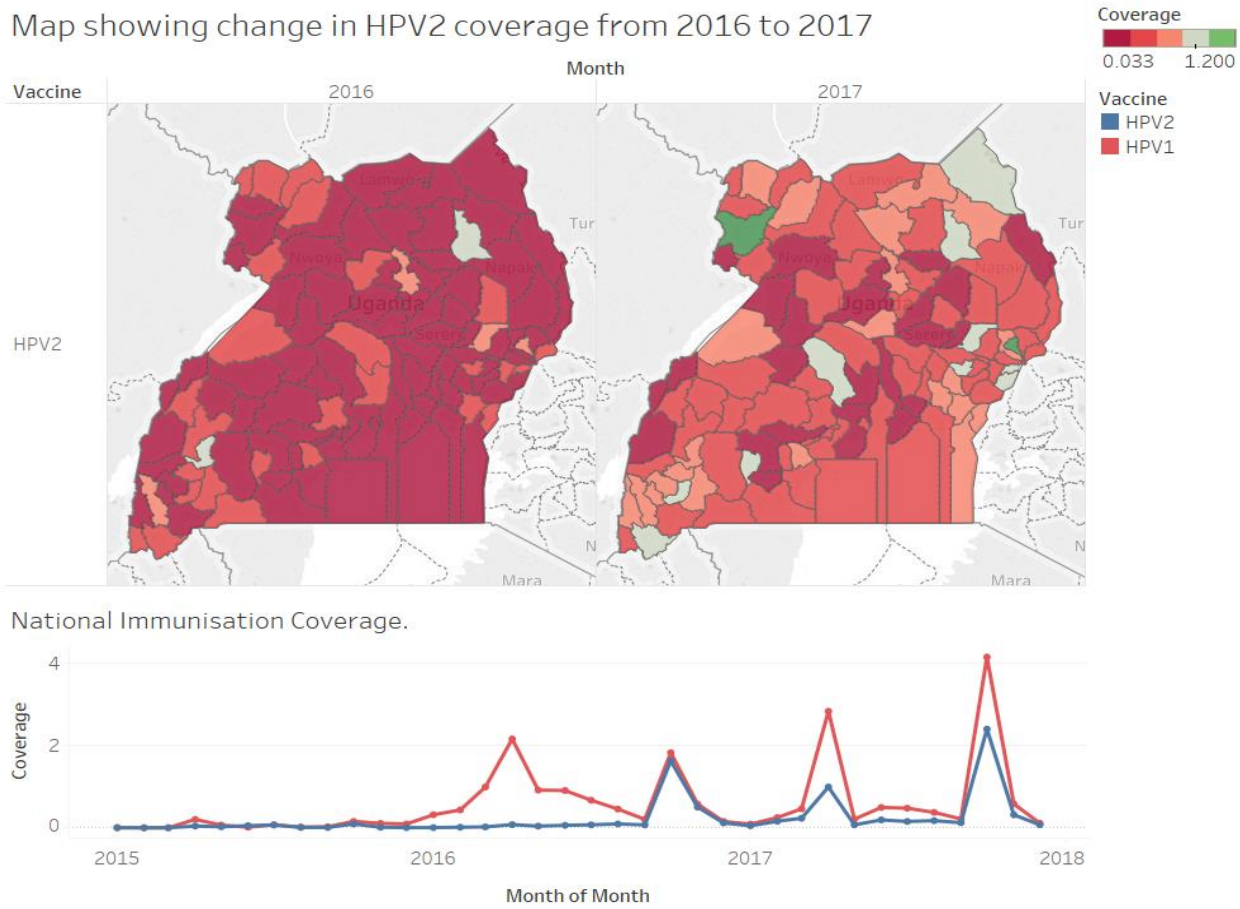
According to HMIS data, coverage for HPV1 was maintained at 80% in 2016 and 2017 (Figure 15). Many of the districts that improved coverage are in the northern part of Uganda, including Amuru, Napak, Lamwo, Agago, and Kitgum.

**Figure 15. Map showing change in HPV1 coverage from 2016 to 2017.**



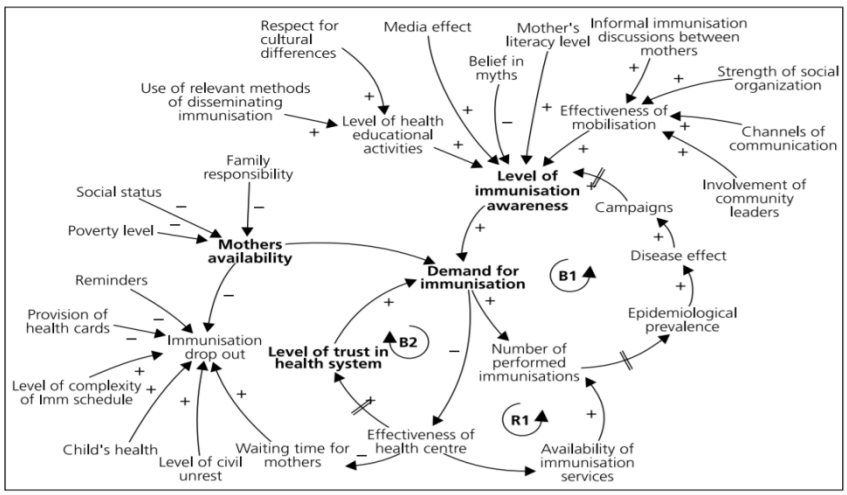

Coverage for HPV2 improved by 17% from 22% in 2016 to 39% in 2017. Despite this improvement, coverage is still low, with a majority of the districts having a coverage of less than 50%. The maps in Figure 16 below show coverage for HPV2 by district in 2016 and 2017. The trend line below the map shows the national coverage for HPV1 and HPV2 with spikes in coverage in April and October, which correspond to the Child Days Plus (CDP) program. This indicates that vaccination for HPV vaccine mainly takes place during the CDP months as opposed to other months. It is on this basis that country stakeholders requested that the FCE explore the demand-side reasons for low HPV2 coverage in selected districts.

**Figure 16. Map showing change in HPV2 coverage from 2016 to 2017.**




In order to answer this question, we employed an existing framework for immunization demand in Uganda: the causal loop framework for demand for immunization dynamics (Figure 17).[8] The causal loop framework shows a circular chain of diagrams that illustrate cause and effect used to represent relationships between variables that are often difficult to describe.

**Figure 17. Causal loop diagram for demand for immunization dynamics (from Rwashana 2009).[8]**



Development of data collection tools and data analysis were done according to the framework. As noted in the methods section, data were collected in a total of four districts (two low-performing and two high-performing districts) from DHOs, teachers, parents, facility in-charges, health workers, and health facilities. The health centers and schools visited are indicated in Table 10 below. Findings were categorized by framework dimensions and analyzed by stakeholder categories that were interviewed (i.e., DHOs, facility in-charges, health workers, teachers, parents, and the district).

**Table 10. Districts, schools, and health centers visited to investigate demand-side reasons for low HPV2 coverage.**

| DISTRICT | UDHS SUB REGIONS | HEALTH CENTERS VISITED | SCHOOLS VISITED |
|---|---|---|---|
| **Arua** | West Nile | Ogoko HCII<br>Vurra HCIII<br>Oli HCIV | Ogoko Primary School<br>Bridge International School<br>Arua Hill Primary School<br>Ekarafe Primary School |
| **Rubirizi** | Ankole Region | Kyenzaza HCIII<br>Kichwamba HCIII<br>Rugazi HCIV | Kichwamba Primary School<br>Mushumba Primary School<br>Ndyekye Primary School |
| **Buliisa** | Bunyoro | Bigoigo HCII<br>Biiso HCIII<br>Buliisa HCIV | Buliisa Primary School<br>Bigoiogo Primary School<br>Kihunoya Primary School<br>St. Mary's Biiso |
| **Wakiso** | Central | Nansana HCII | Kisimbiri Church of Uganda Primary School<br>Wakiso Town Primary School |

## *Finding 2.1*

***The demand-side reasons for the low coverage for HPV2 are (1) low awareness of HPV vaccine among parents, teachers, and health workers, (2) inadequacy in the follow-up system for HPV2, (3) presence of a communication gap between health workers and teachers, (4) confusion on the target age group among health workers, and (5) school-based constraints (boys bullying girls and limited time for vaccination due to busy school programs).***

**ROBUSTNESS RANKING** **A**

Data were collected from only KIIs. However, there was validation of findings across different categories of respondents. Findings were also triangulated with the HPV assessment with CHAI and the HPV Post Introduction Evaluation findings.

## LOW AWARENESS OF HPV VACCINE

In both low- and high-coverage districts, several respondents attributed the low demand for HPV2 to low levels of knowledge about and awareness of HPV vaccine, its benefits and side effects, and the vaccination schedule. This was largely attributed to the poor sensitization of the community, including parents, girls, religious leaders, and teachers. In low-coverage districts, respondents (five parents) did not know where their children could access the vaccine, indicating their lack of knowledge.

> *"I don't know where the HPV vaccine will be administered. Last time, girls were vaccinated at school and another time, we heard that the vaccination happened in another place but now I don't know where the second dose is supposed to be given." —KII, parent*

> *"Girls don't understand why they are receiving the second dose. They stubbornly reject the vaccine because they feel the single dose is quite enough to protect them." —KII, teacher*

Inherently, the low level of knowledge has negatively affected the attitude toward HPV given the various beliefs and myths present in the community that were reported. In all visited districts, beliefs and myths were reported to influence uptake of HPV vaccine. These ranged from beliefs that the HPV vaccine can cause infertility, cancer, death, and other health complications among their children.

In addition, beliefs and myths in Wakiso, Rubirizi, and Buliisa districts were fueled by the religious leaders who continually discourage their followers from receiving the HPV vaccine on the basis that it is a method of contraception and can cause harm to their children. For example, there's a religious sect called the Bekinza that is opposed to any type of medication and completely relies on "healing water" to protect their children from diseases.

> *"Parents tell their daughters that if they get the vaccine, they will get cancer and others would say that they would not be able to give birth." —KII, parent*

> *"Girls fear that the vaccine will make them barren. Completing both HPV doses therefore implies total barrenness." —KII, teacher*

> *"Some religious leaders like in the catholic faith do not encourage family planning. They often package the HPV vaccine as a deliberate family planning control measure hence discouraging their followers from embracing it." —KII, teacher*

Furthermore, some health workers attributed the low coverage to the inadequate training they received before its introduction. In the first phase of the evaluation, the FCE reported the merging of

the measles campaign, supplementary immunization activities, and HPV vaccine introductory activities due to the limited bandwidth of UNEPI and the failure of the country to raise sufficient funds to cover all activities. The merge affected the quality of HPV training that was received and thus contributed to the low level of knowledge of the health workers administering the vaccine.
Some parents mentioned that their children had developed adverse effects following immunization and as a result, members of the community eventually learned about the experience, which affected their attitude toward the vaccine.

> *"Some time back, there were girls who got severe side effects including vomiting following vaccination with HPV vaccine. . . . This experience scared other girls from going back for the second dose." —KII, parent*

The lack of knowledge by the health workers to communicate the potential side effects of HPV vaccine to the girls and the parents and other attributes such as benefits of the vaccine have also contributed to the low HPV2 uptake.

Overall, the various misconceptions toward HPV vaccine among the girls and the parents and the low level of knowledge about HPV vaccine among the health workers indicate that there is a general lack of adequate knowledge and interest among parents and schoolgirls with respect to HPV.

## INADEQUATE FOLLOW-UP SYSTEM FOR SECOND DOSE OF HPV

In both low- and high-HPV-coverage districts visited, health workers expressed difficulty in tracing girls who received HPV1 and were thus eligible for HPV2. After vaccination, girls are supposed to be given a card to indicate that they received the first dose. However, many girls do not receive these cards (mainly due to stockouts) and few of those who receive the cards carry them when they are due for the second dose.

> *"Currently, we cannot follow up girls, especially after failing to turn up for the second dose." —KII, health worker*

> *"Most children do not return with their HPV cards; therefore, before administering the second dose, we confirm orally if the girls received the first dose. This presents a challenge, especially when tallying. It is also very likely that we tally HPV1 many times." —KII, health worker*

### *Confusion on the target age group*

Furthermore, both health workers and teachers were not sure of the actual target group for HPV vaccine. Uganda adopted a hybrid strategy by grade (school-based vaccination) and age (community-

based vaccination). In school, girls in primary 4 were targeted while in the community; the target was 10-year-old girls.

Findings indicate that in areas where teachers targeted girls in primary 4, there was a concern that girls in most of the rural schools were already sexually active and out of the target age group of 9–13 years. Also, it was noted that health workers targeting girls in primary 4 would forget to administer the second dose for girls who advanced to primary 5, explaining the low coverage in HPV2. By primary 5, however, girls are also hard to keep track of due to high dropout rates from school, change of schools, and absenteeism.

On the other hand, in areas where teachers and health workers concentrated on the target age group of 9–13 years, girls were distributed from primary 1 to primary 5, making it hard to track them in the subsequent visits.

> *"The dropout rate is very high and most girls are out of school or in another school before receiving the second dose. Most children are likely to miss out since there is no proper follow-up system for girls in the community." —KII, teacher*

### *Communication gap between the teachers and health workers*

In all districts visited, the low HPV vaccine coverage was attributed to the communication gap between the teachers and health workers. Teachers mentioned that health workers do not communicate their visits to schools early enough and as a result, teachers are unable to mobilize children to turn up for the HPV vaccine outreaches. Additionally, teachers are often left out of trainings and yet they have the closest contact with girls and can advocate for the vaccine.

> *"We are just ambushed; before you know it, health workers are already at school when you have not yet done any mobilization." —KII, teacher*

As indicated in the conceptual framework, a gap in communication has a negative impact on the effectiveness of mobilization, which in turn affects immunization awareness and ultimately the demand for HPV vaccine.

### *School-based constraints*

Given the unique target age group of HPV vaccine, several school-based constraints emerged. Respondents from the education sector mentioned that school programs were too busy, thus making it hard to create time for school health programs. Also, in some schools, teachers mentioned that the boys bully the girls who receive HPV vaccine because it is assumed that those who receive HPV vaccine are not sexually active, which is perceived as odd.

> *"In some schools, boys bully girls who got the first dose. They say these ladies pretend not to be sexually exposed and yet they always see them with men all over the village. This therefore discourages them from going back for the second dose." —KII, teacher*

More still, due to the fear of injections, once vaccination is announced, some girls don't show up on the day of vaccination.

### *Supply-side barriers*

In addition to the demand-side challenges, there are also supply-side barriers to HPV vaccination. Overall, parents and health workers in districts visited mentioned that they experienced vaccine stockouts.

> *"Vaccines are not readily available at the nearest health facilities and even when the vaccines are brought, information about the availability of the vaccines at the health facility is not disseminated in time." —KII, parent*

The HPV assessment conducted by CHAI in April 2017 to identify barriers to uptake of HPV vaccine in Karamoja also highlighted similar issues. Findings from the assessment highlighted training and knowledge gaps among schools, health workers, and caretakers in HPV immunization, specifically on the required number of doses to administer, spacing of dosing, and target population. CHAI found major barriers to uptake of HPV vaccine, including low awareness and knowledge among caretakers and schools, limited clarity of HPV vaccine delivery models among stakeholders, limited health worker training and availability of tools, and limited community engagement.[9] Additionally, the Post Introduction Evaluation (PIE) conducted in October 2017 also identified similar drivers of low uptake of HPV vaccine, including low knowledge and awareness of HPV in communities, insufficient knowledge of health facility and community health workers, confusion over eligibility for vaccination, and vaccine stockouts.[9]

Findings from the CHAI assessment and HPV PIE demonstrated the need for a comprehensive improvement plan in order to increase uptake of HPV vaccine and increase coverage. To this effect, UNEPI has developed an HPV improvement plan with an overall objective to increase and sustain the uptake of HPV vaccine through a national improvement strategy with a tiered approach targeting national and subnational levels.[10] The objectives stipulated in the plan are to achieve 85% coverage for HPV1 by April 2018 and 60% coverage for HPV2 by October 2018.

The key notable interventions include strengthening planning and coordination at national and subnational levels (district leadership, parents, and teachers) led by UNEPI and other key stakeholders like the Ministry of Education (MOE).[11] The plan also provides for quarterly follow-up and review of performance, especially in poorly performing districts, which will be prioritized for supportive supervision using partner and existing government resources.

## *Recommendations*

- **Act now:**
  - UNEPI should conduct intensified social mobilization for HPV vaccine to raise awareness of HPV among the population. Social mobilization should specifically target:
    - Girls, to increase their acceptability and demand for the vaccine.
    - Boys, to reduce stigmatization of girls and offer support.
    - All teachers in the school, not just primary 4 teachers. This could help in follow-up of girls for HPV 2, especially if they have changed classes.
    - Religious leaders, to encourage their followers to access the vaccine.
    - Parents, so that they can consent and encourage their children to obtain vaccination.
  - UNEPI should strengthen the communication between schools and health workers regarding HPV vaccination to facilitate smooth planning and implementation of HPV vaccination in schools. Planning would include scheduling of school visits, making sure the girls are informed and are available. This would also facilitate follow-up of the girls who received the first dose.
  - UNEPI should involve the MOE in planning for implementation of HPV vaccination at both national and district levels.

# Alliance Systems and Processes

***EQ 17: What are the positive and negative consequences of the new/updated Gavi processes like the program capacity assessment (PCA) and grant performance frameworks?***

***EQ 18: What positive and negative unintended consequences occur as a result of Gavi support?***

## *Finding 3.1*

***The Uganda PCA recommendations informed the grant management requirements (GMRs), which had to be addressed before disbursement of the first tranche of HSS2 funds. Gavi also conducted a Cash Programme Audit (CPA) in 2016 whose findings resulted in GMRs. Despite the country's efforts to implement the GMRs, Gavi changed course and made a decision to channel HSS2 funds through UNICEF. This decision has resulted in prolonged interchange between Government and Gavi on the most suitable modality to implement HSS2. As a result there has been delayed implementation of HSS2. Furthermore, based on insights from key informants and learnings from countries with similar experiences in funding modality, future consequences of this decision may include (1) limited country ownership of the HSS2 implementation, (2) lack of clarity in roles and responsibilities, (3) high management fees incurred, (4) implementation delays due to an additional layer of bureaucracy, and (5) challenges with coordination of funds flow and activity implementation at district level.***

**ROBUSTNESS RANKING** **B**

Data were collected from various categories of respondents through KIIs and document review.

Gavi's risk policy states, "Gavi is very conscious of its obligation to be an effective steward of donors' resources and the need to manage risks proactively, appropriate to the preferences of a diverse stakeholder base."[12] In reference to this, Gavi conducts financial and programmatic audits in countries as a way of monitoring efficient and effective use of its cash support. In light of this policy and given that Uganda was in the process of applying for HSS2 funding, Gavi conducted a PCA in February–March 2016. The purpose of the PCA was to assess the (current or proposed) financing modality and other structures for use of Gavi support provided in the form of cash grants, vaccines, and vaccine-related devices. Additionally, Gavi conducted a Cash Programme Audit (CPA) in 2016 which identified weak financial systems and specific ineligible expenditures. Findings and recommendations from the PCA and the CPA informed the GMRs. One condition from Gavi was that some of these GMRs had to be addressed before disbursement of the first tranche of HSS2 funds. As such, the country made efforts toward addressing these, as shown in Table 11 below.

**Table 11. Status of implementation of key GMRs.**

| PCA RECOMMENDATIONS[13] | GMR REQUIREMENT | STATUS OF IMPLEMENTATION AS OF MARCH 2018 |
|---|---|---|
| A dedicated body (Immunization Country Coordination Mechanism) should be established to oversee immunization program in the country. | Constitute a broad-based Immunization country coordination mechanism body, equivalent to the ICC. Representation to include country Gavi partners to oversee immunization programs in Uganda. | UNICC was constituted and TORs were developed and shared with Gavi for approval. However, changes have been proposed on the committee composition and its alignment to the immunization board as stipulated in the Immunization Act of 2016. |
| TCC should continue with the role of coordinating Gavi program.<br><br>Scope of TCC should be expanded to include program management focus. In addition, the composition of TCC should be revised to include DGHS as chair, UNEPI program manager as secretary, MOFPED, development partners involved in immunization in Uganda (including Gavi partners), academia, and fiduciary support to UNEPI. | Restructure the TCC to become a technical working group with membership as follows: DGHS as a chair, UNEPI program manager, MOFPED, academia, representatives of the fiduciary management agent (FMA) and technical people from WHO, UNICEF, and other relevant organizations involved in immunization programs and HSS in Uganda. | This was disbanded. |
| Current function of technical assistant should be expanded to include fiduciary management support to UNEPI in financial management, compliance with sound internal control systems, and accountability for results. The resultant role should be an FMA. | An independent FMA will be engaged to provide fiduciary support and strengthen the financial management capacity of the MOH to manage all Gavi funds. The cost of the FMA will be covered from the HSS2 grant. | Edes & Associates was transformed from a technical management agency to an FMA. |
| The in-country Gavi program management should be put under UNEPI program manager. Monitoring and evaluation specialist and accountant in the current Gavi program management unit should be retained in UNEPI and report to the program manager. | The program management unit in-country (referred to locally as the Gavi Secretariat) will be disbanded in favor of strengthening the capacity of UNEPI. The following positions will be funded, under the HSS2 grant, to enhance UNEPI's capacity to manage Gavi grants:<br>> Recruit a Gavi HSS grant coordinator, procurement specialist, and accountant to report to the UNEPI program manager and the relevant functional heads for their role (e.g., the accountant reporting to the assistant commissioner of accounts). | Program management unit was disbanded, and a Gavi HSS grant coordinator, procurement specialist, and accountant were recruited. |

| | | |
|---|---|---|
| Financial management for Gavi grants should be done through the IFMIS. | MOH will use IFMIS (or another recognized accounting software if IFMIS cannot be configured for this purpose before the commencement of the HSS2 grant) to account for all Gavi grants. MOH and MOFPED shall configure the system/chart of accounts and design appropriate reports for the management of Gavi grants in alignment with Gavi financial management requirements available on the Gavi website. | MOF and auditor general configured IFMIS to generate accountabilities specifically for Gavi and also activated the e-cash function within the IFMIS. |
| | Gavi will disburse funds for all cash grants to the designated bank account(s) managed by MOFPED/MOH. The government will maintain the funds in the USD account and transfer to an operational Uganda shilling (UGX) account on an as-needed basis. | Decision was made by Gavi to channel HSS2 funds through UNICEF, who will play a grant management role. |

As the country was in the process of addressing these GMRs, Gavi made a decision to channel HSS2 funds through UNICEF. This decision was based on Gavi's concerns over the weak MOH's financial systems and ineligible expenditures as captured in the PCA and country program audit of 2016. This decision has resulted in a prolonged interchange between the Government and Gavi on the most suitable modality to implement HSS2, without reaching a compromise to date. The tri-partite Grant Agreement between Gavi, UNICEF, and the Government of Uganda has not been agreed. The government argues that it has put in place sufficient safeguards and systems as requested through the GMRs and emphasizes the need to uphold principle of strengthening national health systems while Gavi remains concerned about the potential risk of implementing HSS2 through weak government financial systems. As a result there has been delayed implementation of HSS2 which may have further impact on immunization coverage, as discussed in the HSS section of this report.

Disbursement of funds by Gavi to other agencies is a growing trend for Gavi grants. In Bangladesh (part of FCE phase 1), Gavi disbursed the annual HSS2 payment directly to WHO and UNICEF in 2016. Two bilateral agreements were created between Gavi and WHO and Gavi and UNICEF, with the Government of Bangladesh not being party to the agreements. This raised concerns about country ownership of the HSS2 implementation.[14] Similarly, country ownership of the meningitis A campaign in 2017 was an issue given that funds were channeled through WHO.

In addition, a meta-review of country evaluations of Gavi's HSS support noted that in Cameroon, Chad, and Somalia, funding being channeled through Gavi partners (WHO and UNICEF) due to weak government capacity was criticized for a lack of clarity in roles and responsibilities, high management fees incurred, and implementation delays due to the additional layer of bureaucracy.[15] Furthermore, preliminary findings from key informants in Uganda reflect concerns that the decision to channel funds through UNICEF will not build the country's financial management capacity. Key informants also envision challenges with coordination of funds flow and activity implementation especially at district level given that the funding agent and program implementers are different.

The FCE will continue to prospectively track the unintended consequences resulting from this decision, taking into consideration the above observed and envisioned consequences among others.

# Conclusion

Findings from this evaluation show that there is a need for intense social mobilization to address demand-side barriers to HPV2 coverage. Findings also show that strong leadership, management and coordination at both district and health facility levels are key to improving and sustaining immunization coverage. Additionally, this evaluation shows that the funding gap left by the end of the HSS1 grant at the sub-national level may have contributed to a decrease in immunization coverage. This points to a strong dependence of the immunization programme on Gavi funding, thus raising a concern of the programme's financial sustainability in the absence of Gavi support. The presence of immunization partners countrywide presents an opportunity for UNEPI to push the immunization agenda at both national and district levels. However, in order to realize the desired results from partnerships, there is need for better coordination of partners by UNEPI in relation to geographical distribution, reporting, and supervision.

# Annex 1. Methods

This section describes the methods utilized in generating the findings covered in this report of the Gavi, the Vaccine Alliance Full Country Evaluations (FCE). Table 12 provides a high-level overview of the various methods, data sources, and topics investigated. We provide additional details on the FCE theory of change (TOC), mixed-method analysis, process evaluation, secondary analysis, qualitative methods, and robustness rankings. The FCE country reports and accompany appendices also provide further details on the application of methods within each country context.

**Table 12. Methods overview.**

| METHODS | SOURCES | TOPICS INVESTIGATED |
|---|---|---|
| **Document review** | > Gavi policies and guidance documents<br>> Gavi Board, PPC, and IRC meeting minutes<br>> Country funding applications (HSS, NVI, etc.)<br>> Joint Appraisal Reports<br>> PCA findings and recommendations<br>> EPI reviews<br>> Gavi grant performance frameworks<br>> FCE phase 1 (FCE1) reports<br>> Post-Introduction Evaluation reports<br>> Effective Vaccine Management assessments<br>> Sustainability Strategic Focus Area | Coverage and equity (EQ1–3); HSS (EQ4–6); Use of data, evidence, and program learning (EQ9); HPV vaccine (EQ10, 12); Sustainability (EQ14–16); Alliance systems and processes (EQ17–18) |
| **Data analysis** | > Health Management Information Systems (HMIS) data<br>> DHIS-2 data<br>> HHS and HFS data from FCE1<br>> Small area estimates from FCE1 | Coverage and equity (EQ1–3); HSS (EQ4–6); HPV vaccine (EQ12); Sustainability (EQ14–16) |
| **District-level case study (DCS)** | > KIIs<br>> Subnational immunization data (HMIS/DHIS-2) | Coverage and equity (EQ1–3); HSS (EQ6); HPV vaccine (EQ12) |
| **Key informant interviews (KIIs)** | > Relevant stakeholders at global and country levels | Coverage and equity (EQ1–3); HSS (EQ4–6); Use of data, evidence, and program learning (EQ9); HPV vaccine (EQ10, 12); Sustainability (EQ14–16); Alliance systems and processes (EQ17–18) |

| METHODS | SOURCES | TOPICS INVESTIGATED |
|---|---|---|
| **Policy analysis** | > Gavi immunization financing policy and guidelines (and other relevant documents)<br>> Resource gap analysis<br>> Resource-tracking data from phase 1<br>> Program costing data from EPIC<br>> Root cause analysis<br>> KIIs | Coverage and equity (EQ1–3); Sustainability (EQ14–16) |
| **Process tracking** | > Observation<br>> Document review<br>> EPI reviews<br>> Performance frameworks<br>> Root cause analysis<br>> Ripple-effect mapping<br>> KIIs | Coverage and equity (EQ1–3); HSS (EQ4–6); Use of data, evidence, and program learning (EQ9); HPV vaccine (EQ10, 12); Sustainability (EQ14–16); Alliance systems and processes (EQ17–18) |

**Table 13. Detailed methods employed per evaluation question.**

| THEME | EVALUATION QUESTION | DATA COLLECTION METHODS |
|---|---|---|
| **Coverage and equity** | What are the drivers of changes in coverage and equity?<br>What is the relative contribution of Gavi support to changes in coverage and equity? | Using DPT3 coverage as the main indicator, four districts that changed (increased or decreased) vaccine coverage slope during 2017 were purposively selected. District selection was based on:<br>1. Change in DPT3 vaccine coverage in 2017 (increase/decrease).<br>2. Geographical distribution of districts using the UDHS sub-regions.<br>3. The presence of immunization inequities according to the Uganda Immunization Equity Assessment conducted in 2016.[16]<br><br>The following districts (subregions) were selected:<br>• *Increase in vaccine coverage:* Kibaale (Bunyoro), Mpigi (South Central).<br>• *Decrease in vaccine coverage:* Pader (Acholi), Manafwa (Bugisu).<br>In each of the districts, three health facilities representing all the levels of service delivery within the district (HCIV, HCIII, HCII) were also randomly selected and visited.<br>KIIs were conducted with DHOs, EPI focal persons, health unit in-charges, and health workers responsible for immunization. |

| THEME | EVALUATION QUESTION | DATA COLLECTION METHODS |
|---|---|---|
| **Health systems strengthening** | What is the effect of an interruption in Gavi HSS funding on routine service delivery, highlighting Government of Uganda and other partner funding? | Like the district case study approach, DPT3 coverage was used as the main indicator for selection of districts. A total of 18 districts that changed (increased or decreased) vaccine coverage slope during 2017 were purposively selected. This was based on the hypothesis that interruption of HSS could have negative effects on coverage. District selection was also based on presence of immunization inequities (per equity report) and UDHS sub-regions.<br>Selected districts (subregions) include:<br>• *Increase in vaccine coverage:* Arua (West Nile), Nakaseke (North Central), Kibaale (Bunyoro), Yumbe (West Nile), Lira (Lango), Bukedea (Teso), Mpigi (South Central), Kanungu (Kigezi), Buliissa (Bunyoro).<br>• *Decrease in vaccine coverage:* Abim (Karamoja), Pader (Acholi), Rubirizi (Ankole), Manafwa (Bugisu), Dokolo (Lango), Kasese (Tooro), Isingiro (Ankole), Hoima (Bunyoro), Amudat (Karamoja).<br>In each of the districts, 3 health facilities representing all the levels of care were also randomly selected and visited. (HCIV, HCIII, HCII)<br>Key Informant Interviews were conducted with the DHO's, Chief Administrative Officers (CAOs), EPI focal persons, Health unit in-charges and health workers responsible for immunization. |
| **Human papillomavirus** | What are the demand-side reasons for the low coverage of HPV second dose in Uganda? | Using DHIS2 data for 2017, a total of four districts were purposively selected. Two districts with a higher HPV2 coverage were purposively selected: Arua (West Nile)—128% and Rubirizi (Ankole)—36%. Two districts with low HPV2 coverage were also purposively selected: Buliisa (Bunyoro)—22% and Wakiso (Central)—18%.<br>KIIs were conducted with the DHOs, EPI focal persons, health unit in-charges, health workers responsible for immunization, teachers, caretakers of girls aged 9–13 found at the health facility, and the district education officer.<br>In each of the districts, three health facilities representing all the levels of care were also randomly selected and visited. (HCIV, HCIII, HCII)<br>Additionally, three schools were visited in each of the districts. |
| **Alliance systems and processes** | What are the positive and negative consequences of the new/updated Gavi processes (e.g., PCAs and grant performance frameworks)? | KIIs were conducted with UNEPI-MOH, WHO, Edes & Associates, and the Gavi senior country manager. |

| THEME | EVALUATION QUESTION | DATA COLLECTION METHODS |
|---|---|---|
| **Partnership** | What is the structure of the immunization partnership in the country at national and district level? | KIIs were conducted in all 116 districts in Uganda.<br>Data were collected at DHO's office and CAO's office and from representatives of partners supporting immunization per district. |

### *Theory of Change*

For the purposes of this evaluation, the Gavi FCE team developed a Theory of Change (TOC) for each of the relevant Gavi support streams active in the FCE countries. During FCE1, we developed a high-level TOC (Figure 18) based on FCE evidence regarding the most important drivers of sustainable coverage and equity. The FCE2 TOC builds off the FCE1 TOC by examining subnational-, national-, and global-level drivers of immunization coverage and equity. The expanded FCE2 TOC (Figure 19) includes more granular demand-side drivers that were not a focus of the phase 1 process evaluation. The key thematic categories of the expanded TOC, corresponding vaccine coverage determinants, indicators, and proposed data sources are outlined below. The thematic categories include those identified in the phase 1 TOC, while the determinants and indicators draw additional nuance from new research on immunization coverage, equity monitoring, and country-level determinants of inequality in vaccination and are informed by the frameworks referenced in the systematic review describing the determinants of vaccine coverage.[Error! Bookmark not defined.] Within these categories, we aim to better understand the causal pathways between coverage and determinants that are more proximate (e.g., adequate stock), versus others that are more systemic. By ensuring that these distinctions are clear, we are able to develop actionable recommendations that are directed to the appropriate stakeholders.

**Figure 18. FCE1 Theory of Change**

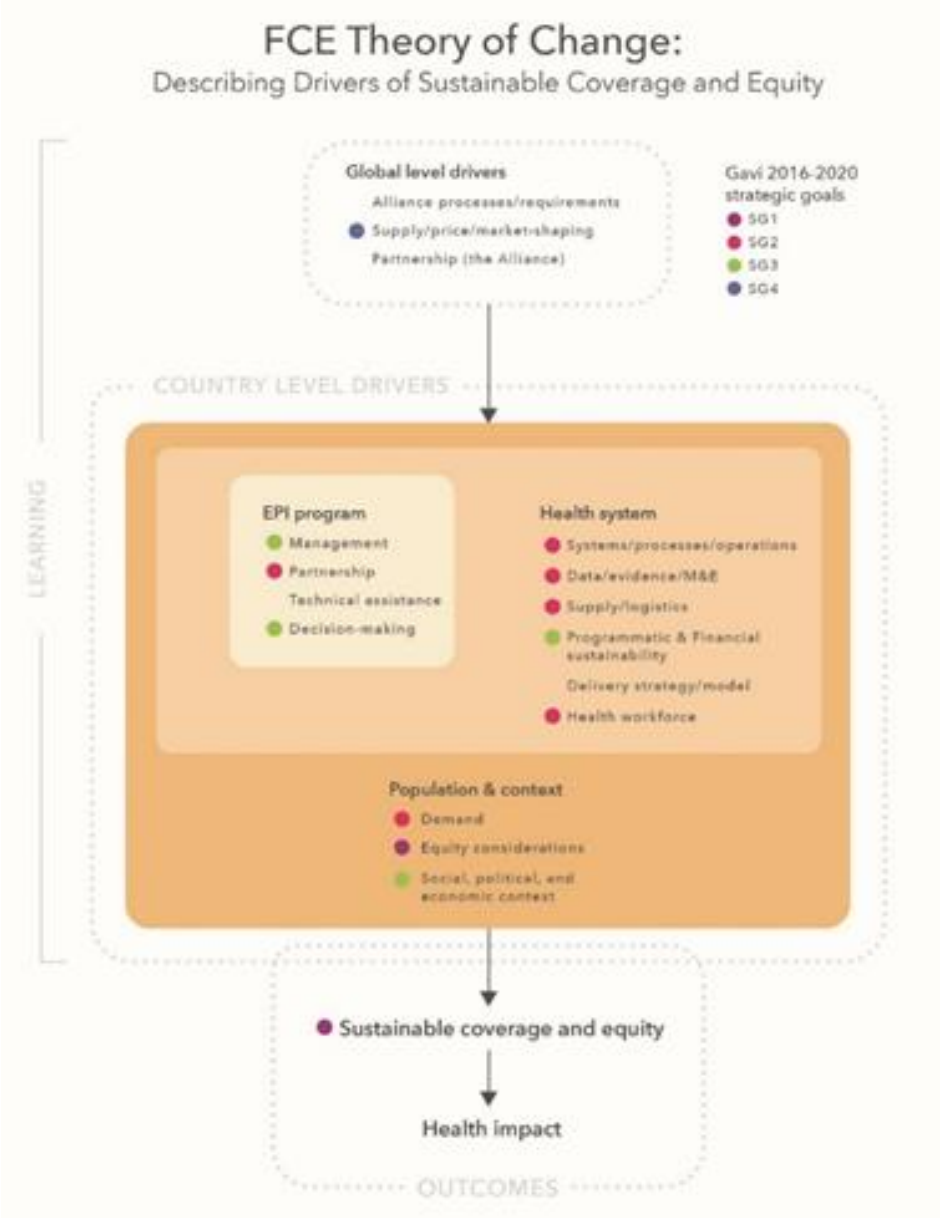
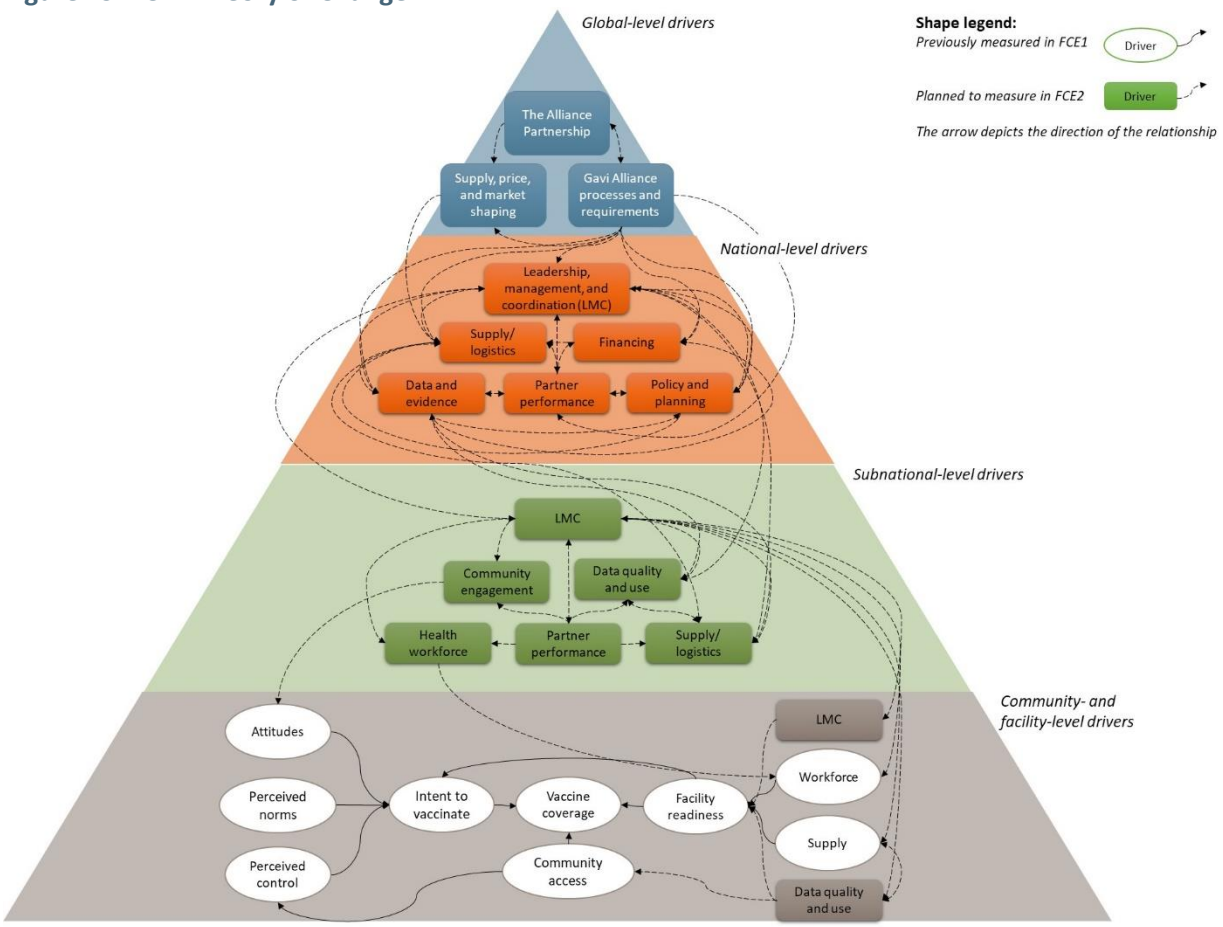


**Figure 19. FCE2 Theory of Change.**




The levels depicted in the FCE2 TOC include:

- **Global-level drivers.** This relates to the contextual and institutional enabling factors of success in Gavi-supported countries. Drivers include Alliance processes and requirements that have the potential to add value—both to countries and to Gavi—when they are designed and implemented to balance their administrative and management burden with their potential benefits. Supply, price, and market-shaping factors are part of the contextual enabling factors that are outside of countries' control. The Alliance partnership contributes to the global-level drivers through its technical expertise, financial resources, and coordination support.
- **National-level drivers.** This predominately includes ensuring that the Expanded Programme on Immunization (EPI) and Ministry of Health teams have adequate leadership, management, and coordination (LMC) capacity and skills, access to the necessary data and evidence to inform decision-making, adequate supply and logistics management and infrastructure, financing and policy planning capacity and structures, and mechanisms in place to coordinate and evaluate partner performance. Relevant, effective, and efficient technical assistance (TA) is a related driver within this category for its role in strengthening the capacity of national teams to implement increasingly complex immunization programs.
- **Subnational-level drivers.** This includes the supply-side barriers to coverage as they relate to health facility readiness to administer vaccines. It draws on WHO's Health Systems Framework, describing the supply of essential medicines and the health workforce as the most proximal components of a successful health system. This includes determinants related to data and evidence; vaccine supply and logistics; and delivery strategy. We include performance

management in this category, recognizing management as a systems-level driver of immunization coverage due to its role in strategic decision-making, particularly at the subnational level.[17]

> **Community- and facility-level drivers.** This includes the demand-side, patient-centric barriers to coverage as they relate to a caretaker's intention to vaccinate his or her child. It draws on behavioral models of health service utilization, such as the Theory of Planned Behavior, the Health Belief Model, and the Vaccine Perceptions, Accountability and Adherence Model.[18,19,20] Pulling from these models, this category describes the cultural and economic factors that influence choice, as well as perception-related factors that drive the individual-level decision to vaccinate. Contextual drivers take into account the community-level access barriers to coverage that fall in between supply- and demand-side barriers. Factors related to access include physical access and resource capacity, as well as ability. Distance and affordability are examples of access-related barriers that exist between the child's caretaker and the child's contact with health workers. Within this category, we also include factors that are recognized determinants of inequities in child health, such as maternal education, place of residence (urban versus rural), gender, and wealth.[21]

### *Mixed-method analysis*

An important aim of the Gavi FCE is to maximize linkages between the different evaluation components and strengthen confidence in findings through triangulation of evidence. The prospective design lends itself to various opportunities for integrating evidence from the different data sources. The evaluation questions (EQs) provided an overarching analytical framework within which to analyze and synthesize quantitative and qualitative evidence.

Comprehensive cross-country analyses have been recently conducted to measure determinants of immunization coverage and equity, including the contribution of Gavi, across Gavi-eligible countries.[22,Error! Bookmark not defined.] These existing analyses focus on national-level indicators of coverage a nd equity. FCE1 was also largely focused on national-level data collection. To complement and avoid duplicating this important work, we use the TOC as a guiding framework for analysis of the drivers of coverage and equity at national and subnational levels. Understanding the role of the drivers and relationships between drivers was achieved through monitoring TOC drivers and conducting district-level cast studies.

1. Monitoring TOC drivers of coverage and equity and descriptive analysis

We used the TOC to establish indicators to measure and monitor the potential drivers of sustainable coverage and equity over the data-collection period. Within each FCE country, health management information systems (HMIS) dashboards were created to track changes in vaccination coverage and equity in real time at the national and subnational levels. Leveraging the work completed in FCE1, we compared coverage and equity results from the SAE with the trends in coverage and equity observed in the HMIS data. For additional information on the data analysis using SAE and HMIS data and comparisons of data quality, please see the "Secondary data analysis" section below.

2. District-level case study (DCS) of inequities in vaccination coverage

The objective of the DCS is to compare multiple districts (or "cases") with varying success in increasing coverage and equity in order to identify the drivers of their success. The FCE team employed a district-level mixed-methods comparative case study approach to qualitatively explore through KIIs with district-level stakeholders how the TOC drivers are influencing the achievement of results in those districts. This approach primarily answers EQs 1 through 3 but can incorporate data-collection tools to help answer other EQs. The DCS investigated the major drivers of district-level changes in vaccine coverage and equity.

For this report, Uganda implemented the district case study approach to answer EQs 1 through 3, as well as EQ6 (health systems strengthening [HSS]) and EQ12 (HPV vaccine). For each EQ the Uganda FCE team selected a sample of districts in collaboration with the EPI team. For HSS, 18 districts were selected purposively based on their vaccine-coverage statistics and other, relevant characteristics. To measure vaccine coverage, districts were chosen based on changes in diphtheria–pertussis–tetanus (DPT)3 vaccine coverage in 2017, geographical distribution of districts using the Uganda DHS subregions, and the presence of immunization inequities according to the Uganda Immunization Equity Assessment[23] conducted in 2016. Health facilities within districts were randomly selected. A subset of four districts from the 18 selected were asked additional questions specifically related to EQs 1 through 3.

For HPV, the Uganda FCE team purposively selected 4 districts using DHIS-2 data for 2017 (2 with high HPV vaccine coverage and 2 with low HPV vaccine coverage). KIIs were conducted with the district health officers (DHOs), EPI focal persons, health unit in-charges, health workers responsible for immunization, teachers, caretakers of girls aged 9 to 13 years found at the health facility, and the district education officer. In each of the districts, three health centers representing all the levels of care were also randomly selected and visited. (HCIV, HCIII, HCII). Additionally, three schools were visited in each of the districts.

## *Process evaluation*

The process evaluation is an important component of the evaluation that examines the interface between Gavi and countries as Gavi inputs (including financial and TA) are applied for, received, and implemented. A process evaluation examines the quality of the process, with the underlying assumption that improving the process will improve the outputs and outcomes. The prospective process evaluation employs a developmental approach, with various stakeholders of the evaluation engaged in the design, collection, synthesis, and use of findings throughout the study. Two important methods for data collection and analysis include root cause analysis and key informant interviews.

### *Root cause analysis (RCA)*

RCA is a procedure for identifying underlying causes of identified challenges and successes. A "root cause" is a key factor in a causal chain of events that, if removed from the sequence, would prevent the final undesirable or desirable event from occurring or recurring.[4,5] RCA were applied to all countries and in the cross-country analysis, using it to prioritize process-tracking findings along with selected survey findings, and then to construct diagrams of causal chains to visually illustrate the dynamic links between observed challenges or successes to possible root causes. This process was iterative because RCA diagrams were continually refined through testing assumptions against multiple data sources and through collective deliberation. In this way, RCA enabled both intermediate-stage development of hypotheses and key questions for in-depth investigation, as well as end-stage confirmation of assumptions and development of recommendations.

### *Key Informant Interviews*

Semi-structured key informant interviews (KIIs) were conducted at the global, national, and subnational levels. Key informants were identified purposively based on relative authority or responsibility as it pertains to the topics investigated. Topic guides and questions were generated based on the evaluation questions, existing evidence, and notable gaps or outstanding questions from our analysis. Interviews are particularly important to understand complex phenomena that are not measurable through other qualitative or quantitative methods. Interviews are an important

component of any mixed methods approach in order to understand and interpret why data collected through other methods say what they say.

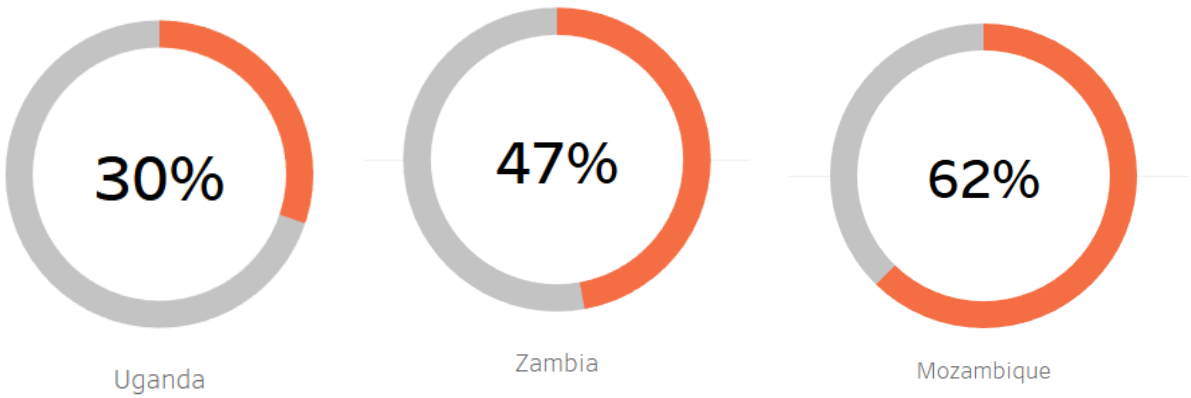
## *Secondary data analysis*

In Mozambique, Uganda, and Zambia, we analyzed administrative data on immunization coverage at the national level and between-district inequalities in coverage. In Mozambique, this included data from the HMIS system, called *Módulo Básico,* as well as a parallel reporting system implemented by the National Immunization Program. In Uganda and Zambia we relied on the HMIS data captured in DHIS-2.

### *DHIS-2 methods*

Country DHIS-2 systems capture subnational estimates of vaccine coverage on a monthly basis. Routine administrative data contains doses of vaccines administered monthly for each antigen at the facility level, and these data are then aggregated to the district, region/province, and national levels. In order to calculate immunization coverage, annual population estimates from the Central Statistical Office are used as the denominator. These annual population estimates are derived from historical census data, projected birth rates, and assumptions of the population structure (percentage of population under 1 year). Coverage rates calculated from DHIS-2 frequently exceed 100% coverage, presumably because population estimates from the civil society organization often underestimate the true target population in districts. Without accurate denominator data, it is difficult to assess the true immunization performance. For example, 2017 DPT3 coverage rates from DHIS2 show that between a third and two-thirds of districts in each country have coverage rates in excess of 100% (Figure 20).

**Figure 20. DHIS2 DPT3 coverage rates in 2017.**




In addition to the issue of the population denominator, there are concerns that data quality may be affected by the completion and accuracy of forms at the district level.[24] In spite of the poor validity of coverage calculations of DHIS data, we expect that trends observed in the DHIS data are reliable, as the inaccuracies in the denominator are not expected to change greatly over time.

### *Small area estimate methods*

**SAE estimates include survey data from:**

- *Demographic and Health Surveys*
- *Living Conditions Monitoring Surveys [Zambia]*

- *Multiple Indicator Cluster Surveys*

In FCE phase 1, annual subnational estimates of vaccine coverage were generated at the district level using small area estimate (SAE) methods and household survey microdata. All available survey data were fit to hierarchical linear models, which were adjusted for survey stratification and weighting, to produce annual estimates for select antigens. Due to the inclusion of multiple data sources and the model specifications, this results in longitudinal data that are smoothed over space and time. Multicountry household survey data (e.g., Multiple Indicator Cluster Survey, DHS) is typically considered the gold standard of coverage data, due to the standardized nature of the survey and the rigorous survey design and implementation.[25] The reliance on household survey data also ensures that coverage estimates are always less than 100 %, as the population denominator is known from the survey. However, the accuracy of the estimates is limited by the quality of the inputted survey data, where child-specific vaccination information is based on the child's health card record and/or maternal recall.[24] The input survey data are particularly limited in terms of survey data coverage at the subnational level. There are certain subnational areas where there is little area-specific information available, and many surveys are not designed to be representative at the subnational level. This is compounded by the issue of changing subnational boundaries. For instance, the SAE estimates for Zambia contain 72 consistent districts from 1999 to 2016, in spite of the fact that new-district creation since 1999 has raised the total number of districts to 10,312 in 2016.

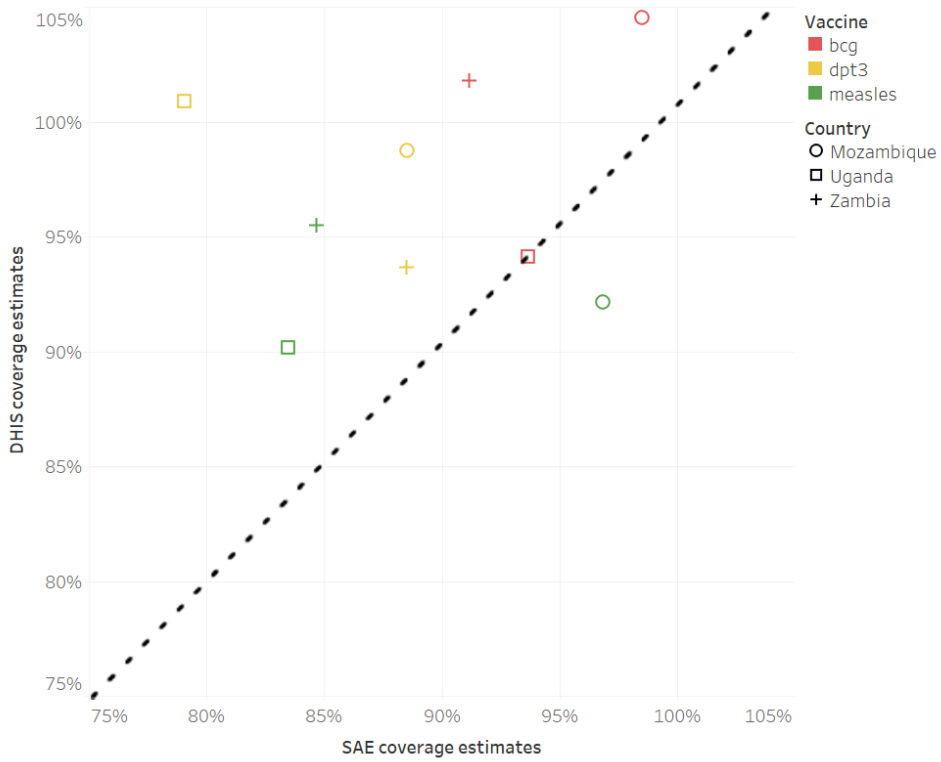
***Usage of secondary data***

The FCE2 annual report utilizes data from both DHIS and SAE, acknowledging that there are tradeoffs in using both. Table 14 summarizes the strengths and weaknesses of both data sources.

**Table 14. Strengths and weakness of SAE and DHIS data sources.**

| | STRENGTHS | WEAKNESSES |
|---|---|---|
| SAE | > Due to the use of multiple data sources and smoothing, the estimates are less volatile year over year<br>> Coverage estimates are more accurate due to use of standardized household surveys<br>> Using survey data, we are able to estimate historical coverage rates from 1999 | > Coverage accuracy is dependent on the availability and quality of survey inputs, particularly at the subnational level<br>> There is lack of country ownership in creating and understanding SAE estimates |
| DHIS | > Country ownership is greater as administrative systems are maintained by country stakeholders<br>> Data is accessible and usable by country stakeholders; most actionable<br>> More responsive to country changes, such as new subnational boundaries<br>> Data is more frequent and granular than SAE data (monthly and facility level) | > Validity is poor, with indicators often exceeding 100%<br>> There are other reporting-accuracy challenges, such as recording and entering data<br>> Due to its being a single, unsmoothed data source, estimates vary more dramatically over time<br>> Data are not available prior to the introduction of DHIS2 (2008) for historical trends |

**Figure 21. Coverage estimate comparisons, SAE and DHIS.**
When comparing the data from the SAE estimates and DHIS, they show similar patterns over time,




though the relative volatility of the DHIS data makes the comparison imprecise. Absolute estimates of coverage do not align precisely between DHIS data and SAE; DHS estimates are about 10 percentage points higher across all FCE countries. Figure 21 shows the comparison between annual SAE estimates and DHIS estimates for 2016 (the most recent year where both data sources are available); DHIS is higher, due to the challenges of data validity, with the exception of measles coverage estimates in Mozambique.

In this report we primarily use SAE data to present the historical trends in vaccine coverage. To present current coverage and emerging trends, we primarily utilize DHIS data. This is in part due to lessons learned from the FCE phase 1, where there was limited uptake of SAE results among country stakeholders who did not feel ownership of the modeled data. Given the importance of HMIS data as a country-owned resource to manage immunization performance, and to further encourage the use of these data, we use HMIS data to present the current portrait of coverage in countries.[24]

### *Robustness ranking*

Considering the prospective design of the evaluation and the flexible, adaptive nature of data-collection activities, the depth and breadth of the evidence base varies across findings. This variation signals the need to gauge the evaluation team's confidence in each finding. We, therefore, developed a robustness ranking scale to subjectively, but systematically, assess robustness of findings with respect to three dimensions:

> Triangulation refers to the breadth of qualitative and quantitative data sources (e.g., surveys, documents, key informants, etc.) that inform the same finding, where greater triangulation equates to more robust findings.

> Where the finding lies on the continuum between fact and perception, this dimension complements triangulation in that factual information generally requires less triangulation in order to be considered robust. However, it is important to note that some of the EQs are largely

perception-based (e.g., the added value of partnership, or caregiver knowledge of disease) and rely on inferences based on more subjective than objective evidence. As long as these findings are supported by well-triangulated data, they could be considered robust even though they are based on more subjective evidence.

- The quality of the data from each source is the third dimension, where high-quality data clearly contribute to greater robustness. Indicators of quality in qualitative data include, but are not limited to:
  - Recentness (e.g., timing of interview or group discussion relative to topics discussed to minimize recall bias).
  - Conditions of an interview or group discussion (e.g., rapport with respondent, interruptions, appropriate pacing, appropriate level of privacy for interview, balanced as opposed to one-sided group discussions).
  - Degree of proximity to the topic or event in question (e.g., first-hand observation by the evaluation team's or respondent's first-hand experience as opposed to second-hand information).

Indicators of quality in quantitative data include but are not limited to reliability, timing, sample size, potential for selection or measurement bias, and potential for confounding in causal analysis.

Our robustness ranking does not systematically distinguish between qualitative and quantitative findings. Rather, each finding is assessed in terms of all relevant and appropriate data sources that inform the conclusion, whether the sources be exclusively qualitative or quantitative in nature, or a combination of both.

Using the dimensions above, we developed the following four-point scale (Table 15) as a general guide for ranking findings and for describing the rationale behind the ranking. A ranking is provided for each key finding in both the cross-country and country-specific sections of the report.

**Table 15. Robustness of rankings overview.**

| RANKING | REASON (GENERIC) |
|---|---|
| A | The finding is supported by multiple data sources (good triangulation), which are generally of good quality. Where fewer data sources exist, the supporting evidence is more factual than subjective. |
| B | The finding is supported by multiple data sources (good triangulation) of lesser quality, or the finding is supported by fewer data sources (limited triangulation) of good quality but perhaps more perception-based than factual. |
| C | The finding is supported by few data sources (limited triangulation) and is perception-based, or generally based on data that are viewed as being of lesser quality. |
| D | The finding is supported by very limited evidence (single source) or by incomplete or unreliable evidence. In the context of this prospective evaluation, findings with this ranking may be preliminary or emerging, with active and ongoing data collection to follow up. |

# Annex 2. Evaluation Questions

Table 16 summarizes each evaluation question for phase 2 by theme, as well as a description of the rationale as to how each question was generated.

**Table 16. Evaluation questions by theme.**

| THEME | EVALUATION QUESTION | RATIONALE |
|---|---|---|
| **Coverage and equity** | 1. What are the major factors influencing the achievement of the results of Gavi support (particularly within the context of implementing multiple Gavi streams of support within a short period of time)? (cross-country)<br><br>2. Whether, how, and why is Gavi support contributing to increased vaccination coverage and equity (with an emphasis on gender)? (cross-country)<br><br>3. What are the major factors influencing the achievement of these results? (cross-country) | These questions will be answered by all FCE countries. Despite the success of Gavi in improving access to new and underutilized vaccines, many children still do not receive these vaccines due to incomplete coverage within countries. For this reason, Gavi made coverage and equity goals the core of its strategy for 2016–2020. This deeper focus on expanding the reach of vaccines and narrowing within-country inequalities in coverage is also in line with the post-Millennium Development Goals agenda for health. The recently adopted Sustainable Development Goals make a commitment to "leave no one behind," a goal which requires that inequalities are effectively measured, monitored, and addressed.<br><br>During FCE phase 1 of the evaluation, we measured vaccine coverage through household surveys, HMIS, and small area estimates.<br><br>In phase 2, we have leveraged on HMIS and other secondary data sources to monitor trends in coverage and equity. |
| **Health systems strengthening** | What is the effect of an interruption in Gavi HSS funding on routine service delivery, highlighting Government of Uganda and other partner funding? (Uganda, proposed by country stakeholders) | This question was suggested by the in-country stakeholders because they wanted to assess whether the gap in Gavi HSS funding had an effect on service delivery and targets given that it could have displaced PHC funds at district level. This would also inform HSS2 implementation. |
| **Use of evidence and program learning** | 1. Whether, why, and how is an analysis of the lessons learned from previous support being taken into consideration? (cross-country)<br>2. Whether, why, and how is the HPV vaccine national scale-up using the lessons learned from the HPV vaccine demonstration projects? (cross-country) | This question will be answered by all FCE countries. These questions were chosen given the numerous instances of immunization program learning as well as missed opportunities for learning and improvement documented in phase 1. These questions relate to the use of evidence in policymaking. |
| **Human papillomavirus vaccine** | What are the demand-side reasons for the low coverage of HPV second dose | This question was suggested by in-country stakeholders in Uganda. EPI and other stakeholders wanted to understand the |

| | | |
|---|---|---|
| | vaccine in Uganda? (Uganda, proposed by country stakeholders) | demand-side factors influencing the HPV vaccine uptake, which were not clear, especially for the second dose of HPV. |
| **Sustainability** | 1. Whether, why, and how are country decisions (including NITAG's role) to apply for new Gavi support taking into account the programmatic and financial sustainability aspects (e.g., current country Gavi eligibility status, cofinancing requirements, budget impact analysis)? (cross-country)<br>2. What are the drivers to increase financial support for immunization? (cross-country) | This question will be answered by all FCE countries. In phase 1, the FCE found that there was limited consideration of programmatic and financial sustainability in planning to introduce new streams of Gavi support. It is on this basis that the FCE is seeking to document the country decisions in light of the Sustainability Strategic Focus Area, which intends to strengthen support to countries for sustainability planning. |
| **Alliance systems and processes** | 1. What are the positive and negative consequences of the new/updated Gavi processes (e.g., PCAs and grant performance frameworks)? (cross-country)<br>2. What positive and negative unintended consequences occur as a result of Gavi support? (cross-country) | These questions will be answered by all FCE countries. In FCE phase 1, several changes were made to Gavi systems, processes, and policies. It is on this basis that these questions intend to evaluate the consequences of Gavi's changes to countries receiving Gavi support. |
| | 3. To what extent are the Gavi-supported activities to enhance performance management practices of the EPI effective in strengthening the ICC and accountability across the program? (Uganda TOR question) | Current governance and management structures in Uganda include the Health Policy Advisory Committee, National Coordination Committee, Technical Coordination Committee, and other technical working groups. Following recommendations from the PCA, which proposed the formation of an ICC, it is important to understand the roles of the existing structures versus ICC. |
| **Miscellaneous** | 4. Why and how is the new Immunization Act affecting implementation (e.g., demand generation) and outcomes of Gavi support? (Uganda TOR question) | In 2016, Uganda enacted a law that provides for compulsory immunization of children, women of reproductive age, and other groups against immunizable diseases and also the establishment of a fund. The act will be supported through HSS2 and Gavi has interest in understanding how the act will be implemented to address coverage and equity. |
| | 5. What is the structure of the immunization partnership in the country at national and district level? (Uganda, proposed by country stakeholders) | This question was suggested by in-country stakeholders. In phase 1 of the evaluation, we conducted a partnership analysis on HPV vaccine application progress. Given the increasing number of immunization partners with unclear roles and areas of operation, UNEPI wanted to understand who the partners are and where they are operating to improve coordination and planning so as to improve efficiency of immunization resources and ultimately increase coverage and equity. |

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