Gavi Full Country Evaluations

2016 Annual Dissemination Report

Bangladesh Report

Acknowledgments

The Gavi Full Country Evaluations team would like to thank all immunization program partners (Ministries of Health, technical partners, Gavi Secretariat, and other stakeholders) in Bangladesh, Mozambique, Uganda, and Zambia, especially those individuals who participated in workshops, were involved in stakeholder consultations, and served as key informants. We thank the Ministries of Health for facilitating stakeholder consultations and workshops. We also acknowledge and thank the Gavi Secretariat Monitoring and Evaluation team for providing critical feedback, advice, and guidance over the course of the evaluation.

Evaluation team

This report presents findings from the 2016 Gavi Full Country Evaluations (FCE). It was prepared by the Institute for Health Metrics and Evaluation (IHME) at the University of Washington (UW) in collaboration with members of the FCE Team: icddr,b in Bangladesh, and Program for Appropriate Technology in Health (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 Gavi funding. The contents of this publication may not be reproduced in whole or in part without permission from the Gavi Full Country Evaluations Team.

Citation: Gavi Full Country Evaluations Team. *Gavi Full Country Evaluations: 2016 Dissemination Report – Bangladesh*. Seattle, WA: IHME, 2017.

---

icddr,b
GPO Box 128
Dhaka 1000
Bangladesh

Telephone: (+8802) 9881760, (+8802) 9827001–10 (Ext. 2546)
Fax: (+8802) 9827039
Email: Md. Jasim Uddin, PhD
jasim@icddrb.org
www.icddrb.org

Institute for Health Metrics and Evaluation
2301 Fifth Ave., Suite 600
Seattle, WA 98121
USA

Telephone: +1-206-897-2800
Fax: +1-206-897-2899
Email: engage@healthdata.org
www.healthdata.org

PATH
Monitoring and Evaluation Department
2201 Westlake Ave., Suite 200
Seattle, WA 98121
USA

Telephone: +1-206-285-3500
Fax: +1-206-285-6619
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
Fax: 00 41 22 9096551
Email: Abdallah Bchir
abchir@gavi.org
www.gavi.org

Acronyms

AEFI	Adverse event following immunization
bOPV	Bivalent oral polio vaccine
CBHC	Community Based Health Care
CC	Community Clinics
CMCH&IW	Community Maternal and Child Health and Immunization Worker
CSO	Civil Society Organization
DAH	Development assistance for health
DGHS	Directorate General of Health Services
DMCH&IO	District maternal, child health and immunization officer
EOI	Expression of Interest
ESD	Essential Service Delivery
EVM	Effective vaccine management
FCE	Full Country Evaluations
FCI	Fact-checking interviews
FGD	Focus Group Discussion
FMA	Financial management assessment
GDP	Gross domestic product
GoB	Government of Bangladesh
GPEI	Global Polio Eradication Initiative
HED	Health Engineering Department
HFA	Health Facility Assessment
HFS	Health facility survey
Hib	*Haemophilus influenzae* type B vaccine
HMIS	Health management information system
HNPSP	Health Nutrition and Population Sector Program
HPNSDP	Health, population, nutrition, and sector development program
HPV	Human papillomavirus vaccine
HSS	Health system strengthening
ICC	Interagency coordination committee
IPV	Inactivated Polio Vaccine
IRC	Independent Review Committee
ISS	Immunization Services Support
JA	Joint Appraisal
KII	Key informant interview
LCG	Local consultative group
M&E	Monitoring and Evaluation
MLM	Mid-level Manager
MNC&AH	Maternal, Neonatal, Child, and Adolescent Health
MNCH	Maternal, newborn, and child health
MoE	Ministry of Education
MoH	Ministry of Health
MoHFW	Ministry of Health and Family Welfare
MSD	Measles second dose
NC	National Coordinator
NVS	New vaccine support
OP	Operational plan

PCV	Pneumococcal conjugate vaccine
PCV10	10-valent pneumococcal conjugate vaccine
PEF	Partners' Engagement Framework
PFM	Public financial management
PIC	Program implementation committee
PIP	Program implementation plan
RCA	Root Cause Analysis
SIMO	Surveillance and Immunization Medical Officer
SMO	Surveillance Medical Officer
SoE	Statement of expenditure
SWAp	Sector-wide approach
TA	Technical assistance
TAG	Technical Advisory Group
TAP	Transparency and Accountability Policy
TOC	Theory of change
tOPV	Trivalent oral polio vaccine
TSC	Technical Sub-Committee
UH&FPO	Upazila Health & Family Planning Officer
VIG	Vaccine Introduction Grant
VMA	Vaccine Management Assessment

Introduction

The Gavi Full Country Evaluations (FCE) is a prospective study covering the period 2013–2016 with the aim of understanding and quantifying the barriers to and drivers of immunization program improvement, with emphasis on the contribution of Gavi, the Vaccine Alliance in four countries: Bangladesh, Mozambique, Uganda, and Zambia. This fourth annual dissemination report complements previous reports by providing key findings and recommendations for the 2016 evaluation period in the four FCE countries. The FCE encompasses all phases of Gavi support, from decision to apply, application and approval, preparation, and implementation in each of the relevant streams of support. Table 1 summarizes the scope of the evaluation during the 2016 period. In addition to evaluating the various streams of support active in each of the FCE countries, we have addressed issues that impact Gavi support across streams. The latter issues include both established processes that impact all vaccine streams within the four countries, such as the Joint Appraisal (JA) and Partner Engagement Framework (PEF), and broad organizational functions, such as the provision of technical assistance and promotion of sustainable EPI programs, that affect the extent of Gavi's current and future success.

Table 1: Overview of streams evaluated in each county*

Gavi Stream	Vaccine	Bangladesh	Mozambique	Uganda	Zambia
New Vaccine Introductions (NVI)	**Inactivated polio vaccine (IPV)**	Implementa-tion interrupted by global stockout	Post-introduction	Implementa-tion interrupted by global stockout	Potential introduction postponed until 2018
	Measles second dose (MSD)		Post-introduction		Post-introduction
	Measles-rubella (MR) vaccine				Preparation for introduction
	Meningitis A vaccine			Preparation for introduction; launch postponed until 2017	
	Rotavirus vaccine		Post-introduction	Launch postponed until 2017	Post-introduction

	Pneumococcal conjugate vaccine (PCV)	Post-introduction	Post-introduction	Post-introduction	Post-introduction
	Human papillomavirus (HPV) vaccine	Implementa-tion of demonstration project	Post-demonstra-tion project	Post-introduction	Preparation of application for national introduction
Campaigns	**Measles-rubella (MR) vaccine campaign**				Implementation and evaluation
Health System Strengthening (HSS)	**Health System Strengthening (HSS)**	Implementa-tion of HSS-2	Implementa-tion of HSS-2	Completion of HSS-1 and application for HSS-2	Preparation for HSS-2

**The Gavi FCE did not evaluate pentavalent vaccine delivery, since pentavalent vaccine had been established and routinized in these countries prior to the start of the FCE. That put pentavalent vaccine outside of the scope of the FCE.*

Methods

Evaluation components relevant to this report include:

- Development of priority themes used to guide data collection at the global and country levels;
- Process tracking based on document review, observation, and fact-checking interviews;
- Root-cause analysis to identify underlying causes of identified challenges and successes;
- In-depth analysis of the process using key informant interviews (KII) and focus group discussion (FGD);
- A resource tracking study to generate estimates of national-level resource envelopes on immunization in Bangladesh (submitted separately from the FCE reports);
- Analysis of Health Management Information Systems (HMIS) and EPI administrative data to understand the rollout of new vaccine introductions and demonstration program coverage levels;
- Analysis of primary and secondary data to generate small-area estimates of vaccine coverage, other maternal and child health indicators, and child mortality at subnational levels (Annexes 5 and 6); and
- Causal analysis of small-area estimates of vaccine coverage and child mortality to estimate the relationship between new vaccine introductions and child mortality (Annex 7).

Table 2: Strengths and limitations of the Gavi FCE approach

Strengths
• Mixed-method approach allows for triangulation of findings across evaluation components to increase robustness of findings and provide more in-depth understanding. Findings from one data source also inform the design and implementation of other data collection. • Concurrent evaluation of all relevant streams of Gavi support in a country allows for timely understanding of the interactions between streams of support. • Evaluations such as Post-Introduction Evaluations (PIEs), monitoring and evaluation of HPV vaccine demonstration projects, or HSS monitoring and evaluation focus on the implementation phase. The Gavi FCE complements these by examining the full process from decision-making to application, preparation, implementation, and routinization, and allows identification and linkage of issues earlier in the process with downstream consequences. • Data collection designed to build on or complement other surveys and activities minimizes duplication. • Prospective approach allows for collection of information in real time so that key issues may be identified as they arise, allowing for the opportunity to inform the implementation process and implement corrective action.
Limitations
• Due to the wide scope of the FCE, there is a limited ability to examine all issues in detail. However, the broad scope compels selective and more in-depth evaluation of critical issues that are priority areas for Gavi and countries. • Limited ability to prospectively collect information on larger-scale political-economic and social processes (e.g., priority-setting at the donor level; social displacement and migration at the country level) that affect immunization activities but fall outside the analytical scope of the process tracking of defined milestones. • Although there is a better ability to access informal channels of communication and decision-making, there are limits to this which result in an incomplete understanding of the process. • Absence of a prospective observation mechanism at the regional or global level and at subnational levels. • In-depth qualitative data collection relies heavily on KIIs that are prone to recall and respondent bias. • In each country there are a limited number of stakeholders involved across multiple streams, introducing significant potential for respondent fatigue in key informant interviews. • The timing of surveys means that the evaluation is only able to capture relevant aspects of some, but not all, Gavi support streams. • Secondary data analyses are subject to the availability and quality of the underlying data source (e.g., HMIS, surveys).

Summary of findings and recommendations

Table 3 summarizes the findings and recommendations for Bangladesh.

Table 3: Findings and recommendations

Bangladesh Findings	Recommendations
Human papillomavirus (HPV) vaccine	
Finding 1. HPV first dose school sessions were not conducted according to the micro plan in most areas due to time constraints and inadequate consultation with the yearly school plan. However, EPI stakeholders applied planning lessons learned during the first dose administration to the delivery of the second dose.	Country stakeholders should perform their activities in a more coordinated way, including close collaborations with schoolteachers and education officers at all administrative levels, to ensure a successful demonstration project and future national introduction of HPV vaccine.
Finding 2. The high levels of commitment of health workers enabled them to complete their routine activities during the HPV demonstration program, resulting in maximum coverage for the HPV demonstration program.	EPI headquarters should allocate adequate time for the preparatory activities for all its programs in order to minimize the workloads of service providers and ensure successful completion of assigned responsibilities without any interruptions.
Finding 3. Completion of the demonstration program was the priority task for EPI stakeholders, while ensuring the feasibility of scaling up the program nationally and sustaining the program may be future concerns.	The programmatic and financial sustainability of HPV should be assessed by taking into account the country's capacity to cofinance vaccine purchasing as well as support delivery costs. During the second year of the demonstration program and the national introduction of HPV vaccine, country stakeholders should be more conscious of the coverage survey and costing analysis for future sustainability.
Health system strengthening (HSS)	
Finding 1. The GoB received the HSS-1 grant directly from Gavi. However, in 2016, the annual HSS-2 payment was disbursed directly to WHO and UNICEF. This raises concerns about country ownership of the program.	In order to maximize the GoB's ownership of EVM and surveillance activities, future HSS grants should be disbursed to the GoB, as is planned with the next grant.
Leadership, management, and coordination	
Finding 1. To date, effective EPI management, supportive health workers, and strong coordination among partners have helped in handling multiple Gavi funding streams. The future sustainability and retention of these leaders is becoming an area of concern.	The GoB should provide adequate transport and logistic support to the dedicated and motivated health service providers at the upazila level in order to ensure retention of these leaders and program sustainability. In addition, the GoB should request that TA partners provide capacity-building activities (e.g., comprehensive training, workshops) for newly recruited officers – managers who will be potential leaders in the future.

Finding 2. Multiple Gavi grants create a management burden on national- and subnational-level EPI managers, as well as on TA providers at all levels.	Before providing new grants, Gavi should assess the country's workforce readiness (in terms of number of workers available in the country), capacity to work on a new grant in addition to existing activities, and capability of sustaining the grant activities in the long term. It should also provide additional support and incentives regarding these areas through the country engagement framework.
Technical assistance and capacity building	
Finding 1. The existing TA process, which utilizes the SMO network of WHO, helps to build the capacity of the immunization system and staff at the subnational level.	As the GoB has started discussion on sustaining the SMO network within GoB funding mechanisms, the GoB should take the proper initiative to arrange the required support (comprehensive training, vehicle support, and laboratory facilities) for the SMOs.
Finding 2. TA was inadequate for building capacity of EPI managers at the national and subnational levels in a sustained manner.	The GoB should identify human resources and management training from Gavi and other partners as a TA priority for 2017. While it is likely to be included in the second HSS-2 application, earlier investment will ensure the continuation of a strong network of skilled EPI managers.
IPV	
Finding 1. The EPI managed the IPV stock interruption smoothly by maintaining regular communication with Gavi and following the GPEI guidelines.	Following the GPEI guidelines, IPV introduction was supposed to help in reducing risks associated with the withdrawal of tOPV and the switch to bOPV. The suppliers should be more aware of ensuring supplies for the smooth implementation of IPV.
Finding 2. The IPV stockout had no effect on PCV third-dose coverage or on caregiver confidence in the EPI program.	
Sustainability (programmatic and financial)	
Finding 1. Despite the optimistic nature of EPI stakeholders, there are still some concerns around the financial sustainability of the EPI program after graduation from Gavi support.	EPI stakeholders should ensure the political priority of the immunization program and secure its financial sustainability beyond Gavi support. Therefore, the GoB should partner with EPI stakeholders, the MoF, and the planning wing of the MoHFW, to make a realistic plan to procure vaccines using GoB funds in the future.
Resource Tracking	
Finding 1. Flow of immunization funds, 2014–2015.	

Finding 2. Allocation of budget for EPI sustainability.	Since Bangladesh has the potential now for continuing economic growth, the GoB should be able to ensure EPI sustainability by increasing funding for the recurrent costs of the EPI program.
Finding 3. Findings from the facility survey show variations in expenditure and coverage among different points of delivery. Both expenditure and coverage were lowest for city corporations.	Advocacy activities for improving valid vaccination coverage in the urban areas, especially for city corporations, need to be undertaken. These should include increasing social mobilization activities and developing infrastructure with adequate personnel for vaccine delivery.
Finding 4. The estimated total expenditure for EPI was BDT 10,860.7 million (US$ 139.5 million) for the financial year 2014–2015. The average estimated cost per fully vaccinated child was BDT 2,754 (US$ 35.40).	1. In order to properly utilize vaccines and minimize vaccine wastage, periodic monitoring at the points of delivery, including outreach visits to obtain a probable estimation of the number of beneficiaries in each outreach area, would be beneficial. 2. The consideration and analysis of cost and effectiveness should be included in the EPI decision-making process on a regular basis.

Contents

Summary of Gavi support for country

Bangladesh first received Gavi support in 2001. Among the various antigens offered in the routine immunization system, Bangladesh has, with Gavi support, introduced monovalent hepatitis B vaccine into its childhood vaccination schedule under routine EPI in 2003, replaced DPT and monovalent hepatitis B vaccines with pentavalent vaccine (DPT, hepatitis B, and *Haemophilus influenzae* type B [Hib] vaccines) in 2009, and introduced measles second dose (MSD) into its routine EPI for 15-month-old children in 2012. With its own funds, the government of Bangladesh (GoB) incorporated MR vaccine into its routine childhood vaccination schedule. IPV was introduced nationally in March 2015 through a joint launch with PCV. In 2016, the country implemented an HPV demonstration program and received approval for HSS-2 funding.

Table 4: Overview of Gavi support in Bangladesh

Gavi support	Period of funding	Total amount of funding (US$)
Pneumococcal conjugate vaccine (PCV)	2014–2018	161,581,500
Pentavalent vaccine	2009–2017	235,012,750
Human papillomavirus (HPV) vaccine demonstration project	2015–2016	734,000
HPV vaccine demonstration cash support	2015–2016	358,500
Measles second dose (MSD)	2012–2016	8,575,522
Measles-rubella (MR) vaccine campaign	2013	35,781,812
MR vaccine, operational costs	2013	33,586,500
Inactivated polio vaccine (IPV)	2015–2017	19,829,310
Hep B monovalent	2002–2008	20,224,465
Health system strengthening (HSS)	2009–2018	47,594,231
Immunization services support (ISS)	2001–2004, 2006, 2009	23,340,200
Injection safety support (INS)	2004–2006	6,144,414
Vaccine Introduction Grant (VIG)	2002, 2008, 2012, 2015	8,314,000

Source: http://www.gavi.org/country/all-countries-commitments-and-disbursements, accessed November 21, 2016. Values shown represent Gavi commitments, those which Gavi intends to fund over the lifespan of the program, subject to performance and availability of funds.

Methods overview

Table 5: Evaluation methods

Methods	Source consulted/study area	Topics investigated
Process tracking	- Collected and reviewed documents from various levels of the health system, including GoB letters; decision letters; meeting minutes of interagency coordination committee	Information was collected based on research questions under six priority themes of 2016.

	(ICC), program implementation committee (PIC), technical advisory group (TAG); GoB documents (training manuals, communication materials, etc.)	
Key informant interviews	- Key informant interviews at national level (15) and subnational level (8) - Semi-structured interviews with service providers on HPV demonstration program (39) - Semi-structured interviews with adolescent girls on HPV demonstration program (44) - Semi-structured interviews with mothers on IPV stockout issue (18)	
Resource tracking	- Identification of all possible sources of funds for the EPI program of Bangladesh was done through KIIs with representatives of GoB and other donors - Collected documents related to the allocation and expenditure of funds for the financial year 2014–2015 from EPI headquarters - Facility survey was carried out covering seven administrative divisions (regions) - For rural and urban representation, one district and one city corporation from each administrative division were surveyed - A total of 36 facilities, including EPI headquarters, were surveyed. This covered seven district civil surgeon offices, seven city corporation offices, seven municipals, and 14 upazilas - Estimation of all direct spending for immunization-related activities was done based on these facility survey data	- Sources of funding for EPI, amount of donor involvement, and flow of funds for implementing the program - Collected information about the amount of budget allocated for specific immunization-related activities such as the sustainability of routine EPI, introduction of PCV, IPV, or new vaccine, cold-chain management, etc. - Financial data collection on staff and infrastructure used specifically for immunization programs, transportation cost, cold-chain management, used vaccine, etc. Immunization coverage data were collected from each surveyed facility.

Findings

The FCE compiled and systematically analyzed relevant data to estimate country performance along key indicators at the national and, when possible, the subnational level.

Table 6: Country characteristics

Characteristic	
Demographic and economic indicators	
Total population	162,903,941
Birth cohort	3,115,553
Gross national income (GNI) per capita	$US 1,190
*Health spending and development assistance for health (DAH)***	
Government health expenditure as source (GHE-S)	$US 145.8M
DAH, channeled through government	$US 334.6M
DAH, channeled through non-government entities	$US 309.8M
Total DAH	$US 644.4M

** GNI per capita source: World Bank World Development Indicators, 2015, reported in current US dollars*

***Health expenditure is explained in terms of GHE-S, DAH-G, and DAH-NG. GHE-S + DAH-G gives the total government health expenditure, GHE-S + Total DAH gives total spending on health in the country. Institute for Health Metrics and Evaluation (IHME).* Financing Global Health 2015: Development Assistance Steady on the Path to New Global Goals. *Seattle, WA: IHME, 2016. Unit is 2013 USD.*

Table 7: Vaccine coverage estimates

Vaccine coverage	Most recent survey estimate*	WUENIC 2015 revision	Self-reported coverage (WHO)
DPT/Penta3 coverage	91.3%	94%	93%
DPT1–DPT3 dropout rate	5.7%	3%	0%
BCG coverage	97.9%	98%	93%
OPV3 coverage	91.4%	94%	93%
Measles coverage	86.1%	88%	90%
Percent fully vaccinated	83.8%	NA	NA

*Data from DHS 2014 survey.

Table 8: Child, adult, and vaccine-preventable disease mortality

Child, adult, and vaccine-preventable disease mortality	GBD 2015 Estimate (95% uncertainty interval [UI])
All-cause mortality (risk per 1,000)	
Infant mortality (${}_1q_0$)	27.1 (23.3–31.6)
Under-5 mortality (${}_5q_0$)	122.6 (113.2–134.1)
Female adult mortality (${}_{45}q_{15}$)	73.3 (59.0–89.2)
Male adult mortality (${}_{45}q_{15}$)	121.5 (95.7–149.0)
Cause-specific mortality: children under 5 (rate per 100,000)	
Measles	13.3 (2.4–41.4)
Diphtheria	0.1 (0.01–0.4)
Tetanus	7.09 (4.4–11.2)
Pertussis	14.0 (0.04–69.25)
Meningococcal infection	10.69 (4.6–21.7)
Diarrheal disease	106.7 (66.8–159.6)
Lower respiratory infections	169.0 (121.3–234.2)
Cause-specific mortality: all ages (rate per 100,000)	
Cervix uteri cancer	1.9 (1.3–2.9)
Acute hepatitis B	1.6 (1.2–2.1)
Cirrhosis of the liver secondary to hepatitis B	8.6 (6.8–10.3)
Liver cancer secondary to hepatitis B	0.6 (0.4–0.8)

Figure 1: Timeline of major immunization events in Bangladesh, 2008–2016

	PLANNED		ACTUAL
	2008	First tranche grant received in country for HSS-1	2010
		Joining of national coordinator	2011
		Start of HSS-1 grant implementation	2010
	2009	Second tranche grant received in country for HSS-1	JAN 2013
	2010	End of HSS-1 grant implementation	DEC 2014
	2011	Government of Bangladesh (GoB) submitted application for new vaccine support (NVS)	✓
	2012	NVS application approved	✓
	2013	Decision letter for HSS-1	✓
2014	JAN		
	FEB		
	MAR	Second decision letter for HSS-1 to approve no-cost extension to 2014	✓
		GoB submitted application for IPV support	✓
	APR		
	MAY	GoB submitted Expression of Interest (EOI) for HSS-2	✓
	JUN	Decision letter for NVS for routine IPV	✓
	JUL	Assessment of cold and dry space for new vaccine introduction	✓
		Decision letter for NVS for routine PCV	✓
	AUG	Information, Education, and Communication (IEC) meets to endorse PCV materials	FEB 2015
	SEP	National Training of Trainers (ToT); divisional, district, and upazila PCV trainings	OCT 2014
		GoB submitted application for HPV demonstration	✓
	OCT	Official letter to UNICEF regarding programmatic readiness for PCV shipment	DEC 2014
	NOV		
	DEC	Second decision letter and internal appraisal for PCV with detailed budget approved by Gavi	✓
		Revised decision letter for IPV	✓
		National advocacy for PCV	MAR 2015
		PCV Concurrent launch of IPV with PCV introduction	MAR 2015
2015	JAN	GoB submitted application for HSS-2 grant	✓
	FEB	HPV first dose administration	APR 2016
	MAR	National ToT; district and upazila trainings for IPV	✓
		Gavi approves HPV demonstration program	✓
	APR		
	MAY		
	JUN	HPV Technical Advisory Group developed	✓
	JUL		
	AUG		
	SEP	GoB resubmitted application for HSS-2 grant	✓
		Bangladesh received pre-assessment report from WHO	✓
	OCT	HPV second dose administration	OCT 2016
	NOV	GoB received changes to HSS-2 proposal requested by Gavi IRC; Gavi IRC approves bifurcated HSS-2 proposal	✓
	DEC	Bangladesh received final shipment of IPV from Unicef	✓
2016	JAN	GoB responded to IRC's request for changes to HSS-2 proposal	✓
	FEB	Last supply of IPV from EPI HQ at sub-national level	✓
	MAR	ICC planning and SAGE notification regarding IPV shortages	✓
		Bangladesh received HSS-2 proposal approval	✓
	APR	SEARO notified stakeholders of global IPV shortages	✓
	MAY		
	JUN	Gavi and WHO signed HSS-2 grant agreement	✓
	JUL	WHO received one year of HSS-2 funding under agreement	✓
	AUG	PricewaterhouseCoopers conducted cash program audit in Bangladesh	✓
		Gavi and UNICEF signed HSS-2 grant agreement	✓
		UNICEF received one year of HSS-2 funding under agreement	✓
	SEP	Bangaldesh out of IPV stocks	✓

Support streams evaluated in 2016
- Pneumococcal conjugate vaccine (PCV)
- Health System Strengthening (HSS)
- Human papillomavirus vaccine (HPV)
- Inactivated polio vaccine (IPV)
- Other

✓ Implemented as planned/no delay
Delay

HPV vaccine

The HPV demonstration program in Bangladesh started implementation in in 2016. It is a "hybrid" of school-based and out-of-school-based outreach, with the targeted group being class-five female students and 10-year-old out-of-school girls. The GoB selected this model by considering the 90% enrollment of target girls in the schools. Though the entire Gazipur district was selected for the demonstration program (Gavi Full Country Evaluation 2015, Annual Dissemination Report, Bangladesh Report), later the decision was changed since the target population of Gazipur district was higher than that cited in the approved proposal. The ICC approved four sub-districts (Kaliganj, Kapasia, Sreepur, and Kaliakoir) from rural areas of the Gazipur district and one zone (Zone 1-Tongi) of Gazipur City Corporation for this demonstration program. The target population was 30,869.

Table 9: Timeline of HPV demonstration program implementation

Timeline	Event
May 2013	Shared the plan of introducing HPV vaccine in EPI as a demonstration program in ICC meeting
18 May 2014	Bangladesh submitted the EOI
15 September 2014	HPV application submitted
February 2015	HPV first dose administration plan deferred one year from February 2015 to February 2016 to avoid workload associated with introduction of PCV & IPV
9 March 2015	Gavi approved the application
17 March 2015	GoB received decision letter
10 June 2015	Technical Advisory Group (TAG) developed
13 August 2015	First TAG meeting held and three subcommittees formed
February 2016–April 2016	HPV first dose administration again deferred two months due to having close expiry-dated HPV vaccine
12-13 March 2016	Training of Trainers (ToT) for the implantation of first dose HPV demonstration program at national level
15-24 March 2016	Training of service providers at the subdistrict level
27-29 March 2016	Programmatic assessment
26 March–13 April 2016	Orientation of teachers
10-18 April 2016	Advocacy workshop
16 April 2016	Inauguration of the HPV first dose demonstration program
16 April–16 May 2016	HPV first dose administration
2 October 2016	Training of trainers (ToT) for the implementation of second dose of HPV demonstration program at national level

3 October 2016	District orientation seminar for the implementation of second dose of HPV demonstration program
4-8 October 2016	Orientation of second dose of HPV demonstration program at the subdistrict level
16 October–16 November 2016	HPV second dose administration
13-23 October 2016	Post Introduction Evaluation (PIE) of HPV demo program by PATH

Research questions

1. To what extent has the HPV demonstration program been implemented as planned?
2. How is the country planning to address the sustainability (programmatic and financial) issues surrounding HPV?

Finding 1

HPV first dose school sessions were not conducted according to the micro plan in most areas due to time constraints and inadequate consultation with the yearly school plan. However, EPI stakeholders applied planning lessons learned during the first dose administration to the delivery of the second dose.

Prior to conducting the HPV demonstration program, the GoB organized two days of cascade training for the national- and subnational-level service providers. At the district level, orientation meetings were organized with teachers and school committee members. Those meetings were intended to foster cooperation in motivating girls and their guardians to participate in HPV vaccination. For demand generation among the targeted group, advocacy meetings were conducted with teachers, district officials, parents, and community leaders.

A post-training programmatic readiness assessment for the HPV demonstration program was conducted from 27 to 29 March 2016 by the Surveillance Medical Officer (SMO) of WHO. Through this assessment, health workers' knowledge on HPV vaccination was assessed by face-to-face individual interviews. The availability of HPV stickers for ILRs was also checked. Just after the assessment, WHO sent the final report to Gavi in Geneva on 30 March 2016. Gavi responded to the report and coordinated vaccine shipment with UNICEF. Bangladesh received HPV vaccine on 11 April 2016 and distributed to the subnational and upazila/zonal levels on the following days, aiming to launch the vaccine on 16 April 2016. These activities were performed by stakeholders in a short period of time.

The first year of the HPV demonstration program was implemented according to the event calendar, although the start time had been rescheduled from February 2016 to April 2016. From FCI with a national-level respondent, it was revealed that the expiry date of available Cerverix vaccine was June 2016. Therefore, EPI HQ did not agree to receive those vaccines for the demonstration program and decided to wait for an additional two months until newly manufactured vaccines were available in the market. (The close expiry date of available HPV vaccine required that the country wait for new vaccine with a longer expiry date – this situation is covered in depth in the FCE Bangladesh 2015 report).

However, it was a challenge to fulfill the strategy of administering two doses in one program year. Bangladesh EPI succeeded in completing the first-year HPV demonstration program on schedule, but subnational service providers faced challenges in implementing the first dose according to the micro plan. From observation and interviews at the subnational level, it was found that the HPV demonstration program followed the MR campaign technique of developing micro plans in which service providers adjusted the schedule of school-based vaccinations according to routine EPI vaccinations (in order to capture girls who had dropped out of the HPV vaccination). The service providers communicated with the schoolteachers during micro planning, but the schedule was prepared without consulting the dates of examination or vacations. Additionally, service providers reported that they were often unable to contact schoolteachers while preparing the micro plans due to time constraints. They got a week (including weekends) for micro planning, but they had to perform other EPI activities during that time. One respondent said that in some instances, the schedule was given by the school authority, but they were not prepared for giving HPV vaccine to the targeted students on the scheduled day. Therefore, service providers sometimes had to alter the date and reschedule vaccinations at that school. Our session observation data showed that more than half (26 sessions out of 45) of the observed school sessions were rescheduled from the micro plan.

> *We couldn't work according to micro plan because of disagreement of the schoolteachers. The micro plan we prepared first phase is conflicting with school schedules such as exam schedule, school holidays, etc.* (KII)

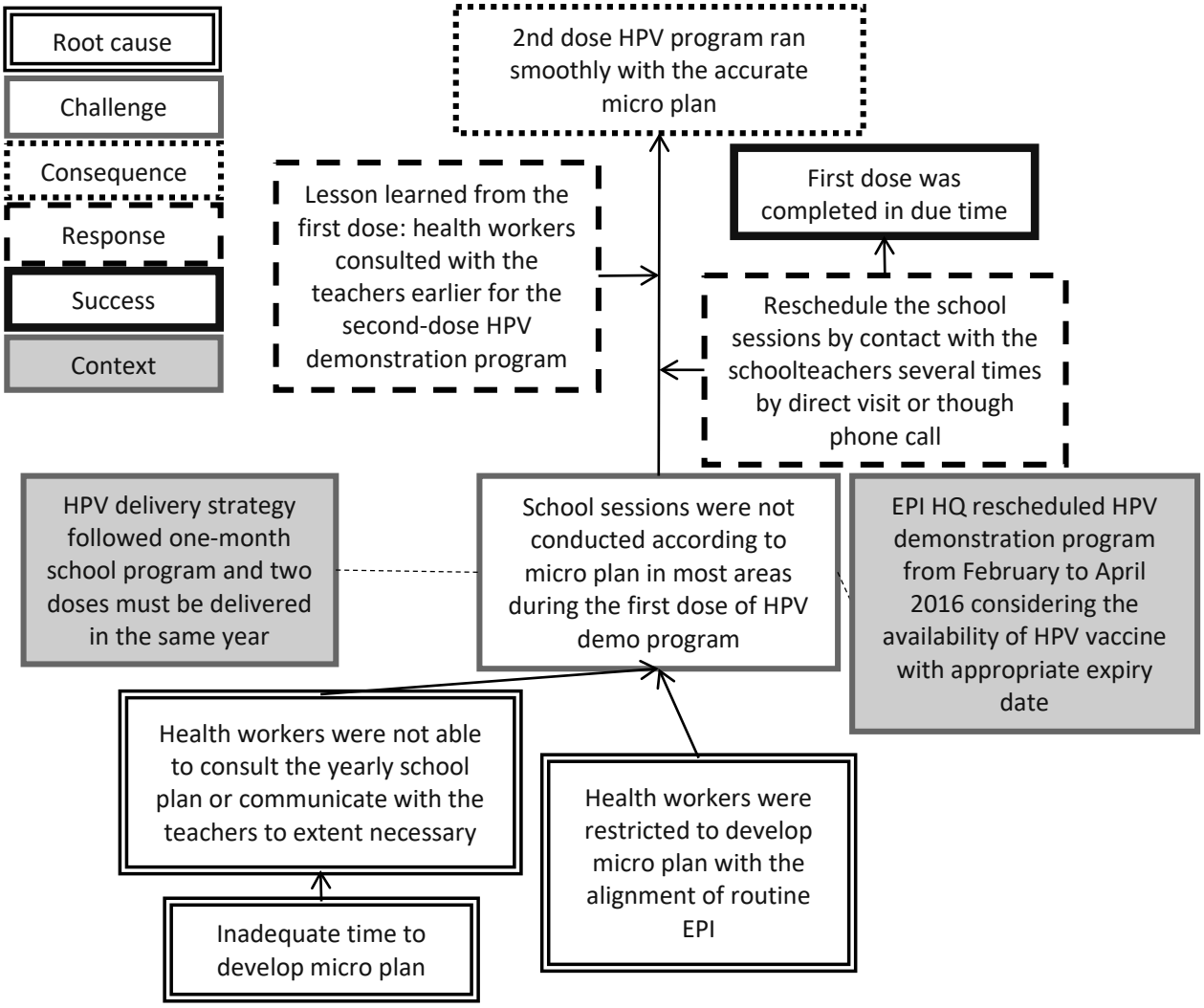
Service providers mitigated the problem and rescheduled the school sessions by directly visiting with the schoolteachers or calling them on the phone several times. As the previous experience of EPI had built an established coordination between service providers and school authorities, the problem was solved without much complexity, but service providers often had to spend money from their own pockets for this purpose.

In spite of scheduling and rescheduling the school sessions, service providers completed the session by the targeted time of 16 May 2016. This was possible due to adaptive management and a history of effective coordination between the EPI program and the education sector. From the beginning, EPI stakeholders communicated with their counterparts in the educational sector. Existing members of the Technical Advisory Committee (TAG) of the HPV demonstration program invited and appointed education sector personnel, such as the Directorate of Primary Education (DGPE) from the Ministry of Education (MoE) from the year 2015, to attend its meeting in order to improve coordination. Before registration, district-level authorities communicated with schools from the beginning of the program (during registration and teacher orientation). All of these things made the personnel of the education sector well aware of the program. Previous school-based program (such as the MR and measles catch-up campaigns) made communication between two sectors easier. Additionally, the dedication of service providers in the health sector was also responsible for this success, which helped them to conduct one to seven school sessions per day to complete the targeted schools. All of these factors helped in overcoming the challenges regarding the micro plan. As a result, administration of the first dose of vaccine was implemented successfully.

From the first dose of the HPV demonstration program, stakeholders learned that to avoid rescheduling from the micro plan, they needed to consult yearly lesson and vacation plans and communicate with the upazila primary education officer (UPEO) and district primary education officer (DPEO) prior to fixing the date of second dose in the HPV vaccination program.

Following the suggestions of stakeholders, health workers contacted schoolteachers very early in the school session to discuss the second-dose micro plan. As a result, the second dose of the HPV demonstration program is being implemented according to the micro plan.

Figure 2: Root cause analysis on HPV demonstration program. First-dose school sessions were not conducted according to the micro plan in most areas, though EPI stakeholders deployed lessons learned from the first dose administration to the second dose administration



Recommendation

Country stakeholders should perform their activities in a more coordinated way, including close collaborations with schoolteachers and education officers at all administrative levels, to ensure a successful demonstration project and future national introduction of HPV vaccine.

Robustness of finding

Finding 1	Ranking	Robustness criteria
HPV first dose school sessions were not conducted according to the micro plan in most areas due to time constraints and inadequate consultation with the yearly school plan. However, EPI stakeholders applied planning lessons learned during the first dose administration to the delivery of the second dose.	A	The finding is supported by multiple qualitative data sources such as KII and document review, which were well triangulated with quantitative data such as session observation, semi-structured interviews with service provider and adolescent girls.

Finding 2

The high level of commitment of health workers enabled them to complete their routine activities during the HPV demonstration program, resulting in maximum coverage for the HPV demonstration program.

Following previous experience from vaccination campaigns (such as the measles catch-up campaign, measles follow-up campaign, and 2013 MR campaign), a school-based delivery model was chosen for coverage considerations. Findings from HPV program lessons learned reports (PATH and LSHTM, 2015) also predicted high HPV coverage and enrollment rates if countries implemented school-based HPV vaccination programs. This delivery model also ensures minimum vaccine wastage.

However, health workers faced challenges in implementing the HPV demonstration program along with their routine activities. Due to the demonstration program, routine activities were hampered for a certain period of time. From the semi-structured interview with service providers during the demo program, it was found that although a few service providers at the subnational level (10 out of 39) preferred a school-based delivery model for HPV vaccination for coverage considerations, the majority (26 out of 39) preferred HPV vaccine to be included in the routine EPI model due to the interruptions that come with school-based programs. Service providers indicated that their preference was due to the increased workload they experienced in integrating school-program interpersonal communication (IPC) activities into their normal EPI routines. In the regular activity plan, service providers were supposed to go to the community to inform people about the EPI session, which would be held on the next day. For the HPV demonstration program, they were unable to perform this IPC activity. Additionally, they couldn't go to the community clinic where they routinely worked. All of this meant they had to work more than normal for school-based programs.

> *It [the school based program] creates work load… we have to work regular now without Friday. Moreover, we have to go for motivation [IPC] for EPI, which we can't do now.* (KII)

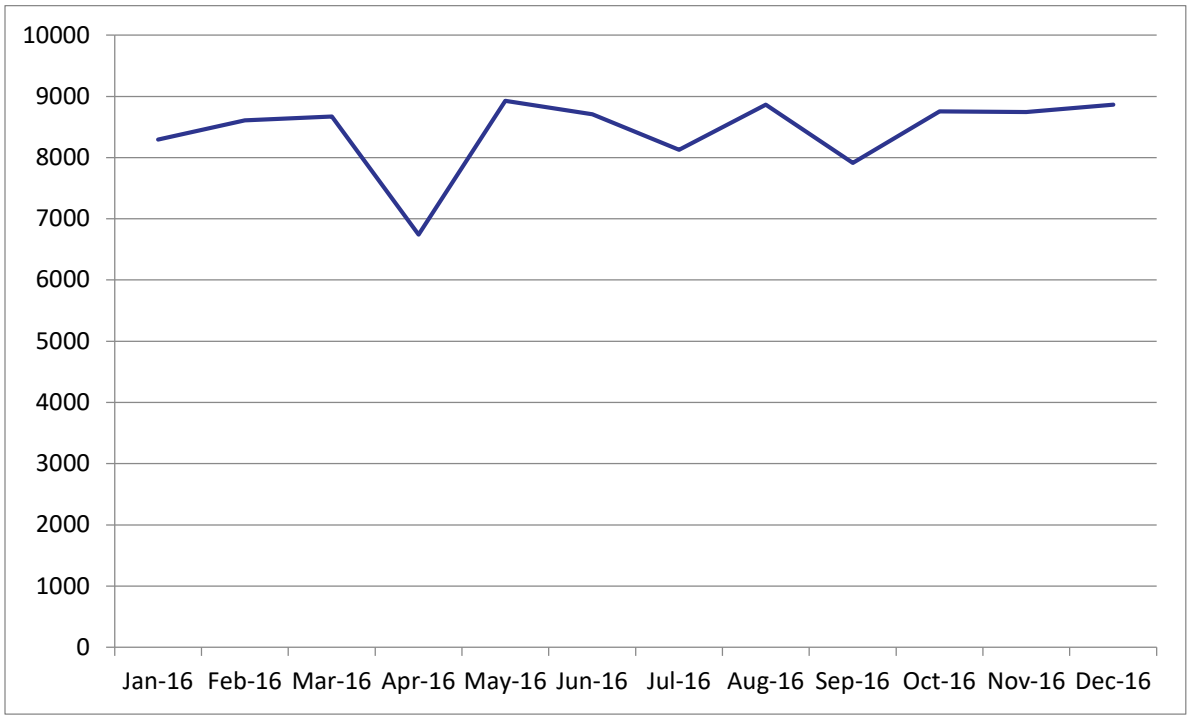
The challenges of completing IPC activities for HPV vaccination were somewhat mitigated due to the commitment and professionalism of the EPI program staff. For example, service providers used their own communication mechanisms, performing IPC through mobile phone communication and home visits on the days of vaccination to achieve the target of routine EPI. Service providers also managed a miking system for IPC. One subnational-level respondent reported that

We can manage now. We are familiar with the area. If there is miking system, we inform about EPI session through mike; otherwise we go in a household and told one person to inform other… (KII)

Moreover, general population awareness about EPI prompted people to initiate communication with the health workers about getting their children vaccinated.

As a result, routine EPI activities were not significantly interrupted by HPV demonstration program activities. Comparing the HMIS data of 2015 and 2016, it was found that coverage of penta-3 did not differ substantially between the pre- and post-HPV demonstration program period (Figure 3).

Figure 3: Comparison of penta-3 coverage between pre- and post-HPV demo program at Gazipur



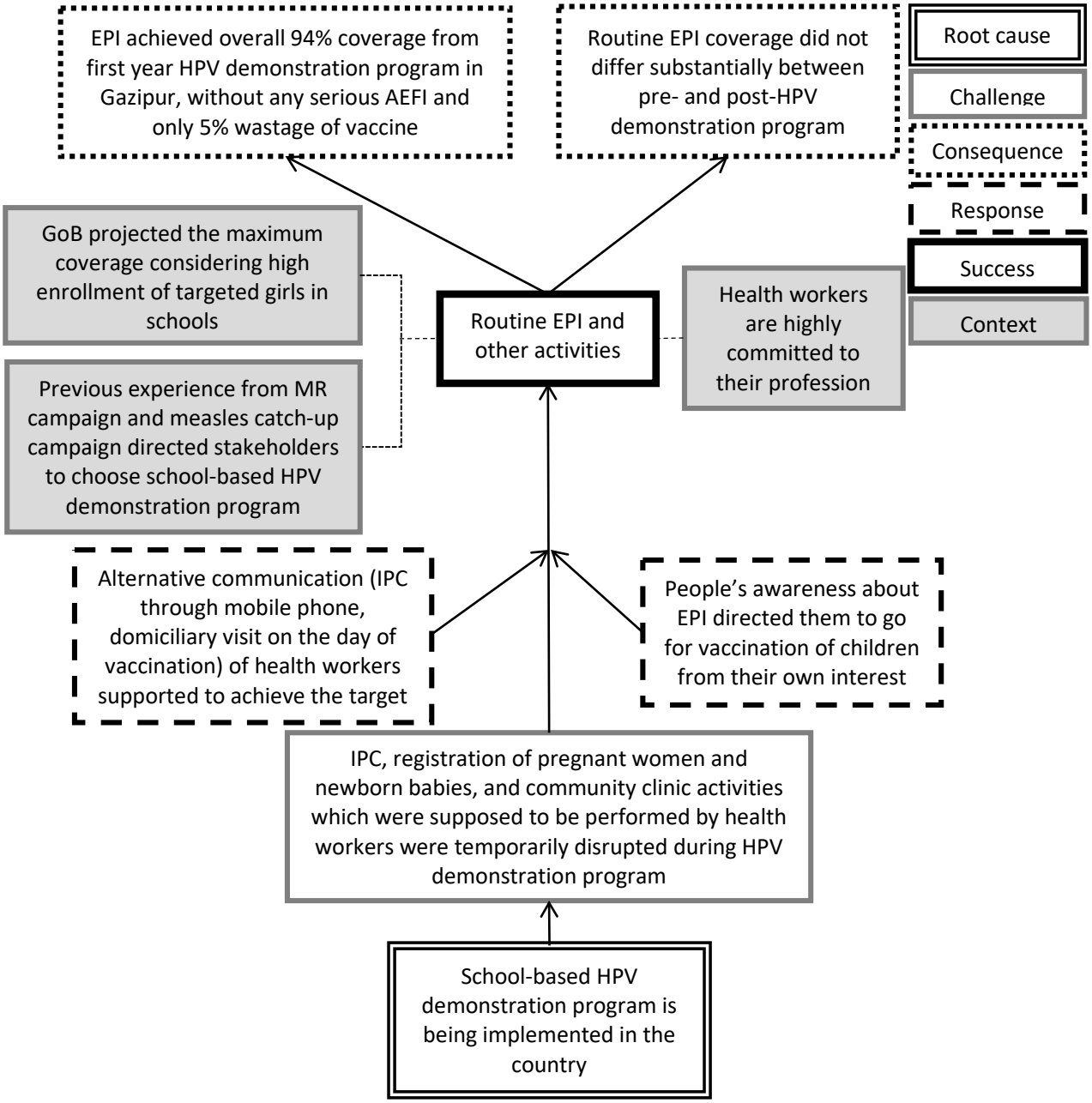
Simultaneously, HPV vaccination coverage rates were found to be high. It was found from the PIE report that the coverage rates in the first year of the HPV demonstration program were 95% and 82% in the in-school and out-of-school cohorts, respectively. Overall coverage was 94%, as coverage at schools was higher (Table 10). Regarding vaccine wastage, 5% wastage was found during the first-year HPV demonstration program, according to the administrative report. According to health worker interviews, that wastage occurred only in instances when an odd number of targeted girls were scheduled for vaccination, as each vaccine vial contains two doses.

Table 10: Year-1 coverage data of HPV demonstration program (first dose and second dose)

Upazila	Girls vaccinated (#)				Girls vaccinated (%)		
	Community	School	Total girls vaccinated	Not vaccinated	Out-of-school girls	School girls	Total
First-dose coverage data (16 April–16 May)							
Kaliganj	222	3,558	3,780	136	93%	97%	97%
Kaliakair	675	6,807	7,482	255	94%	97%	97%
Sreepur	547	6,676	7,223	241	98%	97%	97%
Kapasia	202	4,226	4,428	241	81%	96%	95%
CC Zone-1	700	5,495	6,195	888	65%	92%	87%
Total	**2,346**	**26,762**	**29,108**	**1,761**	**83%**	**95%**	**94%**
Second-dose coverage data (16 October–16 November)							
Kaliganj	221	3,555	3,776	140	93%	97%	97%
Kaliakoir	672	6,794	7,466	271	93%	97%	96%
Sreepur	545	6,676	7,221	243	98%	97%	97%
Kapasia	202	4,225	4,427	242	81%	96%	95%
CC Zone-1	687	5,449	6,136	947	64%	91%	87%
Total	**2,327**	**26,699**	**29,026**	**1,843**	**82%**	**95%**	**94%**

Data source: PIE report of HPV demonstration program in Gazipur district and administrative data.

Figure 4: Root cause analysis: The high level of commitment of health workers enabled them to complete their routine activities during the HPV demonstration program



Recommendation

EPI headquarters should allocate adequate time for the preparatory activities for all its programs in order to minimize the workloads of service providers and ensure successful completion of assigned responsibilities without any interruptions.

Robustness of finding

Finding 2	Ranking	Robustness criteria
The high level of commitment of health workers enabled them to complete their routine activities during the HPV demonstration program, resulting in maximum coverage of the HPV demonstration program.	A	This finding is supported by multiple data sources such as KIIs from the national and subnational levels and document review.

Finding 3

Completion of the demonstration program was the priority task for EPI stakeholders, while ensuring the feasibility of scaling up the program nationally and sustaining the program may be future concerns.

Selecting a hybrid delivery model (with a focus on schools) has positive implications for high coverage compared to a single routine-based model. According to KII data, respondents from both national and subnational levels appreciated this delivery model. Subnational-level key informants shared their preferences for using a school-based delivery model for national rollout. One stakeholder mentioned,

> *If HPV vaccination program is being implemented with school-based delivery model during the national rollout for few years after ending of HPV demonstration program to become familiar among people, it will be better. After gaining the desired familiarity, it can be incorporated with routine EPI.* (KII)

On the other hand, this model also presented a challenge regarding sustainability. Respondents from the subnational level recounted the example of TT vaccination, which is administered in routine EPI activities and still could not achieve a satisfactory coverage rate; 55 out of 64 districts found less than 50% TT-2+ coverage (cMYP 2011–2016, Bangladesh). The HPV PIE report revealed that an increased number of EPI stores, adequate cold-chain staff, and human resources, along with the provision of operational funds to health service providers, was needed for all districts prior to national vaccine rollout. Our KII data also reflected this issue of programmatic sustainability and the feasibility of national scale-up of the HPV program. Following the expansion of cold store facilities with the support of the HSS-2 grant (detailed in the HSS-2 section below), it can be assumed that an increased number of EPI stores at all levels will be available before the national introduction of HPV vaccine by 2018. In addition, the recruitment of cold-chain staff (e.g., cold-chain technicians and storekeepers) may be addressed through the second part of HSS-2 proposal, which is being prepared in alignment with the next sector-wide approach.

The PIE report also noted that assessments of financial sustainability should include an analysis of the country's capability and willingness to cofinance and finance projects beyond the transition from Gavi support. Adequate incentives and transportation costs will be necessary for service providers to work overtime and cover schools. Without the above, it may be challenging to scale up the HPV program in the future. Our KII data revealed that health service providers had to spend money from their own pockets to implement the school-based program during the first-year demonstration program.

Considering the limitations on GoB budgets for national rollouts in the future, transport costs were not allocated in the demonstration program budget.

At present, the implementation of the demonstration program, and not the issue of sustainability, has been the major concern of stakeholders. In that regard, one national-level respondent stated that

> *We are now focusing on the demonstration program, the sustainability of HPV program can be ensured after the coverage survey and costing evaluation.* (KII)

Therefore, it is difficult at this point to determine the future sustainability of HPV vaccination using the specific delivery model of Bangladesh. The HPV demonstration program evaluation survey has yet to begin and the program's cost analysis has yet to be reported. These projects will affect the choice of the specific delivery model used, such as only school-based, only community-based, or both, for the national rollout. However, the feasibility of the delivery model could be assessed after the second year of the demonstration program, as there was a limited assessment of feasibility and financial sustainability for national introduction in the first year of demonstration. As the political system (i.e., the Parliament) usually plays an important role in such decisions, MoHFW leaders should place an emphasis on understanding supportive advocacy strategies and seek financing approval in 2017.

Recommendation

The programmatic and financial sustainability of HPV should be assessed by taking into account the country's capacity to cofinance vaccine purchasing as well as support delivery costs. During the second year of the demonstration program and the national introduction of HPV vaccine, country stakeholders should be more conscious of the coverage survey and costing analysis for future sustainability.

Robustness of finding

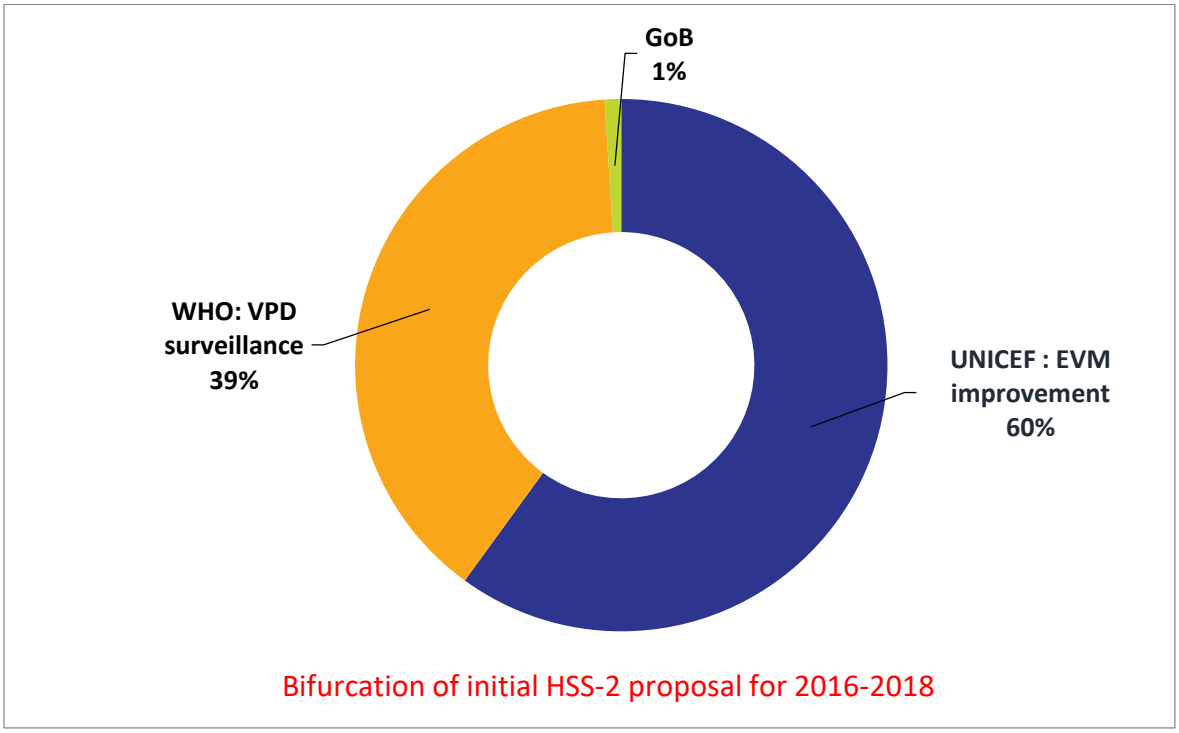
Finding 3	Ranking	Robustness criteria
Completion of the demonstration program was the priority task for EPI stakeholders, while ensuring the feasibility of scaling up the program nationally and sustaining the program may be future concerns.	C	The finding is supported by fewer data sources (limited triangulation) of good quality but perhaps more perception-based than factual.

Health System Strengthening 2

Bangladesh received approval for a HSS-2 grant in the amount of US$ 34 million, allocated to WHO and UNICEF (Gavi FCE annual dissemination report, 2015), for the period of 2016 to 2018. WHO received those funds from Gavi in the middle of 2016 and UNICEF received their funds one month later. At that point, WHO and UNICEF started their preparatory activities for implementing the grant.

WHO and Gavi executed a bilateral agreement for this funding arrangement, signed by WHO on 7 June 2016 and Gavi on 28 June 2016. WHO received the first portion of funds (US$ 4 million, one-third of the total funds for the year 2016) for surveillance activities, specifically to strengthen vaccine-preventable disease surveillance and its integration into the HMIS, including payment of the salaries of surveillance network employees, laboratory renovations, and procurement of vehicles.

Figure 5: Allocation of HSS-2 grant by the designated entities



UNICEF's agreement with Gavi stipulated that they receive a total of US$ 19 million over three years for effective vaccine management activities, during which they would construct, renovate, and expand facilities in 32 districts, including the installation of walk-in-coolers (WICs) in 14 districts. UNICEF has also received its allocation for the first year from Gavi and started its activities.

As part of HSS-2 implementation, UNICEF developed a construction strategy and shared it with the GoB. Therefore, the construction subcommittee (technical subcommittee) was formed with the leadership of the Joint Chief (Planning Wing, MoHFW). This committee has conducted two implementation meetings. According to UNICEF's activity plan, a software-based management information system for the purpose of cold-chain management has been developed and integrated with DHIS 2 software. The procurement process for cold-room instruments has been started for six districts. A quarterly report containing updates of grant activities was prepared and shared with Gavi in November 2016. However, the portion of the grant that the GoB is to receive in order to maintain operational costs has yet to be received, as there are still unused funds remaining from the HSS-1 grant. The independent review committee (IRC) of Gavi also expressed its concern about the mode of implementation through two international agencies, as this would not foster the hoped-for health system strengthening (Gavi IRC Country Report, Bangladesh, Nov 2015).

Table 11: HSS-2 grant receiving steps with timeline

Process	Timeline	Events
1. Submission of EOI	May 2014	Bangladesh submitted the Expression of Interest to Gavi
2. Application development and submission	From late 2014	HSS-2 application development started
	8 September 2015	Bifurcated application submitted to Gavi for 3 years grant instead of 5 years
	12 October 2015	Final version of bifurcated application submitted to Gavi
3. Application screening and pre-review	22 September 2015	Bangladesh received the pre-assessment report from WHO
4. Independent Review Committee	November 2015	IRC sent approval of bifurcated HSS-2 proposal
	By 10 January 2016	Bangladesh sent the response of IRC comment
5. Approval of Gavi CEO	23 March 2016	Bangladesh received the decision letter
6. Cash Programme Audit	19 August to 20 October 2015	A cash program audit was held in Bangladesh
7. HSS disbursement to country	28 June 2016	Agreement was signed between Gavi and WHO
	On late July of 2016	WHO received funds from Gavi
	August 2016	UNICEF received funds from Gavi

Research questions

1. To what extent has HSS-2 implementation (both effective vaccine management [EVM] and surveillance activities) proceeded as planned?
2. How will the programmatic sustainability of HSS-2 activities be ensured?

Finding 1

GoB received the HSS-1 grant directly from Gavi. However, in 2016, the annual HSS-2 payment was disbursed directly to WHO and UNICEF. This raises concerns about country ownership of the program.

With the HSS-2 funds, WHO started activities by publishing recruitment circulars for various vacant posts (drivers, office staff, surveillance medical officers), without getting permission from GoB. The recruitment-related discussion was held in the program implementation committee (PIC) meeting, the leading technical group for Gavi HSS, and made the decision to give preference to keeping existing staff (drivers and DMCH&IOs), based on their satisfactory assessments, in the midst of WHO's publication of the circular. Therefore, some PIC members from the government side were displeased about WHO's role, since they perceived WHO to be adopting a role belonging to the government. One key decision in the recruitment process was whether and how to transition existing SMOs and DMCH&IOs to the new surveillance and immunization medical officer (SIMO) role, but WHO published the circular for SIMO without sharing the TOR for SIMOs with the GoB. As a result, the ministry requested that WHO seek their approval for any recruitment-related activities under the HSS-2 grant. WHO agreed. Resolution of this issue was possible in part due to the strong leadership of one particular ministry official, as well as a long and effective history of partnership between the ministry and WHO. Moreover, the PIC formed a technical committee for implementing the EVM activities, arranged regular PIC meetings to discuss project implementation status, and ensured that there would be a GoB representative in the recruitment committee.

Key ministry personnel in this process have experience implementing HSS-1, and thus are mindful of balancing implementation timelines with longer-term sustainability and country ownership. For example, while forming a recruitment committee may have delayed the implementation process slightly, it was perceived to be a net benefit to country ownership.

One national-level key respondent said that,

> *HSS-2 grant implementation by WHO, UNICEF is not the country implementation. Even, this is not possible to be done in sustained manner as the recruited staff of WHO is not the staff of GoB.* (KII)

At the same, another respondent said,

> *We are secured for next three years with this grant as it was given to WHO and UNICEF to perform the surveillance and EVM activities. Though many other vacant post issues were not addressed in the HSS-2 grant.* (KII)

This comment highlights persistent challenges in sustaining human and other resources in the transition from one funding source to the next. Through the Gavi ISS and HSS-1 grants, volunteers, community maternal, child, and immunization workers (CMCHIW), vaccine porters, and logistics packers were getting salary support for their EPI coverage activities, while these posts are not addressed in the bifurcated HSS-2 proposal. However, there is one designated medical officer from the GoB level to perform surveillance activity at the district level, and GoB is optimistic about utilizing them in the future by providing adequate logistic support to them. Though there is no clear plan at this stage to transition these responsibilities to the government, relevant discussions among the GoB stakeholders have already started, with the goal being to sustain the surveillance network within the GoB staff and to equip and train the existing staff gradually. Surveillance activity is being covered with the HSS-2 grant for the next three years, so there is also scope to apply and secure the second part of the HSS-2 grant to continue the surveillance network.

Both the challenge of country ownership and the absence of long-term sustainability share a root cause: the disbursement of funds directly to WHO and UNICEF from Gavi, which happens to be a growing trend for Gavi grants. Before disbursing funds for HSS-2 activities, two bilateral agreements were created between Gavi and WHO and Gavi and UNICEF, with the GoB not party to the agreements. The GoB is not even aware of the exact signing dates of those agreements. The HSS-2 proposal specified that the GoB will play the role of apex body in monitoring the overall activities of WHO and UNICEF. The country thinks that feeling a sense of ownership over the HSS-2 process will depend on whether these two implementing agencies follow their official role to be accountable to the country by receiving and applying GoB suggestions on implementation. One global level respondent explained that,

> *I see more and more funds going through partners instead of through MoH systems – that to me is the wrong direction. In some cases it is essential, but in some if we really want to have credible exit strategies we have to invest in the country financial systems and try to make them robust.* (KII)

The Gavi HSS evaluation meta-review report noted that funding being channeled through Gavi Partners (WHO and UNICEF) due to weak government capacity has been criticized for a lack of clarity in roles and responsibilities, high management fees incurred, and implementation delays due to the additional layer of bureaucracy (Cameroon, Chad, Somalia). The June 2015 IRC report noted a much higher proportion of HSS grants (44%) channeled through partners, and found this to be particularly relevant for post-conflict or fragile countries – conditions that do not apply to Bangladesh's EPI.

Figure 6: Root cause analysis: The annual HSS-2 payment was disbursed to WHO and UNICEF in 2016, which raised concerns about the implications for country ownership.

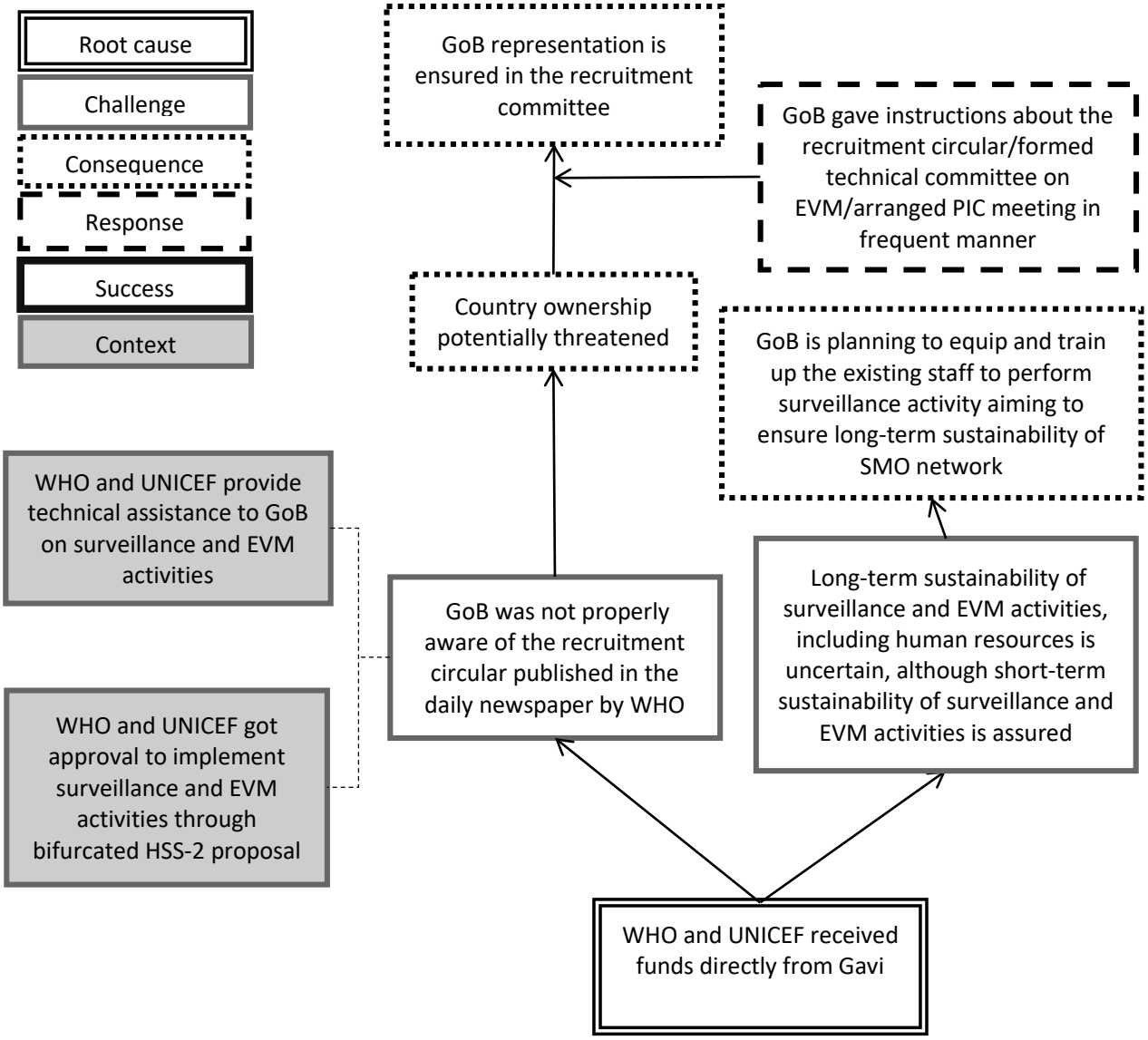


Table 12 compares the current HSS-2 funding situation (direct disbursement to WHO/UNICEF) with the model of disbursement first to GoB, then to WHO/UNICEF:

Table 12: Comparative analysis of HSS-2 fund utilization process by WHO/UNICEF and GoB

Potential issues and consequences	WHO/UNICEF principal recipients of Gavi HSS (decision-letter scenario)	Government principal recipient of Gavi HSS, then disburses to WHO/UNICEF (2015 scenario)
Disbursement and spending processes/bureaucratic processes	Faster.	Slower, but Gavi could support strengthening of these processes by providing support to GoB to strengthen its systems and reduce administrative/bureaucratic delays.
Country ownership	May not support country ownership as it raised concerns about implications for country ownership regarding the recruitment issue.	Stronger country ownership.
"Real-world" accountability	Is happening; WHO/UNICEF have good relationship with GoB, will ensure that GoB is involved in decision-making (e.g., circular revision); Example 2: WHO shared implementation plan with PIC members (GoB and partners), took approval from that meeting.	Potentially more accountability. GoB would prefer this – is the typical situation.
Contractual accountability	Between WHO/UNICEF and Gavi; developed a bilateral agreement.	If agreement went first to GoB, then to WHO/UNICEF, WHO/UNICEF would be contractually accountable to GoB.
Capacity building	Contract mechanism does not strengthen management capacity to implement these types of grants. Stepping around the problem instead of addressing it.	Gavi could have provided support to GoB to strengthen its systems, reduce administrative/bureaucratic delays.

Sustainability	Faster implementation of activities ensures short-term sustainability of SMO activities (otherwise there would have been a gap).	Any delays in implementation would harm short-term sustainability of ongoing surveillance activities.

Recommendation

In order to maximize the GoB's ownership of EVM and surveillance activities, future HSS grants should be disbursed to the GoB.

Robustness of finding

Finding 1	Ranking	Robustness criteria
GoB received the HSS-1 grant directly from Gavi. However, in 2016, the annual HSS-2 payment was disbursed directly to WHO and UNICEF. This raises concerns about country ownership of the program.	B	This finding is supported by multiple data sources such as KIIs from the national and subnational levels and document review.

Leadership, management, and coordination

In 2016, leadership, management, and coordination has been identified as a key area to be investigated in a more systematic way than in previous years. For the Bangladesh FCE team, the preliminary interest under this theme has been to understand "Why is EPI management effective in Bangladesh?" To investigate that question the FCE team identified the following research question:

Research question

What is the overall management burden associated with Gavi funding streams and related processes? How is this management burden addressed at the country level?

Finding 1

To date, effective EPI management, supportive health workers, and strong coordination among partners have helped in handling multiple Gavi funding streams. The future sustainability and retention of these leaders is becoming an area of concern.

Gavi has provided support for several new vaccines as well as health system strengthening in Bangladesh. Bangladesh has demonstrated its capacity to manage multiple Gavi support streams at once (FCE Annual Report 2014 & 2015). In 2014, the GoB implemented the Measles-Rubella Campaign (Jan-Feb), applied for the addition of IPV to the routine EPI (Mar), and applied for HPV demonstration program funding (Sep). In 2015, country stakeholders introduced the PCV and IPV vaccines into the routine EPI (Mar), applied for HSS-2 funding, and implemented the HSS-1 grant. In the current year (2016), the GoB is implementing the HPV demo program in Gazipur district, has applied for rotavirus vaccine support (Sep), has continued to implement the HSS-1 grant with no-cost extension support, and has started HSS-2 activities (July). In addition to that, the country is coping with the global IPV stockout issue smoothly.

We found that effective leadership of managers in the EPI program at the national level is a key factor in handling multiple Gavi streams. We have identified multiple root causes of effective EPI program manager leadership: EPI manager skills and experience; supportive decision-making systems (e.g., the Inter-agency Coordination Committee (ICC); political commitment to immunization; and effective coordination with key EPI partners (WHO, UNICEF) and other sectors (e.g., education sector during MRC, HPV demo). We found within Bangladesh effective handling of multiple Gavi grants, new vaccine introductions (PCV and IPV), immunization campaigns (MRC), and the HPV demonstration program (detailed in the HPV section). With the support of skilled and motivated workers, high coverage within the immunization program has been achieved with the minimum AEFI rate. Although we did not do any assessment of vaccine safety mechanisms and monitoring, it is important to mention that no major AEFI were reported last year after introducing PCV and IPV (Gavi FCE Annual Dissemination Report 2015: Bangladesh); nor were there any reported during the first dose HPV demonstration program (see HPV section, finding 2). Regarding the high coverage rates of the immunization program, one national-level respondent mentioned that,

> *We had 67% coverage before, now we increase our EPI coverage up to 93-94%. There were so many dropout children, we covered them. We enjoyed strong government ownership, political commitment, hierarchy of command (from the chief executive of state to the field level) made us possible to eradicate, control, and eliminate diseases. Now our coverage is higher than other neighbor (SEAR) countries, and our country considered as role model for others.* (KII)

Bangladesh has experienced much success with its EPI, which is renowned globally. Activities related to the implementation of new vaccines are well-coordinated and adjusted based on timely and accurate data to inform program management. For example, the GoB postponed the HPV demonstration program for a year to avoid management burden associated with multiple support streams in a year (2015) in which two other new vaccines (PCV and IPV) were introduced. Strong coordination and communication among donor organizations played a key role in implementing programs quickly and on time. For example, when the WHO country office prepared the programmatic readiness assessment for HPV, it shared the report with their headquarters while also requesting accelerated confirmation of the report receipt. At the same time, the GoB communicated with UNICEF, which facilitated the timely shipment of vaccines. This coordination was also seen during the programmatic readiness assessment for PCV in 2015, the switch from trivalent OPV to bivalent OPV, and the implementation of the HPV demonstration program. For the switch from tOPV to bOPV, EPI arranged ToT at the national level on 12 April 2016. Other orientation workshops for subnational-level health workers were held by 21 April 2016 and, following the OPV switch day on 23 Aril 2016, all over the country. One national-level respondent stated that,

> *We have introduced PCV last year along with IPV, we have conducted separate trainings and orientations prior to introduction. Now, IPV supply is in short globally. If IPV supply were smooth, we could implement it without any interruption. This year, we have implemented the HPV demonstration program, conducted programmatic readiness assessment for HPV and same time we have switched from trivalent OPV to bivalent OPV, conducted trainings at national and subnational level. Everything completed in time, we did not face any obstacles. It is a matter of commitment and efficiency of manager to manage all activities.* (KII)

The continuous supply of skilled managers to the EPI leadership team, many of whom have subnational-level work and management experience, is a potential root cause behind the effective leadership. In 2015, we have evidence of the proactiveness of midlevel managers to overcome challenges in IPV orientation training caused by delayed fund disbursement from the central level to the subnational level. In addition to that, the upazila-level managers and health workers have shown responsiveness in locally managing the issues related to stockouts and logistics. Upazila-level service providers created their own solutions to problems related to immunization cards, safety boxes, syringes, and more. For example, some managers photocopied vaccination cards to back up the tracking done in registration books, or convinced caregivers to make appointments for their children's next EPI date. At the national level it was also revealed that one concerned EPI manager took the urgent initiative to mitigate the stockouts of syringes and vaccination cards with the support of the Ministry of Finance (MoF) and development partners. He stated,

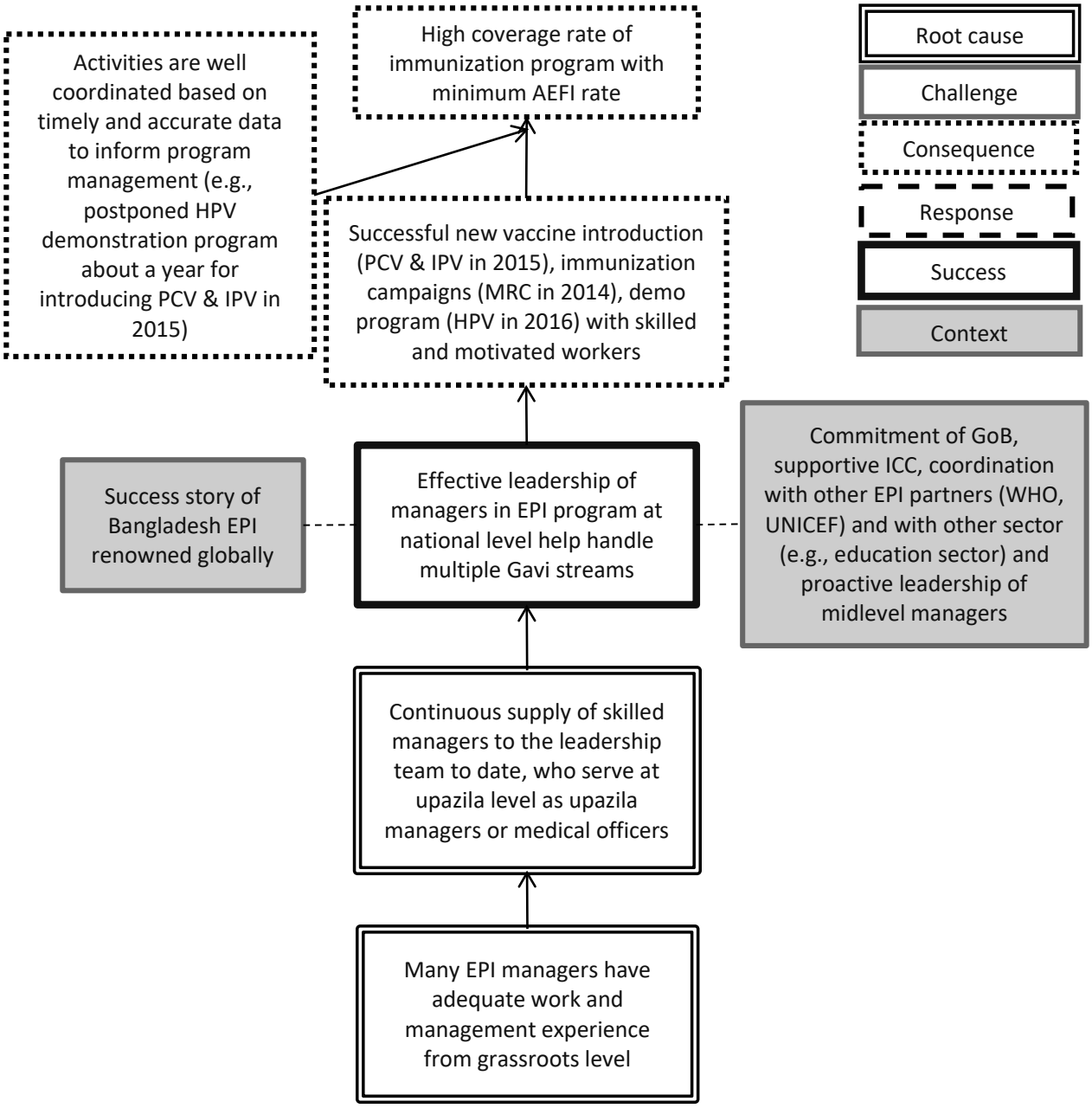
> *EPI is a well-reputed organization and we have a greater challenge in terms of maintaining this well-established reputation. We are in a saturated point of time and we cannot even excuse for a single percentage of coverage.* (KII)

Still, there is concern related to the future availability of efficient health personnel due to retirement. As one national-level respondent stated,

> *In the year 2017, 1,200 health staff will go for retirement and some new skilled person need to be filled up against these vacancies. But we do not get skilled medical graduates as they are not interested to be clinician of health department due to inadequate facilities [remote location as work station/unavailability of vehicle support to perform monitoring visits, etc.] within the government sector for them.* (KII)

Therefore, the GoB needs to focus more on the sustainability of a competent workforce, through appropriate technical assistance and capacity-building process (see TA section), and with other modalities.

Figure 7: Root cause analysis: The effective leadership of EPI managers, supportive health workers, and strong coordination among partners have helped in handling multiple Gavi funding streams to date



Recommendation

The GoB should provide adequate transport and logistic support to the dedicated and motivated health service providers at the upazila level in order to ensure retention of these leaders and program sustainability. In addition, the GoB should request that TA partners provide capacity-building activities (e.g., comprehensive training, workshops) for newly recruited officers – managers who will be potential leaders in the future.

Robustness of finding

Finding 1	Ranking	Robustness criteria
To date, effective EPI management, supportive health workers, and strong coordination among partners have helped in handling multiple Gavi funding streams. The future sustainability and retention of these leaders is becoming an area of concern.	A	This finding is supported by multiple data sources such as KIIs from the national and subnational levels and document review.

Finding 2

Multiple Gavi grants create a management burden on national- and subnational-level EPI managers, as well as on TA providers at all levels.

With the presence of effective leadership, it is necessary that we extend our understanding toward specific processes and requirements that impose the greatest burden and difficulty at the country level. We also investigated whether the EPI team is adequately staffed and structured to manage the program and whether their capacity and allocated time matches demands in the workloads associated with Gavi processes.

In the previous finding, though it is revealed that effective leadership and support from workers and partners helps in the management of multiple Gavi grants, those multiple Gavi grants also create a management burden for national- and subnational-level EPI managers and for TA providers at all levels. Though EPI stakeholders often work more hours to carry out their activities, it creates a burden that can result in inadequate staffing and hamper quality of work.

FCIs with national-level stakeholders revealed that from 1988 to 1998, there was a position of Medical Officer-EPI posted at all upazilas to perform EPI activities. Later this post was abolished and a new position was formed, namely Medical Officer Disease Control (MODC), to perform many activities (such as providing health services to indoor, outdoor, and emergency patients of the Upazila Health Complex [UHC]; skill development of upazila-level staff [HI, AHI, HA, CHCP] through trainings on any new vaccine introduction, campaign, etc.; monitoring and supervision of activities performed by MT-EPI and other below-level staff [HI, AHI, HA, CHCP]; coordinating vaccine and other logistic supply and distribution tasks with the support staff; performing advocacy activities for generating demand for vaccines; and performing necessary activities with the direction of UH&FPO other than EPI). This change had negative consequences for immunization coverage (52% from 1991 to 1999 with a fluctuating rate, highest 62% in 1994/valid coverage among the 12-23 months age group, CES 2011). However, this was covered by the support of SMO from WHO (with their close monitoring), and since 2003 by the support of District Immunization Medical Officers (DIMO) with the Gavi ISS fund. Therefore, EPI was able to sustain an increasing rate of immunization coverage after 2003 (63% in 2003 to 80.2% in 2011). This story exemplifies the relationship between management burden and quality of work.

Our findings revealed that EPI headquarters had allocated inadequate staff. One national-level respondent mentioned,

> *We have less human resources. Previously there were four posts of Assistant Directors, now we have one person; there were four posts of Deputy Program Managers but now we have only two people. We have to work with load but we managed to complete all activities timely… we have told concerned authority for assign more staff here and also discussed with donors for support us.* (KII)

On a related note, a respondent from a development partner mentioned providing more technical assistance due to the inadequate staff at EPI HQ:

> *We provided technical assistance to the EPI over the time but at present we have to work more in providing technical assistance to complete the task in time, as there is inadequate number of staff at EPI HQ, which also creates management burden for us sometimes.* (KII)

Another national-level respondent noted that it is difficult to compare workload and management burden, as working on any new program or funding stream is considered an assigned task and is not likely to accurately quantify the time and effort need for that purpose, since such work is usually done according to priority. Existing staff often work under pressure but consider that burden a part of their service. They manage their own critical activities and responsibilities associated with Gavi funding streams while considering their commitments toward the GoB**.** One of the respondents stated that,

> *Sometimes it feels as it is an extra burden, however as a government employee, we have to manage it with our assigned duties and as it is (activities around HPV demonstration) for welfare of mass people, we consider this burden of work cordially.* (KII)

Another key informant mentioned that working on multiple streams or projects is considered an opportunity for improvement or as assisting in development rather than a management burden. Regarding the adequacy of the number of staff to manage the tasks associated with multiple Gavi grants, he stated,

> *I have to work with what resources I have rather than complaining, but yes, it could be better to have more staff*. (KII)

Inadequate workforce at the subnational level was addressed through a Gavi grant. Volunteer health workers (Community Maternal Child Health & Immunization Worker [CMCH&IW]) supported through the HSS grant offered to temporarily fill vacant Health Assistant posts at the HSS areas. In addition to that, adequate technical assistance is funded by WHO (SMO) and the HSS grant (DMCH&IO), along with the regular monitoring and supervision support of first-line and second-line supervisors. With these initiatives, Gavi funding streams are routinized quickly and coverage is sustained

Figure 8). EPI HMIS data of January-October 2016 showed that PCV third-dose coverage is 93%, compared to 97% penta third dose.

It was revealed in the previous FCE report that community-level health workers are very enthusiastic to implement any program approved by the GoB. Their confidence, built by achieving success in the measles-rubella campaign, helped to manage challenges effectively during the HPV demonstration program and the joint launches of PCV and IPV last year. Regarding working extra hours during the HPV demonstration program, one subnational-level service provider stated,

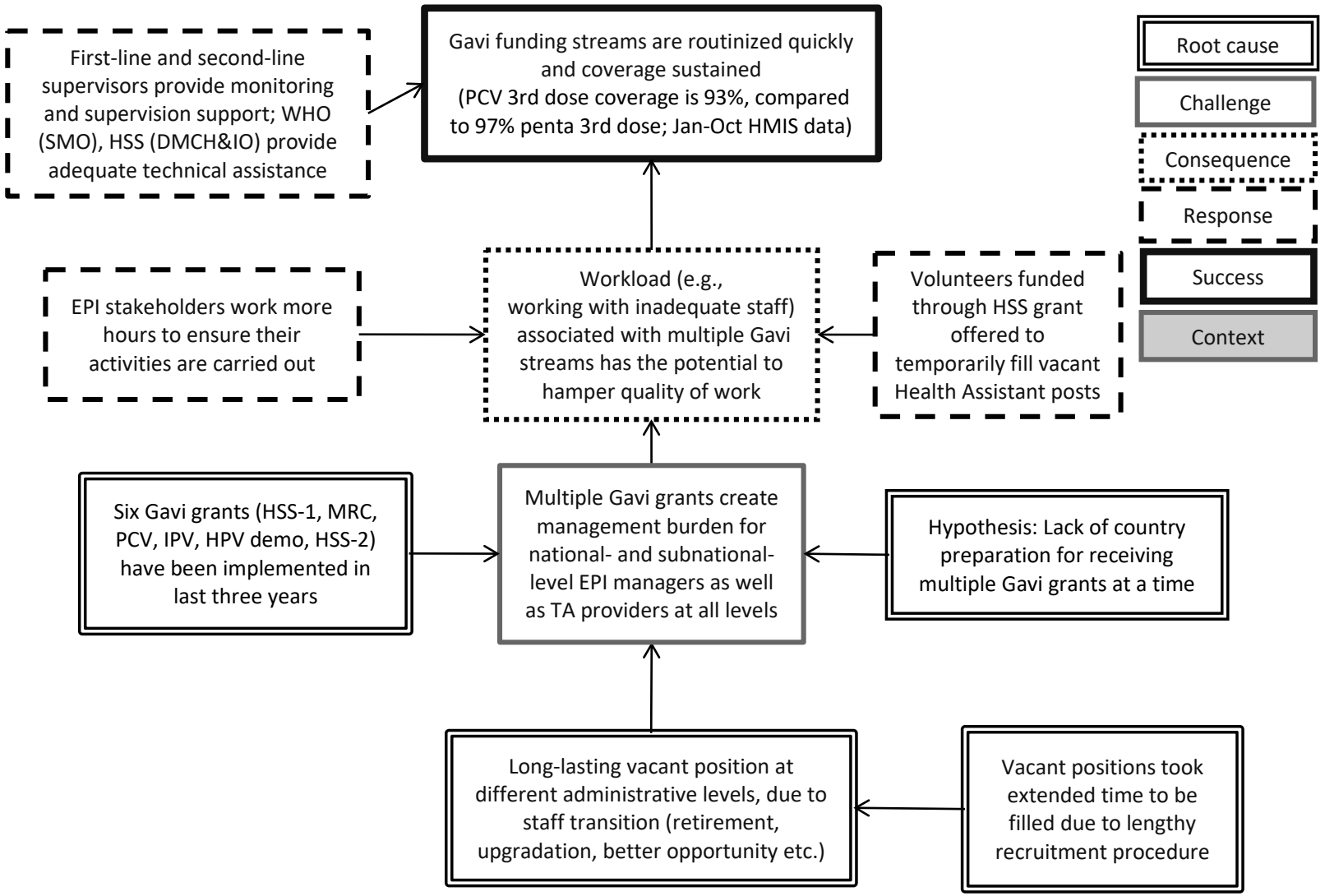
> *We considered this load as our responsibilities and as it is just about a month, we performed our activities for few more hours (2/3) than usual.* (KII)

Another subnational-level service provider discussed the workload associated with the HPV demonstration program due to inadequate staff in a particular area:

> *As I am doing this school session today for HPV demonstration program, the IPC activities for routine session are not possible to perform and tomorrow I have to manage that task by going early to that area. Certainly, I will manage it by mosque miking and mobile phone communication along with domiciliary visit, but I have to work all these things by myself as I am the only staff assigned for this area, and I feel the necessity of another staff here.* (KII)

While investigating the root cause of this reported finding, we found long-lasting position vacancies at different administrative levels due to staff transition (i.e., retirement, promotion, better opportunity, etc.). Behind this we found extensive time needed for hiring due to lengthy recruitment procedures. We also noted another root cause – that the number of Gavi grants has increased over time: in the last three years a total of six grants have been implemented by country stakeholders. Analysis revealed another hypothetical but important root cause: the lack of country preparation for receiving multiple Gavi grants at once. We suggested a recommendation to Gavi in this regard.

Figure 8: Root cause analysis: EPI stakeholders manage their own critical activities with responsibilities associated with Gavi funding streams while considering their commitments toward the GoB



Recommendation

Before providing new grants, Gavi should assess the country's workforce readiness (in terms of number of workers available in the country), capacity to work on a new grant in addition to existing activities, and capability of sustaining the grant activities in the long term. It should also provide additional support and incentives regarding these areas through the country engagement framework.

Robustness of finding

Finding 2	Ranking	Robustness criteria
Multiple Gavi grants create a management burden on national- and subnational-level EPI managers, as well as on TA providers at all levels.	A	This finding is supported by multiple data sources such as KIIs from the national and subnational levels and document review.

Technical assistance and capacity building

WHO and UNICEF are the EPI partners that provided technical assistance (TA) in development of applications and training manuals, and in conducting trainings, workshops, and other events. For better alignment of Gavi support with country priorities, and in the interest of creating sustainable improvements to coverage and equity of immunization, Gavi is making process improvements designed to improve planning and coordination of alliance partner support. Ultimately, these improvements are intended to result in greater country engagement and streamlined access to vaccines. With this in mind, the Gavi board approved new principles and structures of funding TA through the Partnership Engagement Framework (PEF), which is expected to improve transparency, coordination, and country alignment of TA funded by Gavi. The PEF replaced the Gavi Business Plan model in July 2015. It aims to enhance accountability for outcomes at the country level through enhanced coordination, a country-centric process, and TA that is relevant, effective, efficient, responsive to country needs, and derived from bottlenecks to improved immunization coverage and equity.

Research questions

1. To what extent are existing models of providing Technical Assistance (through PEF or other sources) contributing to building capacity in the health system, including the EPI program?
2. To what extent does the current TA process (PEF, JA) help to ensure long-term sustainability in terms of capacity building? How?

Finding 1

The existing TA process, which utilizes the SMO network of WHO, helps to build the capacity of the immunization system and staff at the subnational level.

From the Joint Appraisal of 2016 report, it has been determined that WHO (US$ 135,000) has been supporting Bangladesh with technical assistance in the areas of vaccine subgroups (support in HPV demo, rotavirus application and follow-up on PCV/IPV PIE), HSS (for preparing the HSS-2 application), and data in 2016. At the same time, UNICEF (US$ 165,000) has been supporting Bangladesh with technical assistance in the areas of supply chain (to implement key EVM IP priorities; cold-chain expansion; development of a management information system [MIS]; development of integrated

immunization and supply chain and logistics system), coverage and equity (supporting the implementation and final assessment of HPV vaccine demonstration project; TA for districts on the development of microplanning; monitoring the implementation of corrective actions; supportive supervision; on-the-job orientation; conducting quarterly performance review meetings; and providing TA to the EPI team on the development of evidence-based communication strategies to increase demand for immunization services, particularly for the poor and excluded children). However, as mentioned in the HSS section above, WHO and UNICEF have received US$ 9 million to implement HSS-2 activities (for a one-year period) for surveillance and EVM, two core EPI components for which they are providing technical assistance to Bangladesh's EPI system. The procurement division of UNICEF in Copenhagen manages the supply chain of cold-chain equipment and related supplies. These will be procured by requisition from MoHFW and by maintaining WHO certification standards. UNICEF will continue to provide technical support as requested by MoHFW.

WHO has been providing technical assistance to the country with a network of Surveillance Medical Officers (SMO) working at the subnational level. WHO has been providing technical assistance to the GoB for strengthening the public health system since the beginning of its collaboration in 1972. Current TA needs are identified through the Joint Appraisal process and HSS applications. Currently, WHO TA is primarily provided through SMO, who are salaried WHO staff assigned to work alongside DMCHIO workers, who are salaried through the Gavi HSS-1 grant at the district level to perform immunization and surveillance activities.

The SMOs identify gaps in program implementation and share them with the upazila- and district-level managers. Subsequently, subnational-level managers who are adequately oriented within the EPI program take initiative to resolve those gaps and increase immunization coverage. In addition, WHO offers technical support for the development of district health information systems, health financing strategies, and other operational research activities at the Upazila Health Complex.

SMOs are enabled to successfully implement subnational-level immunization activities through their adequate and timely support, which is a positive story for the Bangladesh EPI program. The root cause identified for this story is the strong SMO network of WHO, which is the basis of subnational-level technical assistance for surveillance and immunization activities. Another root cause behind the success of the SMO network is the adequate salary, vehicle, and logistic support provided to the SMOs – things that make them interested and happy to live in the rural remote areas of Bangladesh.

Despite the observed benefits of the SMOs, there are a number of concerns related to programmatic and financial sustainability. The GoB has yet to take any initiative to increase GoB contributions in cofinancing. In terms of programmatic sustainability, there is dependency on WHO and UNICEF to successfully implement EPI activities. This increased with the bifurcated funding proposal for HSS-2. Moreover, there are always concerns around the availability of skilled human resources, as that is not addressed in the current HSS grant.

Figure 9: Root cause analysis: SMOs enable successful implementation of subnational-level immunization activities through their adequate and timely support

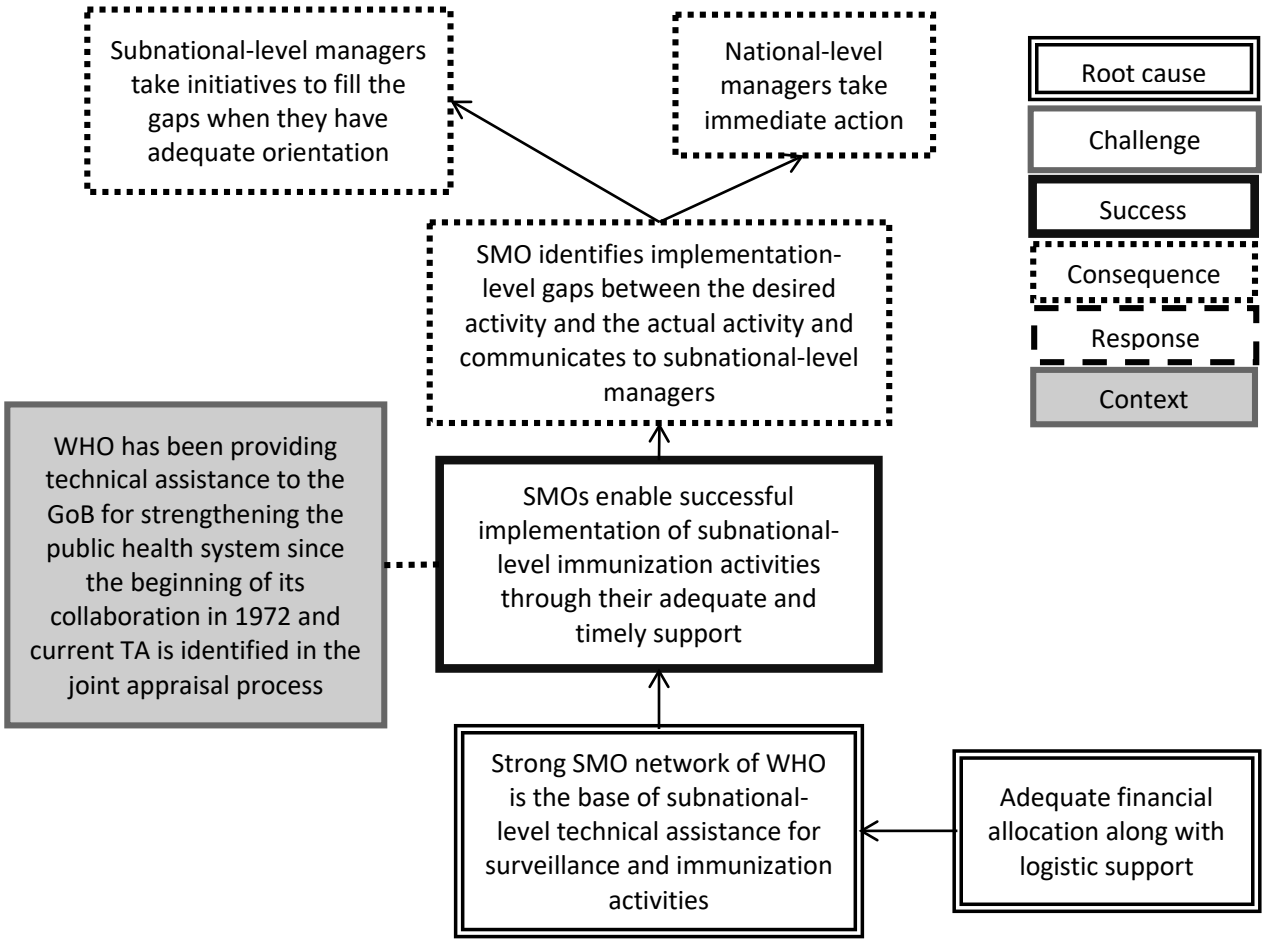


Table 13 compares the SMO and DMCH&IO systems and suggests potential issues to track when these two roles are integrated under HSS-2:

Table 13: Comparison between the role of SMO and DMCHIO and the integrated role as SIMO

Potential issues and consequences	SMO	DMCH&IO	SIMO (integrated role)
Funding source	WHO, then HSS-2	HSS-1, then HSS-2	HSS-2
Roles and responsibilities	-Conduct surveillance activities for vaccine-preventable diseases -Identify implementation gaps and raise them to upazila-level manager and district-level manager; provide advice at monthly and weekly meeting -Involved in PIE, readiness assessment (any WHO assessments) -Only perform visits when alerted to a problem	-Routine EPI, MNCH activities, service activities, SIAs, CC, capacity building, monitoring, coordination -Identify implementation gaps and raise them to upazila-level manager and district-level manager; provide advice at monthly and weekly meeting -Regularly perform visits to facilities at lower levels	-Based on performance evaluation, DMCH&IO can apply for SIMO role. Otherwise, funding for their position ends in 2016. -Will not have much focus on MCH (1 role of 13 in ToR)
Scope	EPI only	All MCH and EPI	Mostly EPI, with 1/11 roles related to MCH
Coverage	32 SMOs that cover up to 3 districts based on area	32 DMCH&IO, cover 1 district each	1 SIMO per district
Logistic support	Have vehicles and logistic support	Must share vehicles, difficult to complete work without vehicle	Will have vehicle (HSS-2)
Salaries	Higher than government, WHO-level	Similar to SMO	Higher than government, WHO-level
Report to	Divisional coordinator (WHO staff); no GoB reporting	National coordinator Gavi HSS; Line Director MNCH	WHO
TA approach (How do they provide TA to EPI program?)	-Work side-by-side, observe work in field (on-the-job training and supervision), provide real-time feedback to supervisors -Facilitates sessions within planned training during NVI (as facilitator), e.g., on monitoring, safety	-Work side-by-side, observe work in field (on-the-job training and supervision), provide real-time feedback to supervisors. More direct interaction with health workers at lower levels. -Facilitates sessions within planned training during NVI (as facilitator), e.g., on monitoring, safety	

Potential issues and consequences	SMO	DMCH&IO	SIMO (integrated role)
Perceptions of TA quality	Subnational respondents satisfied with TA provided by SMOs	Subnational respondents satisfied with TA provided by DMCHI&Os	
Will they be moved over to SIMO role?	Yes, automatically	-Depends on performance assessment -DMCH&IO position will no longer be funded beginning in 2017. GoB is thinking about consequences of losing DMCH&IO.	
Country ownership and sustainability	-Possibly a concern after HSS-2, but everyone is optimistic -Role could be transferred to government staff, but constraint is level of salaries	-GoB not able to sustain DMCH&IO role after HSS-1 ends -What will happen to MCH activities covered? New role is more EPI-specific than original broader role	Possibly a concern after HSS-2, but everyone is optimistic
Transfer of skills and capacity building	SMOs are all national staff, so they could be integrated into the government payroll if GoB could pay their salaries	DMCH&IO are all national staff, so they could be integrated into the government payroll if GoB could pay their salaries after Gavi HSS-1 funding ends	

Recommendation

As the GoB has started discussion on sustaining the SMO network within GoB funding mechanisms, the GoB should take the proper initiative to arrange the required support (comprehensive training, vehicle support, and laboratory facilities) for the SMOs.

Robustness of finding

Finding 1	Ranking	Robustness criteria
The existing TA process helps to build the capacity of the immunization system and staff at subnational level through the SMO network of WHO.	B	This finding is supported by multiple data sources such as KIIs from the national and subnational levels and document review.

Finding 2

TA was inadequate for building capacity of EPI managers at national and subnational levels in a sustained manner.

WHO has been providing technical assistance to the GoB for strengthening the public health system since the beginning of its collaboration in 1972. They are providing support for the development and strengthening of the country's public health systems, with the overall priority being moving toward

universal health coverage. Following the Country Cooperation Strategy (CCS) 2014–2017, WHO got country-specific guidance for planning, budgeting, and resource allocation in five areas of work.

From that context and after reviewing documents and KIIs, it is revealed that the national-level core staff received training from WHO on EVSM/Vaccine Management Assessment (VMA) in 2008. Mid-level managers received WHO-funded training in 2013, but since then no comprehensive training was arranged for the national-level EPI staff using WHO funds. Rather, GoB staff got piecemeal training from WHO when they arranged training on a specific issue with the donor support, such as training on introduction of PCV and IPV or training on the measles-rubella campaign. However, the EPI staff who received the comprehensive training are quickly approaching retirement age.

One national-level key respondent said that,

> *We are concerned about the coming years to get skilled managers for the EPI program as a huge number of skilled workforce will go for retirement so a vacuum will be created.* (KII)

The capacity building of EPI managers at the national and subnational levels was not conducted in a sustained manner. In addition, newly posted EPI managers require a period of orientation to the EPI activities just after their hire. These two challenges create a vacuum of skilled health professionals due to the general retirement process of skilled workers along with the presence of newly recruited staff at the national and subnational levels performing activities without proper orientation. The result is that the quality of work is hampered.

Another respondent said that,

> *Capacity building of EPI staff is the mandate of WHO but it arranged mid-level managers training for their SMOs where all DMCHIOs are yet to get this training.* (KII)

From this analysis process, it is clear that the root cause of these two challenges is the absence in the strategic agenda of a country/WHO cooperation strategy focused on adequate new staff orientation and refresher training for the existing staff. Further, opportunities to receive TA funds for mid-level manager training have not come to fruition. While training for mid-level managers and human resource strengthening was requested in the original HSS-2 proposal, it was not included in the bifurcated proposal. Nor was it requested in the 2015 or 2016 JA reports. The HR issue was discussed, and it was decided that current DMCHIO and SMO posts will be integrated as SIMO positions during the 2016 Joint Appraisal process. We expect it will be included in the GoB's HSS-2 submission planned for 2017, but earlier initiation of training and capacity building could help prevent skill erosion within Bangladesh's historically strong EPI managers. In this instance, the EPI and WHO recently have made a decision to organize, by the end of 2016, mid-level manager training in low-performing areas using the HSS-2 grant. A GoB official confirmed that the required budget for this training has been sent to EPI from WHO. However, the national-level respondent also opined that WHO is very eager to provide technical assistance to the GoB, but it is the role of the GoB to ask WHO or other partners for training. Until or unless the GoB invokes the training requirement, partners cannot arrange any programs. Therefore, the GoB must be proactive in order to utilize the expertise of TA providers to increase the capacity of GoB staff.

Figure 10: Root cause analysis: TA was inadequate for building capacity of EPI managers at national and subnational levels in a sustained manner

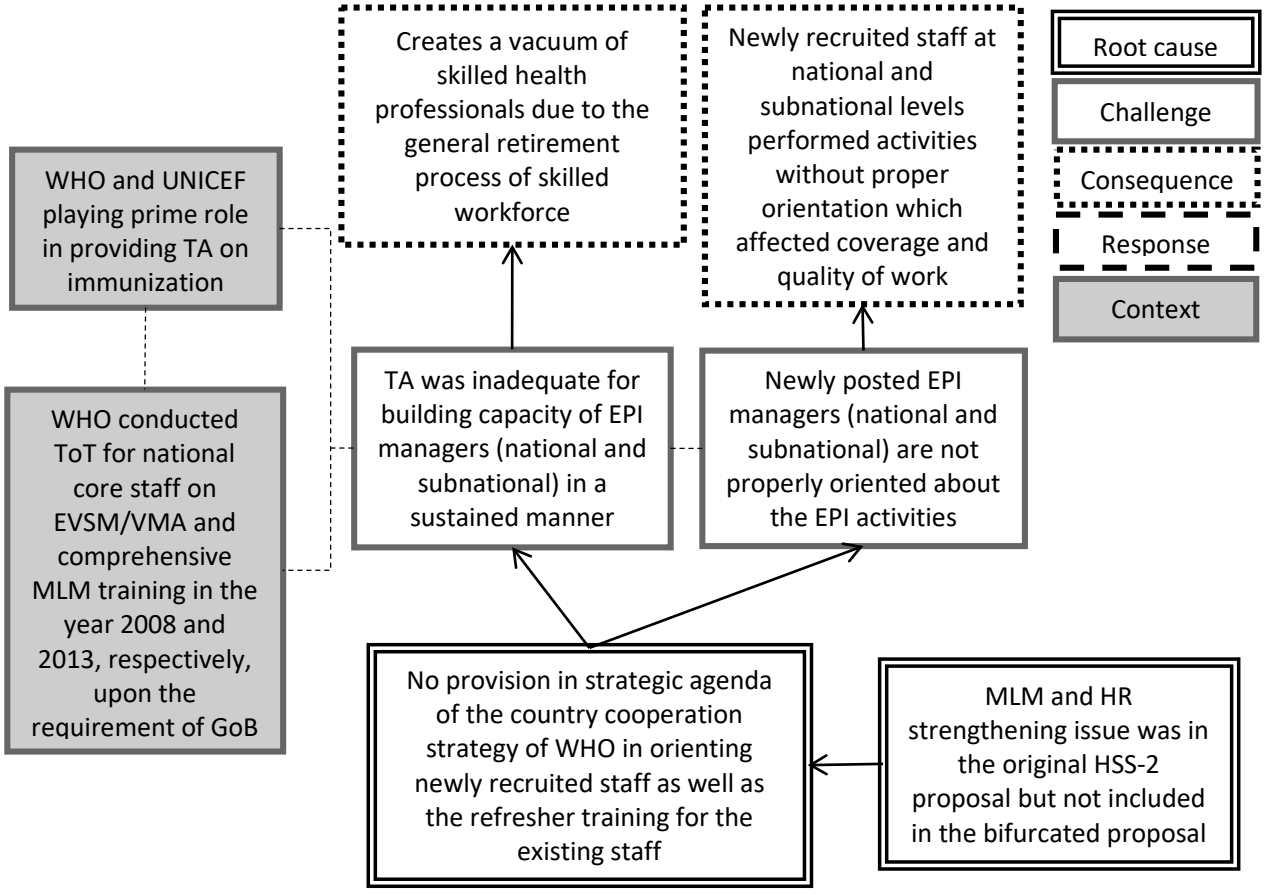


Table 14 delineates the possible mechanisms of funding TA to strengthen mid-level managers in the Bangladesh EPI.

Table 14: Possible mechanisms of funding TA to strengthen mid-level managers

Options to fund MLM	Outcome	Reason
HSS-2 grant	Was included in original proposal (Objective 3), but not in the bifurcated proposal that was approved.	The bifurcated grant was explored in the 2015 report (the bifurcation decision happened in July 2015).
PEF-TCA 2016	Bangladesh is eligible for a small amount of TCA. It is funded by UNICEF (supply chain, process documentation for the HPV demonstration project, coverage and equity) and WHO (Japanese encephalitis vaccine application, HSS proposal, data TA).	MLM or other management-related challenges were not mentioned in the 2015 JA report as a "challenge" or as "TA need" (September 2015). WHO and UNICEF shared their existing TA activities for 2015 and proposed their future needs for recruiting some personnel under this PEF, with the intended outcome of improving immunization coverage through their technical support of the health system.
PEF-TCA 2017	Report pending.	
Non-Gavi sources	There are a number of other partners contributing to EPI who do not receive financial support from Gavi. In urban areas, the Ministry of Local Government, Rural Development & Co-operatives is providing health care services to its inhabitants within specific zones of city corporations with the support of NGOs. The private sector is a significant provider of health care services in Bangladesh, though it has limited involvement in immunization services delivery.	

Recommendation

The GoB should identify human resources and management training from Gavi and other partners as a TA priority for 2017. While it is likely to be included in the second HSS-2 application, earlier investment will ensure the continuation of a strong network of skilled EPI managers.

Robustness of finding

Finding 2	Ranking	Robustness criteria
TA was inadequate for building capacity of EPI managers at national and subnational levels in a sustained manner.	B	This finding is supported by multiple data sources such as KIIs from the national and subnational levels and document review.

IPV

After successfully introducing IPV on 21 March 2015 along with PCV, the GoB faced several challenges, such as the high wastage rate that was reported last year. However, this challenge was mitigated by adapting MDVP for a five-dose IPV vial, allowing the country to minimize the wastage rate. IPV vaccination was interrupted in Bangladesh due to the supply shortage in the global market.

Research questions

1. How is the EPI program responding to IPV stockouts following the global supply shortage?
2. Have stockouts had an effect on other program areas (for example, PCV schedule)?

Finding 1

The EPI managed the IPV stock interruption smoothly by maintaining regular communication with Gavi and following the GPEI guidelines.

Table 15: IPV timeline in Bangladesh

Date	Event
24 December 2015	Bangladesh receives final shipment of IPV from UNICEF SD
10 February 2016	Last supply of IPV at districts/subnational level from EPI HQ
9 March 2016	ICC meeting where shortages were discussed (6-month delay in receiving stock); expecting next supplies on August 2016; decided that at-risk districts with low OPV coverage would be prioritized.
10 March 2016	Strategic Advisory Group of Experts (SAGE) notification of severe global shortages, but proceeded with switch.
1 April 2016	SEARO teleconference notifies stakeholders of global supply shortages.

Bangladesh has faced a major shortage of IPV since April 2016. EPI stakeholders were informed, through an ICC meeting, that the supplier would be able fulfill the global demand of only 4.6 million of 10.6 million doses during this period. The global impact of this shortage has been reviewed by the IMG (Immunization System Management Group) and the supply subgroup (UNICEF, WHO, Gavi, and Bill & Melinda Gates Foundation) using criteria established by the SAGE to prioritize supply. As per the recommendation of the Polio Strategy Committee, the limited vaccine supply would be allocated to Supplementary Immunization Activity (SIA) for polio-endemic countries to stop wild polio virus; a stockpile for type 2 outbreaks following the switch to bOPV; and to the tier 1, high-risk countries. Since Bangladesh is categorized as tier 3, the country will not get any supply of IPV in the first and second quarters of 2017.

The FCE team reviewed the events that led up to the IPV stockout. It identified (from FCI, EPI HQ) that on 24 December 2015, Bangladesh received its final IPV shipment through the UNICEF supply division. The EPI distributed the last vaccine on 10 February 2016 at the subnational level in a regular process (meaning that all districts received IPV). ICC meeting minutes reflected that country stakeholders were not aware of the upcoming major stockout until 9 March 2016. In that meeting they expected another supply in August, although the country actually did not receive any stock after December 2015. Initially, at the ICC (the highest body of decision-making for NVS) meeting, stakeholders decided to take steps in order to reduce IPV wastage to the lowest possible amount and to direct the remaining stock of IPV to districts with low OPV3 coverage, especially the border districts. The FCE later found that country stakeholders were informed about not receiving IPV vaccine prior to the third quarter of 2017 (Observation ToT program on switch to bOPV from tOPV-12 April 2016). Although global KIIs reported that WHO conducted risk assessments on endemic polio in Bangladesh in 2015, no IPV was supplied to risk-prone border areas after the regular delivery in February 2016. HMIS data showed that only 3% (n=260) of eligible recipients in Sylhet division were administered IPV vaccine in July 2016 and the country had no more stocks anywhere from August onward.

It was revealed by national-level KIIs that the EPI headquarters took the necessary actions toward this global problem and disseminated information about IPV stockouts at the field level through the monthly meetings. EPI is tracking all the children who missed out on receiving the IPV vaccine by following its default tracking system (through the immunization card and registration record); those children will get the vaccine, depending on their eligibility, after IPV becomes available to the country. Acute flaccid paralysis (AFP) surveillance and environmental surveillance continued over this period. One national-level respondent said,

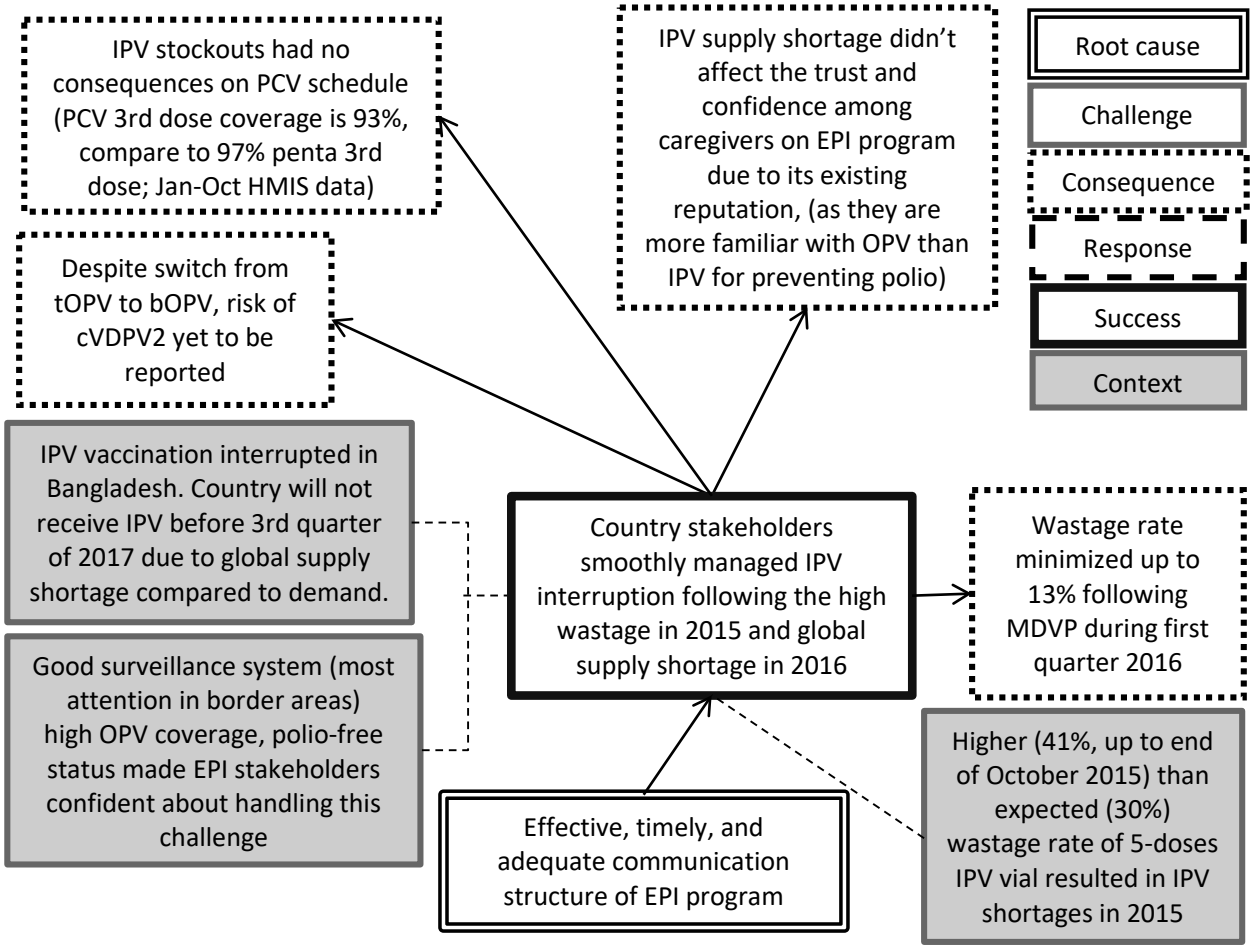
> *If any outbreak occurs for polio type-2 virus or wild polio virus, reserved vaccine can be requested to Gavi as a programmatic emergency for mitigating the risks within 14 days of outbreaks.* (KII)

This might be a potential risk, as the country switched to bivalent OPV (bOPV) from trivalent OPV (tOPV) on 23 April 2016 following the Polio Eradication and Endemic Strategic Plan 2013–2018. The plan suggested that all countries eventually stop using OPV, beginning with the removal of the type 2 component of trivalent OPV (tOPV), through a globally synchronized switch to bivalent OPV (bOPV) by April 2016. However, one national-level stakeholder mentioned that they did not find any risk of outbreaks within six months of the supply interruption following the surveillance report, which is considered the most crucial period (Figure 11). He mentioned,

There is no risk… both from AFP surveillance and environmental surveillance indicators, there is no indication of any risk of cVDPV-2 (circulating vaccine-derived polio virus) circulation or any isolation of polioviruses from the environmental samples. So in many ways that is not a major concern of OPV switch and IPV interruption, but ideally it is better to have the IPV. (KII)

The polio endgame strategy of the Polio Eradication and Endemic Strategic Plan 2013–2018 has resulted in high demand for IPV compared to its supply. Bangladesh EPI is also aware of the global guidance from WHO headquarters, UNICEF supply division, and Global Polio Eradication Initiative program regarding using the IPV vaccine by intradermal injection method. Intradermal doses of 20% of a standard 0.5 ml dose can be administered and might not require reformulation; 0.1 ml of the existing formulation could easily be administered. A national-level respondent mentioned that two fractional doses following the intradermal method can be more effective than one full dose (0.5 ml) of the vaccine following intramuscular route, and that by using the former method the current five-dose vaccine vial could be used for at least 12 children by administering at the age of 6 and 14 weeks. However, EPI has yet to decide about using this method as it requires more efficiency in the administration process than the intramuscular method.

Figure 11: Root cause analysis: The EPI managed the IPV stock interruption smoothly by maintaining regular communication with Gavi and following the GPEI guidelines



Recommendation

Following the GPEI guidelines, IPV introduction was supposed to help in reducing risks associated with the withdrawal of tOPV and the switch to bOPV. The suppliers should be more aware of ensuring supplies for the smooth implementation of IPV.

Robustness of finding

Finding 1	Ranking	Robustness criteria
The EPI managed the IPV stock interruption smoothly by maintaining regular communication with Gavi and following the GPEI guidelines.	A	This finding is supported by multiple data sources such as KIIs from the national and subnational levels and document review.

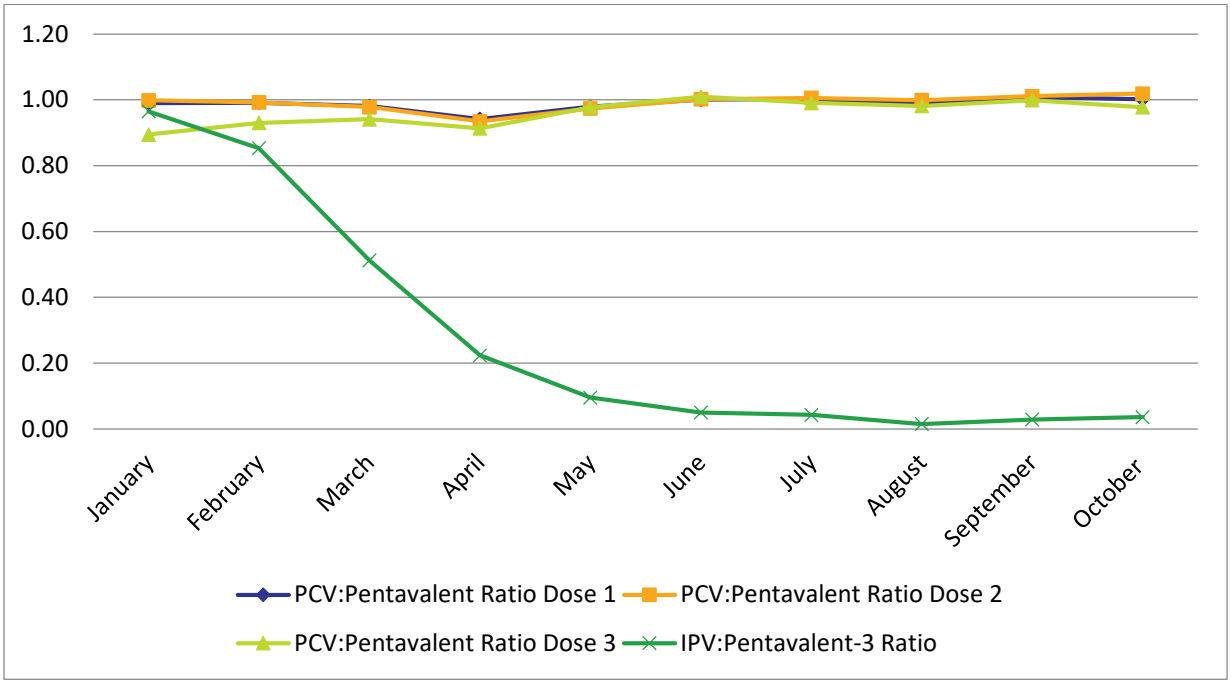
Finding 2

The IPV stockout had no effect on PCV third-dose coverage or on caregiver confidence in the EPI program.

Following the supply interruption of IPV one year after the introduction of the vaccine into routine EPI, the FCE team tracked the perception of mothers on this issue. The FCE also considered the impact of the addition of IPV to the routine EPI on the coverage of PCV third-dose vaccine. We have conducted interviews, by directly visiting the community level, with mothers whose children were eligible but not vaccinated for IPV. Our findings revealed that only a few mothers were aware that their child missed a vaccine due to the shortage of supply, and that none of them could recall the name of the vaccine their children missed or the disease it prevents. In most cases the service providers did not relate anything about the issues of IPV supply shortage to the mothers. Only one mother was found to be worried about her child's health as the child missed the vaccine; none of the mothers seemed to be concerned about losing their trust toward the EPI program, since they were more familiar with OPV than IPV for preventing polio (Figure 11).

HMIS data from the first quarter of 2016 (January to April) showed that IPV coverage was 26%, compared to 40% for the pentavalent third dose given on the same schedule (at 14 weeks), and that, despite a new visit added to the routine schedule of EPI, PCV third-dose coverage was reported to be 37% during this period. Children who missed out on IPV still received their PCV third-dose vaccination; problems with IPV did not seem to have any effect on PCV third-dose coverage (Figure 11). HMIS data indicated that PCV third-dose (given at 18 weeks) coverage is 93%, compared to 97% penta third dose (given at 14 weeks), during the period of January to October 2016. Figure 12 shows that IPV vaccine's integration into routine EPI suffered due to the global stockout, whereas PCV is well routinized in Bangladesh.

Figure 12: PCV/IPV-to-pentavalent ratio from HMIS data, January 2016–October 2016



The FCE team investigated the knowledge and experience of mothers about other vaccines – not only IPV and PCV – as well. Almost all the mothers reported they had no understanding of any particular vaccine, nor could they respond appropriately about which vaccines prevent which diseases. Only one mother was able to properly connect the names of vaccines to the diseases they prevent. It was revealed from the KII conducted with the service providers that usually mothers were in a rush to vaccinate their children and return to their residences. One subnational-level respondent who served in the role of second-line supervisor mentioned that,

> *Most of the mothers did not ask anything to the service providers. Once I have asked a mother about the number of visits for vaccinating the children, she could not tell me. But another mother beside her told that, now they are carrying the child six times at the vaccination center, previously they carried five times.* (KII)

The service providers write down the next vaccination date and ask mothers to follow it; this is the common practice among the mothers as well as the service providers. The mothers reported that there were always crowds in the vaccination center, that they left their household chores, that vaccinators had been busy, and that their child cried after vaccination. Therefore, they did not have much time to stay or concentrate on provider messages other than the next vaccination date. However, the mothers reported that they vaccinate their children because they see others doing it or assuming that it will keep their children free from diseases. One mother stated,

> *How do I know about diseases? We just take our children, the service providers vaccinate them and after that we come back. My child starts crying, they (service providers) are also busy, and other people also standing there for vaccinating their children; so how will I ask them. They just*

tell us to read the card where all vaccination names are written...but later we forget about it. (KII)

Robustness of finding

Finding 2	Ranking	Robustness criteria
The IPV stockout had no effect on PCV third-dose coverage or on the caregiver confidence in the EPI program.	A	This finding is supported by multiple data sources such as FCI, semi-structured interview with mothers, and in-depth investigations (KII).

Sustainability (programmatic and financial)

Bangladesh is a high performer in EPI, and the GoB is committed to carry on this success. As Bangladesh's current GNI per capita is US$ 1,190, it is considered a phase-1 Gavi country, i.e., the GoB has paid 20 cents per dose of vaccine and the cofinancing for the GoB is increasing gradually based on the price of vaccine. Going forward, the 20 cents will be converted into a share of the price of the vaccine and these fractions will increase by 15% every year, on the way to being phased out from Gavi support. By the time of that phase-out, Bangladesh is projected to become a middle-income country so that it can procure vaccines by itself. In addition, recently received HSS-2 funds will be used for vaccine-preventable disease surveillance and EVM as a part of strengthening the EPI. Therefore, planning for graduation and proper allocation of the HSS-2 grant is necessary for the programmatic and financial sustainability of the EPI. To achieve that, the FCE team analyzed the opportunities and challenges to sustainability.

Research questions

1. How is the country planning to sustain activities through the transition from Gavi support?
2. How is the country planning to increase the investment in immunization per child?

Finding 1

Despite the optimistic nature of EPI stakeholders, there are still some concerns around the financial sustainability of the EPI program after graduation from Gavi support.

Gavi support for a country depends on the country's GNI per capita. Bangladesh has entered into the preparatory transition phase in 2016, due to its GNI being US$ 1,190. When the GNI reaches US$ 1,580 on average for three years, the country will be treated as an accelerated transition country (it is important to note, though, that the threshold may change – thereby pushing off Bangladesh's transition – due to being updated to reflect inflation). Gavi will inform the country that it has entered the accelerated transition process, effective January 1 of the following calendar year.

Therefore, sustainability will be a concern for Bangladesh in the coming years. We identified that stakeholders are being optimistic about the sustainability of the EPI in the future beyond transition from Gavi support. One national-level respondent stated,

> *Gavi support will not withdraw suddenly. It depends on country's GNI. Since Bangladesh crosses GNI US$ 1,580 and remains in average for three years; country will be treated as a graduated*

country that is phasing out from Gavi support. But, whenever we have signed any agreement all the development partners (e.g., World Bank, WHO, UNICEF, JICA, Canadian government, etc.) have some commitment for supporting after fund withdrawal. (KII)

Prospects and constraints of sustainability of HSS-2 activities

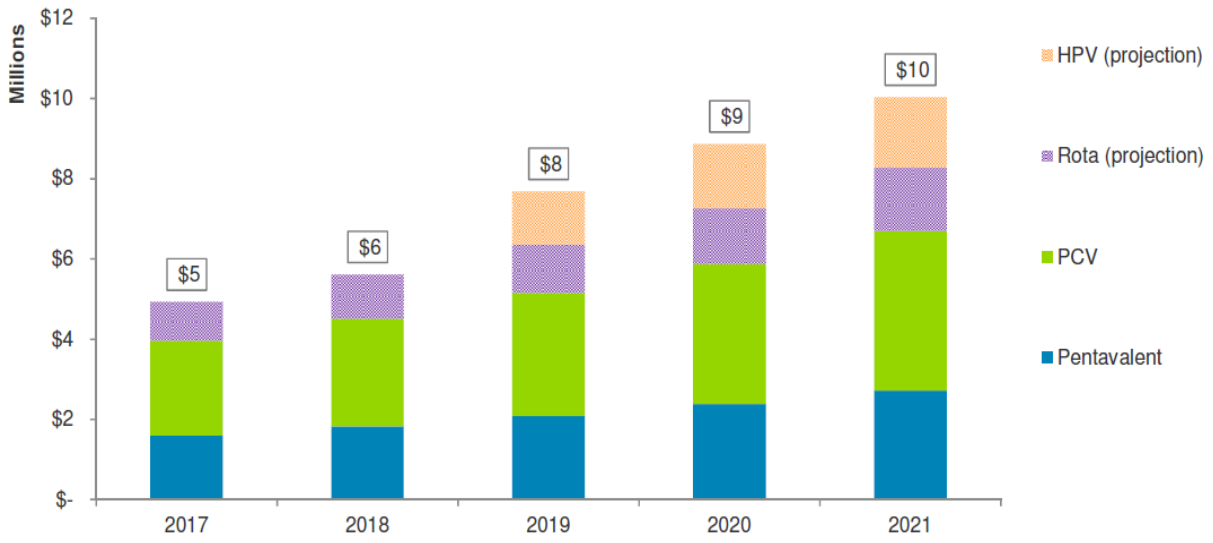
Early planning for transition could help to sustain the program in the future (see Figure 14), but we have not observed early planning activities to date. As a key implementing partner of Gavi, WHO provides support to countries transitioning out of Gavi support. The aim of this support is to ensure that countries have built the appropriate technical, financial, and institutional capacities to sustain their immunization programs once they stop receiving support from Gavi (Sustainability of immunization programmes; WHO website). The HSS-2 grant proposal is an example of early planning for programmatic sustainability, though there is remaining concern around long-term sustainability of this grant beyond 2018. The HSS-2 grant addressed the immediate need for EVM and vaccine-preventable disease surveillance for the successful introduction of any new vaccines in the future (e.g., rotavirus vaccine in 2018), as well as the need to strengthen the EPI through the maintenance of infrastructure, transport, and human resources. Within the current funding structure of HSS-2, Bangladesh may have to eliminate some EPI-related personnel, such as CMCH&IW, porters, and packers, as those positions will no longer be funded beginning in 2017. One consequence of losing DMCH&IO funding will be that the activities of SMOs and DMCH&IOs will be integrated as SIMOs (Surveillance and Immunization Officer), who will work per district, under the WHO portion of HSS-2 grant.

In accordance to the guidelines of the HSS-2 proposal, the GoB committed to take financial responsibility after 2018 as part of the SWAp. According to speculation within the MoHFW, the GoB will be able to maintain financial sustainability of some project activities in the fourth and fifth years beyond the HSS-2 grant period. It needs to be further investigated, however, whether or not the SMOs or DMCH&IOs (or the SIMOs) will be working as GoB staff in that post-HSS-2 grant period, as their responsibilities are essential for sustaining the EPI.

Limited contribution of state budget to immunization

Bangladesh contributed to financial sustainability with its cofinancing ability. The GoB is paying 20 cents per dose of vaccine and its cofinancing is increasing by 15% every year, on the way to being phased out from Gavi support. Figure 13 shows the cofinancing projections of Bangladesh for the period of 2017–2021. The country has been cofinancing pentavalent and PCV vaccines since 2009 and 2014, respectively. However, the budget for the Ministry of Health and Family Welfare (MoHFW), as a percentage of the national budget, has been in continuous decline. The Joint Appraisal report of 2016 illustrated that the MoHFW's share of the national budget declined from over 6% in FY2010-11 to 4.31% in FY2015-16. It thus remains below the sector program (HNPSDP) target (10%) and the Sixth Five Year Plan target (12%). Similar data were also revealed by the resource tracking study: a major portion (60%) of the EPI budget (2014–2015) has been funded by Gavi and other development partners, whereas the GoB only provided 11% (8,187.9 lakh BDT compare to total budget 75,886.9 lakh BDT) for immunization sustainability. The low health budget allocations also affect the immunization program, as the total costs are largely covered by external resources. Traditional vaccines and Gavi cofinancing obligations are funded by the sector program and pool funds (Multi-Donor Trust Fund, MDTF).

Figure 13: Cofinancing projections for Bangladesh, 2017–2021



Data source: Country Cofinancing information, Gavi website.

While investigating the root causes of the stakeholders' optimism, we found that stakeholders believe that the commitment of the GoB, development partners, and EPI stakeholders (both service providers and recipients) to the EPI will help to sustain it in the future. Furthermore, national-level key informants mentioned benefitting from the Advanced Marketing Commitment (AMC) for pneumococcal vaccines procurement for a period (5-10 years) upon phasing out from Gavi support. The GoB also has the platform of the Local Consultative Group (LCG) to help ensure the sustainability of the EPI and its health systems (Figure 14). Further document review made clear that the pilot pneumococcal AMC aims to stimulate the supply of appropriate and affordable pneumococcal vaccines for developing countries. (The AMC was developed in collaboration with the World Bank and UNICEF Supply Division, with the commitment and initiative from the governments of Italy, the UK, Canada, the Russian Federation, and Norway [Advance Market Commitments "promising solutions" to global health challenges; Gavi website]). Stakeholders are also hopeful about the sustainability of the health system as well as EPI. One subnational-level stakeholder mentioned,

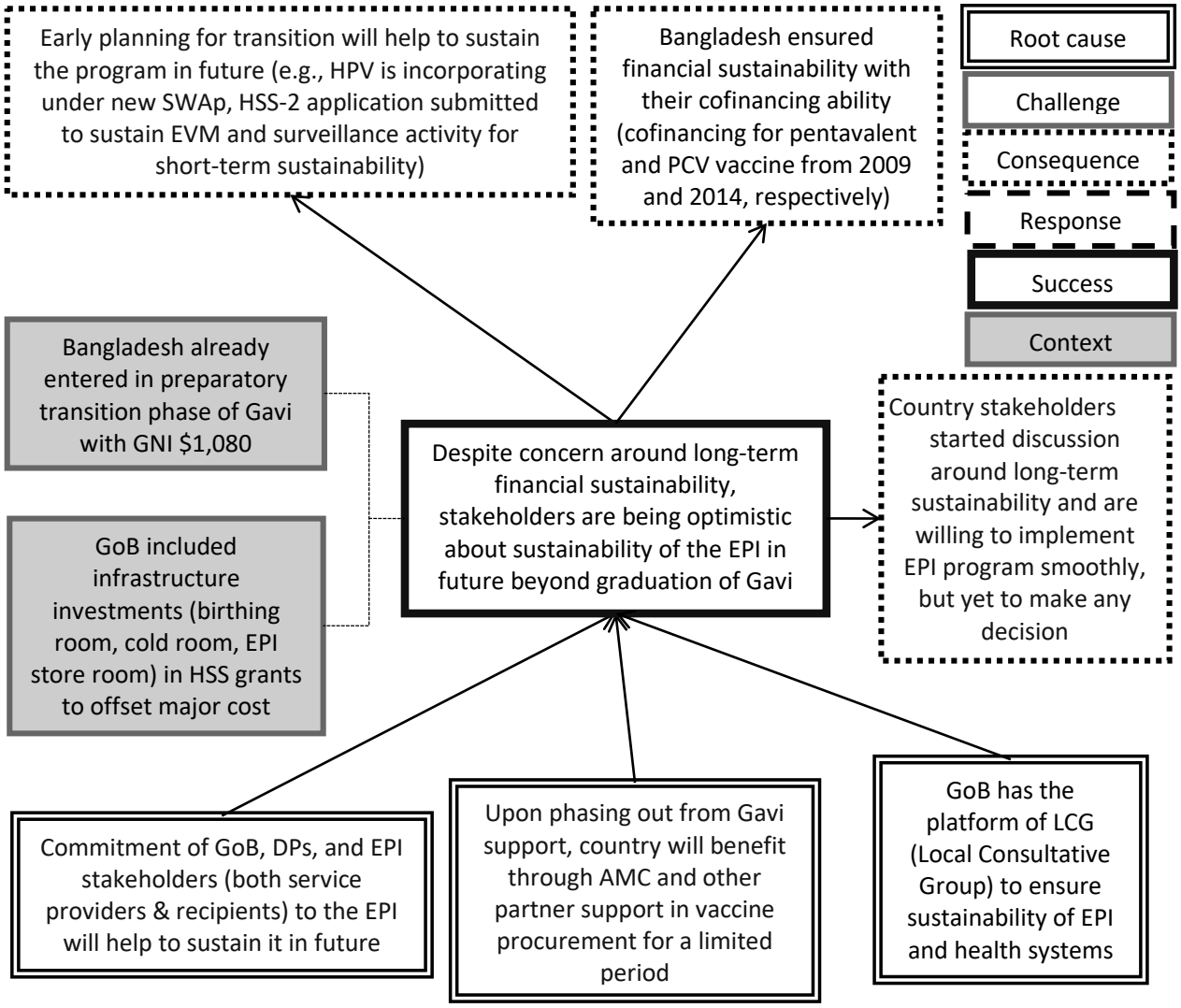
> *We surely can sustain our activities in future, and Gavi fund is helping us out through many infrastructure development, such as cold rooms, EPI store rooms, birthing rooms, etc.; these will be remaining for long period and with this support we can ensure better health system in future after withdrawal of Gavi fund.* (KII)

The GoB and Gavi (and partners) have started discussing the transition

The 2016 Joint Appraisal discussed the preparatory transition phase of Gavi support. Country stakeholders are aware of the increasing cofinancing obligations in the coming years and the nature of Bangladesh's eligibility for receiving Gavi support over the next five years. The forthcoming SWAp 2017–2021 will also focus on Universal Health Coverage and health financing. It will provide a framework for a comprehensive policy dialogue. A key stakeholder at the national level also mentioned,

We already started discussion in several meetings around long-term sustainability of EPI program and everyone is committed to implement EPI program smoothly. We are still in process of preparing the PIP (program implementation plan of operational plan under next SWAp) and we did not take any decisions yet for allocating more budgets from government revenue fund. This is a matter of time and we will jointly take the decision with all other stakeholders in this regard, with the direction of planning wing and Ministry of Finance. (KII)

Figure 14: Root cause analysis: Stakeholders are optimistic about sustainability of the EPI after graduation from Gavi support despite concerns around long-term financial sustainability



Recommendation

EPI stakeholders should ensure the political priority of the immunization program and secure its financial sustainability beyond Gavi support. Therefore, the GoB should partner with EPI stakeholders, the MoF, and the planning wing of the MoHFW, to make a realistic plan to procure vaccines using GoB funds in the future.

Robustness of finding

Finding 1	Ranking	Robustness criteria
Despite the optimistic nature of stakeholders, there are still some concerns around the financial sustainability of the EPI program after graduation from Gavi support.	C	The finding is supported by fewer data sources (limited triangulation) of good quality but perhaps more perception-based than factual.

Resource tracking

This study is intended to track the resources for EPI program activities in Bangladesh. The goal of the immunization resource-tracking study was to identify the major resource drivers and to quantify the contribution of Gavi and other donors to the immunization program in Bangladesh. The financial resource-tracking component quantitatively estimated the contribution of Gavi support for immunization in the country. Estimation of Gavi support was also carried out to find the amount that was spent by Gavi and other donors on immunization and other immunization-related activities.

A retrospective resource-tracking survey was carried out in which data were collected for the financial year 2014–2015. Furthermore, an exploratory approach was taken to examine allocation and use of both donor and government resources for the EPI and immunization service delivery. To capture more detailed and disaggregated data, seven districts were randomly selected, from which one municipality and two upazilas were randomly selected from each selected district. However, seven administrative city corporations were surveyed. Finally, including the EPI head office, a total of 35 facilities were surveyed.

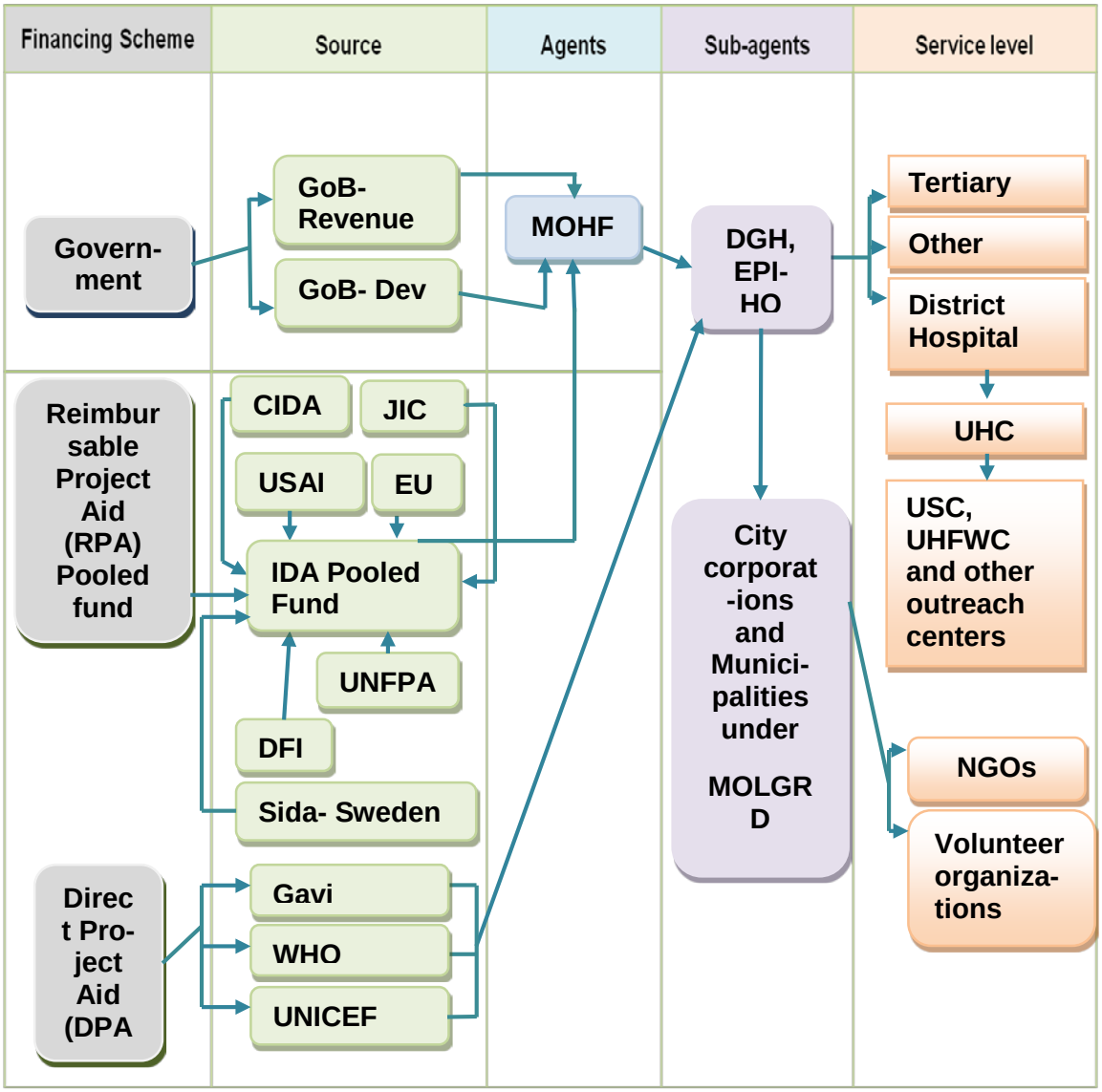
Finding 1

Flow of immunization funds, 2014–2015.

One of our aims of the study is to identify all possible sources of funds for immunization programs and to draw an outline of the flow of funding for immunization programs in Bangladesh. Figure 15 shows that the overall immunization financing in Bangladesh contains three main financing streams: the GoB scheme, Reimbursable Project Aid (RPA), and Direct Project Aid (DPA). The DPA stream is composed of donations from Gavi, WHO, and UNICEF for the year 2014–2015. The World Bank gives a reimbursable pooled fund known as RPA. These mechanisms are actually led by the International Development Agency (IDA), a sister organization of the World Bank. The World Bank pools money from different donor agencies. The IDA collects funds from donor agencies such as CIDA, USAID, JICA, EU, DfID, and Sida-Sweden. As per our investigation, DPA funds go directly to the Directorate General Health Services (DGHS), while other streams flow to MoHFW, which then directs the funds to the DGHS for disbursing. The government financing scheme mainly depends on two sources, the Revenue Budget and the Development Fund, that are also directed to the MoHFW. The EPI headquarters disburses funds as per

micro-planning to the Civil Surgeon office, District Hospital, Upazila Hospital, union-level health center and family welfare center, outreach centers, and city corporation levels.

Figure 15: Immunization funding flows in Bangladesh



Finding 2

Allocation of budget for EPI sustainability.

- The second objective of the study was to quantify the allocation of funds to immunization activities at the national and subnational levels and to determine the contributions of the GoB and other donor agencies. Allocation of the budget on EPI sustainability illustrates that DPA alone contributes about 73% of the total budget allocation for the financial year 2014–2015, followed by RPA (19%). The GoB contributed only 8% of the total allocation. EPI sustainability is also discussed above in the Sustainability (programmatic and financial) section of this report.

- From the DPA, a total of US$ 108 million was allocated, compared to the total immunization allocation amount, which was US$ 147 million.
- The GoB allocated approximately US$ 11 million for different immunization activities.
- Allocation of the budget based on the major components shows that the greatest amount (US$ 103 million) was allocated for the EPI activity named "increasing the sustainability of EPI," which included different EPI-related activities such as procurement of vaccine, AD syringe and logistics, training, cold-chain equipment, logistics, repair and maintenance, furniture, micro planning, transportation, etc. That allocation was followed by the activities of MR campaign (around US$ 20 million). However, the amount allocated for MR campaign follow-up was donated entirely by Gavi and was not spent during fiscal year 2014-15.
- DPA contributed most to the financial sustainability of the EPI, followed by RPA. The GoB allocated the remaining funds for routine EPI activities.
- For introducing IPV, allocation was approximately US$ 6.6 million, with about 97% allocated from DPA funds, to which Gavi was the main contributor.
- For the introduction of PCV, approximately US$ 4.4 million was allocated, with the DPA contribution being 87%. The remainder was allocated by the GoB.
- For the national and subnational levels, cold-chain management was financed through GoB, RPA, and DPA. UNICEF contributed most of the allocated budget.
- For contributing EPI activities, Gavi donated for 90% of the total allocation. WHO donated 7%.
- The distribution of the Gavi funds for ISS showed that the major distribution was for salary allowance (70%) for different level personnel, followed by repair and maintenance. The rest of the amount was distributed for travel expenses.
- For the financial year 2014–2015, Gavi allocated approximately US$ 2.8 million for health system strengthening.

Recommendation

Since Bangladesh has the potential now for continuing economic growth, the GoB should be able to ensure EPI sustainability by increasing funding for the recurrent costs of the EPI program.

Finding 3

Findings from the facility survey show variations in expenditure and coverage among different points of delivery. Both expenditure and coverage were lowest for city corporations.

City corporations

- To estimate the expenditure of city corporations, seven administrative city corporations were surveyed. Those have a separate administrative office for each zone; expenditure data from one zone was collected as the representative of each zone, and then multiplied by the total zone number to estimate total expenditure for each city-corporation. Average expenditure was estimated by dividing the total expenditure by the number of city corporations.
- For the financial year 2014–2015, the average expenditure for each city-corporation was estimated to be around US$ 632,933.

- The largest expenditure for EPI was for the vaccine purchase, which was approximately US$ 358,422 and constituted 56% of the total expenditure, followed by personnel expenses, which was approximately US$ 170,061 and constituted 26% of the total.
- Average numbers of vaccinated children per City Corporation were 25,856, with 18,462 being fully vaccinated. The cost per fully vaccinated child in the city corporation areas was estimated to be US$ 22.34.

Civil surgeon office

- The civil surgeon office has the responsibility for vaccine distribution to different health facilities. However, for maintaining those activities, the civil surgeon office has management costs, including cold chain for vaccine stock. Seven civil surgeon offices were surveyed for the study.
- The average expenditure per civil surgeon office was estimated to be approximately US$ 68,081 for the financial year 2014–2015.
- The largest expenditures were for equipment and materials, personnel, office management, utilities, training, and meetings, which accounted for around 45% (US$ 30,524), 23% (US$ 15,283), 18% (US$ 12,169), 6% (US$ 4,049), 5% (US$ 3,190), and 3% (US$ 1,898), respectively, of the expenditure.
- The breakdown of expenditures across seven civil surgeon offices shows the highest expenditure was for personnel and vaccine-related equipment and materials. Equipment-related expenditure was highest for Bhola district due to the establishment of a new cold room in the indicated year.

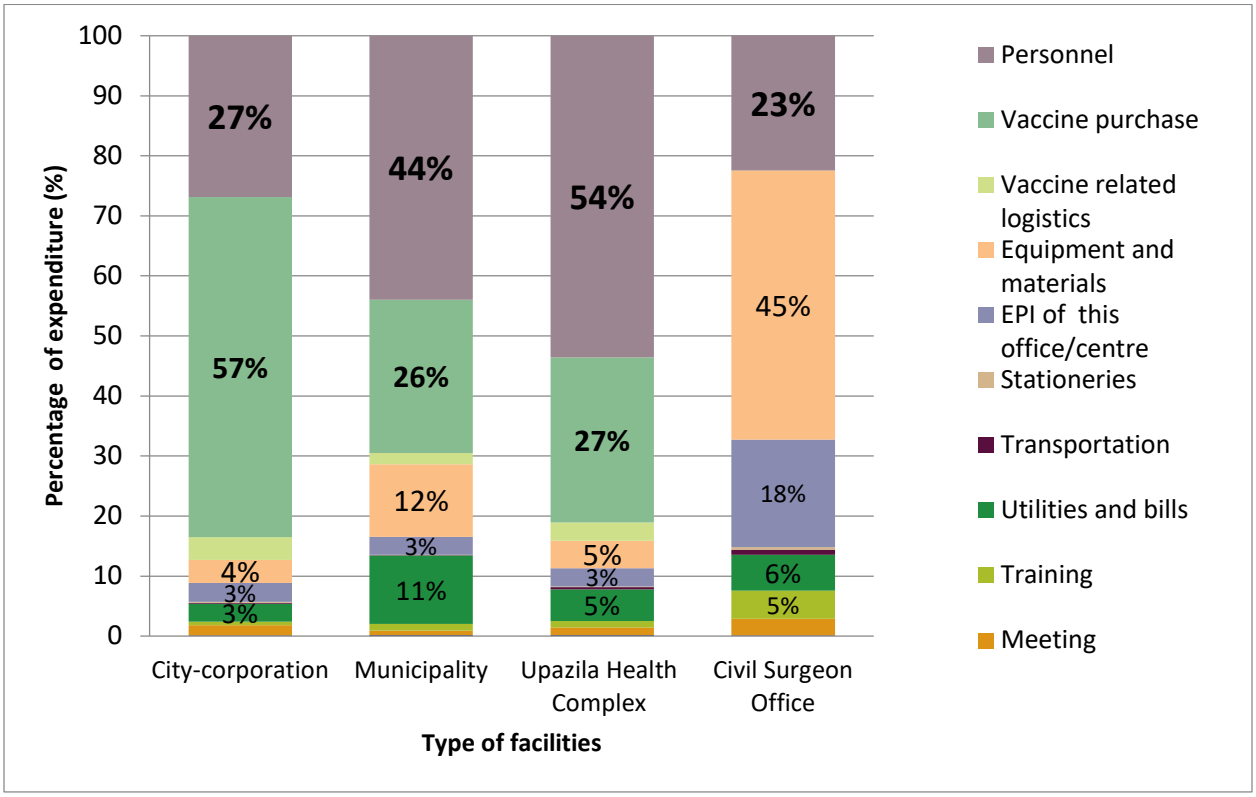
Municipalities

- Seven municipalities were surveyed for collection of financial data in financial year 2014–2015.
- Average expenditure of each municipality was estimated to be approximately US$ 71,204. Personnel expenditure was identified as the major expenditure driver, which contributed about 44% of the average expenditure of municipalities, followed by the purchase of vaccines, which contributed about 25% of the average expenditure per municipality.
- Average personnel and vaccine purchase expenditure per municipality was estimated to be US$ 31,306 and US$ 18,193, respectively.
- The equipment and materials expense was approximately US$ 8,627 and accounted for 12% of the average municipal expenditure.
- Across the municipalities, the highest expenditure was found in Magura, which was about US$ 109,322, followed by Sunamgonj, Joypurhat, and Kurigram, which were estimated to be about US$ 90,790, US$ 66,426, and US$ 66,276, respectively.

Upazila health complexes

- The average expenditure per upazila health complex was estimated to be around US$ 209,868 for the financial year 2014–2015.
- The largest expenditures were for EPI-related personnel (US$ 112,474), which comprised 54% of the average upazila-level expenditure for EPI, followed by vaccine purchases (US$ 57,642).
- The highest expenditure was found in Nageshwari (US$ 382,927), situated in Kurigram district, followed by the Nangolkot upazila (US$ 368,226), situated in Comilla district.
- Across all surveyed upazilas, the highest expenses were reported for personnel and vaccine purchase.

Figure 16: Distribution of EPI expenditure by platform type



Recommendation

Advocacy activities for improving valid vaccination coverage in the urban areas, especially for city corporations, need to be undertaken. These should include increasing social mobilization activities and developing infrastructure with adequate personnel for vaccine delivery.

Finding 4

The estimated total expenditure for EPI was BDT 10,860.7 million (US$ 139.5 million) for the financial year 2014–2015. The average estimated cost per fully vaccinated child was BDT 2,754 (US$ 35.40).

Distribution of vaccine wastage and estimated cost

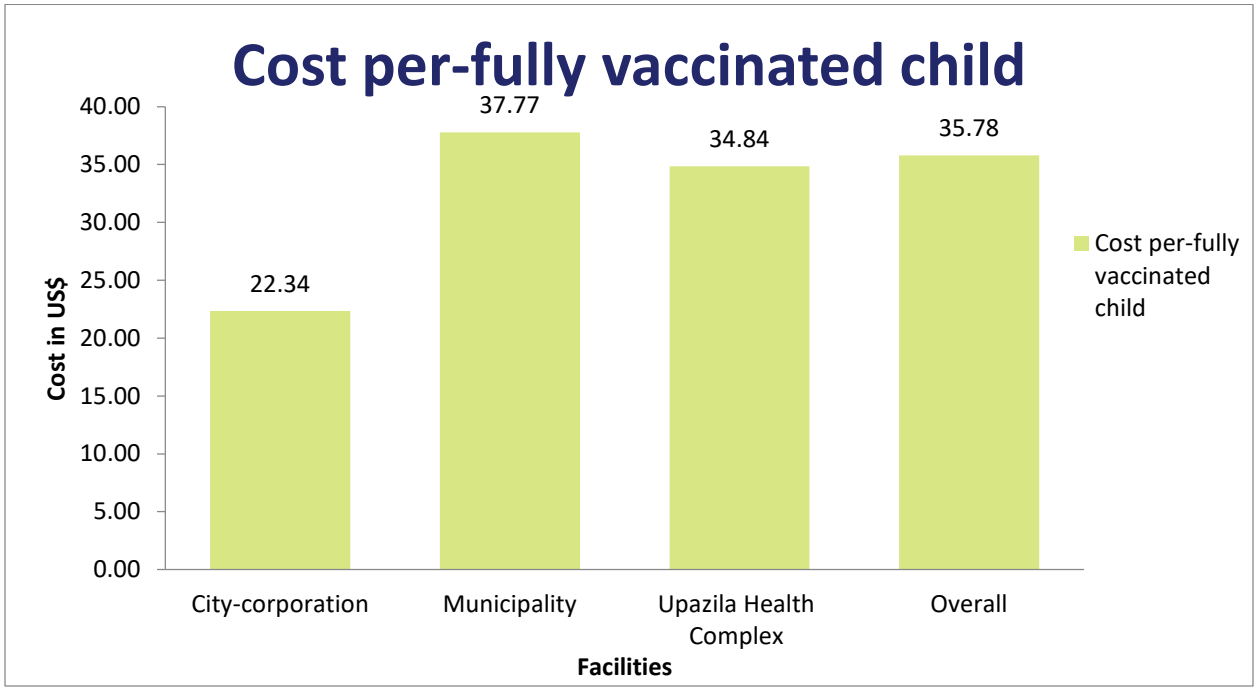
- Vaccine costs were estimated based on the unit prices of vaccines, multiplied by a wastage rate and the number of doses of vaccine administered in the facility.
- The wastage rates of these vaccines have been reported to be high for BCG, measles/MR, and OPV vaccines. BCG wastage rates were as high as 80%.
- Overall vaccine wastage rates for each vaccine by city-corporation were as follows: BCG 77%, Measles/MR 63%, OPV 34%, IPV 30%, PCV 15%, and penta 0%.
- The estimated monetary value of wastage vaccine per city corporation, municipality, and UHC was US$ 10,686, US$ 1,097 and US$ 3,596, respectively, for the year 2014-15.

- The estimated monetary value of vaccine wastage as a percentage of total vaccine procurement cost by facility shows it contributed about 3%, 6%, and 6.2% per city corporation, municipality, and UHC, respectively.

Estimated total expenditure and cost per fully vaccinated child

- For estimating the total expenditure, the average estimation of each platform type was multiplied by the total number of similar facilities.
- The average estimated cost per fully vaccinated child was US$ 35.78.

Figure 17: Distribution of cost per vaccinated child



Recommendations

1. In order to properly utilize vaccines and minimize vaccine wastage, periodic monitoring at the points of delivery, including outreach visits to obtain a probable estimation of the number of beneficiaries in each outreach area, would be beneficial.
2. The consideration and analysis of cost and effectiveness should be included in the EPI decision-making process on a regular basis.

References

1. Gavi Full Country Evaluations. *2015 Annual Dissemination Report*. Seattle, WA: IHME (2015).
2. LSHTM & PATH. HPV lesson learnt, implementing HPV vaccination: A review of seven key themes for decision maker; London School of Hygiene & Tropical Medicine, PATH (2016).
3. Government of People's Republic of Bangladesh. *Comprehensive Multi-Year Plan of the National Immunization Program of Bangladesh 2011-2016*. Government of People's Republic of Bangladesh (May 2011).
4. Gavi Secretariat. *Bangladesh Independent Review Committee (IRC) Country Report (HSS)*. Gavi Secretariat, Geneva (November 2015).
5. Gavi Full Country Evaluation. *2014 Annual Dissemination Report*. Seattle, WA: IHME, (2015).
6. Government of People's Republic of Bangladesh. *EPI Coverage Evaluation Survey 2011*. Expand Programme on Immunization, Directorate General of Health Services (June 2012).
7. WHO. *WHO Country Cooperation Strategy (CCS) 2014-2017*. ISBN 978-92-9022-453-2 (WHO, 2014).
8. WHO. Sustainability of immunization programmes. At http://www.who.int/immunization/programmes_systems/sustainability/en/.
9. Gavi, the Vaccine Alliance. Advanced Market Commitments 'promising solutions' to global health challenges. at http://www.gavi.org/library/news/press-releases/2013/advance-market-commitments-promising-solutions-to-global-health-challenges/.