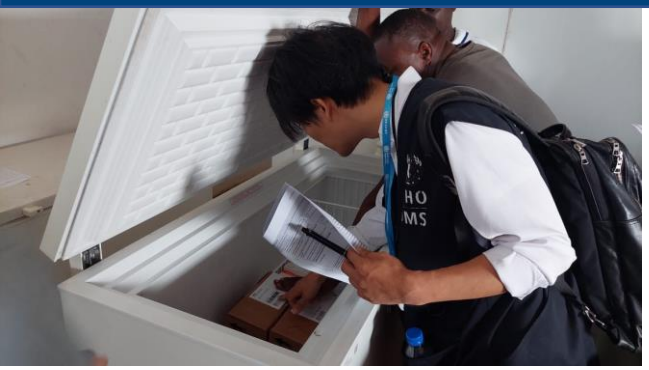
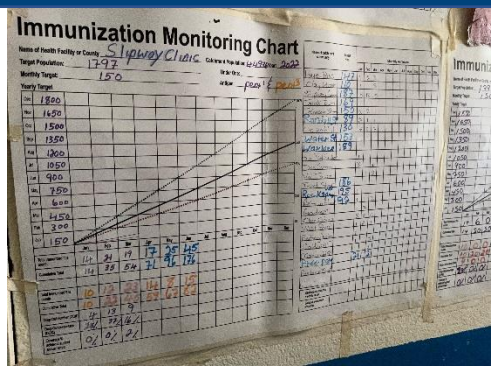
Comprehensive Expanded Programme on Immunization (EPI) Review





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FORWARD

The Liberia Expanded Program on Immunization (EPI/Liberia) was established in 1978 in accordance with recommendations of the World Health Organization and covered six vaccine-preventable diseases (VPDs): tuberculosis (TB), poliomyelitis (polio), diphtheria, pertussis (whooping cough), tetanus, and measles. The global launch of EPI/Liberia followed the successful eradication of smallpox, a global effort in which Liberia was a major player, with research done at the Liberia Institute of Biomedical Research. Operation of the EPI is guided by a well-defined policy introduced in the 1980s. It was formalized in 1993 and is updated regularly. The policy details the key objectives and responsibilities of EPI/Liberia which include guaranteeing free and equal access to immunization services across all villages and towns across the country.

In the 44 years since its launch, Liberia's immunization program has grown. It now targets 13 VPDs: TB, diphtheria, pertussis, tetanus, poliomyelitis, measles, hepatitis B, Haemophilus influenza type b, yellow fever, Rotavirus, pneumonia, human papillomavirus, and typhoid fever. The Ministry of Health (MOH), with support from its health development partners including WHO, UNICEF and GAVI, has introduced new vaccines based on Liberia's disease burden and the emergence of diseases of public health concern. With expansion of the vaccine-preventable diseases that are covered by the Liberia EPI program, so too have the target age groups for routine immunization services expanded to include: (a) children age 0–23 months, adolescents age 9–14, and (c) women of childbearing age 15–49.

Improvement of EPI/Liberia services over the years has led to a gradual increase in immunization coverage within the population. Contributing factors include an increase in the number of functioning health facilities from 517 in 2013 to 628 in 2022; an expanded number of health facilities with modern cold chain equipment; the solar direct drive (SDDs); increased outreach activities; and increased support from partners.

Routine reviews of the EPI program—including the Liberia Demographic & Health Surveys—have, over time, identified factors that contribute to challenges in the program's performance. Progress towards achievement of set program targets, as well as critical issues that constrain service delivery, have been identified. The COVID-19 pandemic has presented a particular challenge to the EPI since 2020. These constraints came at a time when the MOH was recovering from the effects of the deadly Ebola disease outbreak between 2014 and 2015, which devastated all fabrics of society including the health system. The COVID-19 pandemic has caused devastating consequences as well, on patients, health care workers, health systems, and economies. The health facility utilization rate declined in Liberia from 88% in January 2020 to 54% in April 2020. (Liberia COVID 19 daily Sitrep # 70)

The most recent version of the program's Comprehensive Multi-Year Plan (cMYP) guided program implementation over the last five years and expired in December 2020. These past and ongoing public health challenges have created the need to conduct an in-depth and comprehensive review of EPI/Liberia ("the CER") that will serve as the foundation for the program's strategic planning process going forward. The program is preparing to develop a National Immunization Strategy (NIS) to guide program implementation for multiple years. Findings from the CER will provide insights into various aspects of the quality of the outputs of EPI/Liberia and will contribute to the mobilization of resources for the program's NIS. The last comprehensive EPI review for Liberia was conducted in 2012.

We extend sincere thanks and appreciation to our partners who have worked with us to conduct the CER. We hope to continue to work with them to implement the review's recommendations successfully. This brings us closer to upholding our responsibility to ensure the provision of free and equal access to immunization services across every village and town throughout the nation, resulting in the improved health status of individuals, families, and community members in Liberia.

The Government of Liberia commits to working with its development partners and all stakeholders to ensure that the recommendations of the CER are fully implemented. The Ministry of Health will galvanize political will nationally and globally, as it adopts the best strategies for implementation of an improved National Immunization Program through a coordinated country response.

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ACKNOWLEDGEMENTS

The Liberia Expanded Program on Immunization (EPI/Liberia) would like to thank the leadership of the Liberia Ministry of Health for its support for conducting this in-depth Comprehensive EPI Review (CER). The entire process of the CER —from developing a concept note, conducting a desk review, developing a detailed review protocol, and collecting data in the field—was made possible by the contributions of many individuals and organizations. In particular, we extend our gratitude to the Minister of Health, Hon. Dr. Wilhemina Jallah; Deputy Health Minister for Health Services and Chief Medical Officer of Liberia, Dr. Francis Ketah; and Assistant Health Minister for Curative Services, Dr. Goblee Logan for lending their endorsement and support to the entire process.

We also appreciate the support, contributions, and insights of national authorities from the executive and legislative branches of the Government of Liberia, as well as the participation of county, district, and health facility staff. Without their involvement, data collection would not have been completed. EPI/Liberia is also grateful to the National Public Health Institute of Liberia; the Liberia Ministry of Education; the superintendents and other local government officials; county health teams; directors, and representatives of the Health Monitoring, Evaluation, and Research (HMER) Unit; and Community Health Services for their support and for the secondment of the M&E Officers.

EPI/Liberia wants to recognize and express sincere thanks and appreciation to the following EPI and Health Information System, Monitoring, Evaluation and Research (HMER) staff for their tireless efforts and contributions during the planning and execution of the CER in Liberia: National EPI Manager, Aldophus Clarke; EPI Deputy Manager, Nicholas Blidi; Director for Research, Nelson Dunbar; Routine Immunization Officer, Martiranke M. Kanneh; EPI Data Manager, Joseph Yokie; Director for HIS, Patrick Konwloh; Supplemental Immunization Activities Officer, Elizabeth Doe; and Communications Officer, Sando Kiazolu. Finally, EPI/Liberia wants to recognize the financial and technical contributions made by Gavi, JSI, WHO, UNICEF, USAID Liberia and Washington, the US Centers for Disease Control and Prevention (CDC)/USA, and the African Field Epidemiology Network (AFENET). The MOH is particularly grateful for the provision of to the experts who served as external reviewers for this collaborative effort that is aimed at improving the health system of Liberia and, ultimately, promoting healthy lives through the reduction of morbidity and mortality due to vaccine-preventable diseases.

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ACRONYMS

AEFI	Adverse Events Following Immunization
AFENET	African Field Epidemiology Network
AFRO	WHO Regional Office for Africa
ANC	Antenatal Care
CBO	Community-based Organization
CDC	(United States) Centers for Disease Control and Prevention
CEO	County Education Officer
CER	Comprehensive EPI Review
CHDD	Community Health Department Director (County level)
CHFP	Community Health Focal Point
CHO	County Health Officer
CHPFP	County Health Promotion Focal Point
CHSA	Community Health Services Assistant
CM	Certified Midwife
cMYP	Comprehensive Multi-year Plan
CRS	Crusaders for Peace
CS	Child Survival
CCSFP	County Child Survival Focal Point
CSO	County Surveillance Officer
DCSFP	District Child Survival Focal Point
DEO	District Education Officer
DHO	District Health Officer
DPM	Deputy Program Manager
DRHO	District Reproductive Health Officer
DSO	District Surveillance Officer
EHT	Environmental Health Technician
EPI	Expanded Program on Immunization
GSM	Global System for Mobile Communication
HQ	Headquarter
HFDC	Health Facility Development Committee

HMER	Health Information System, Monitoring, Evaluation and Research
IRC	International Rescue Committee
IST	(WHO) Inter-country Support Team
JSI	John Snow, Incorporated
LBNM	Liberia Board of Nursing and Midwifery
LIBR	Liberia Institute of Biomedical Research
LISGIS	Liberia Institute of Statistics and Geo-information Services
LMDC	Liberia Medical and Dental Council
LMH	Last Mile Health
MCV	Meningococcal vaccine
MDV	Multiple Dose Vial
MNCH	Maternal, Newborn, and Child Health
M&E	Monitoring and Evaluation
MOH	Ministry of Health
NIS	National Immunization Strategy
nOPV	Novel oral polio vaccine
NPHIL	National Public Health Institute of Liberia
OFM	(MOH) Office of Financial Management
OPV	Oral polio vaccine
PA	Physician Assistant
PHIL	Public Health Institute of Liberia
RH	Reproductive Health
RI	Routine Immunization
SIA	Special Immunization Service
TOR	Terms of Reference
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WA	West Africa
WHO	World Health Organization
HQ	WHO Headquarters

EXECUTIVE SUMMARY

Introduction: Based on recommendations of the World Health Organization, the Liberia Expanded Program on Immunization (EPI/Liberia) was launched in 1978. Launching the program followed the successful eradication of smallpox, a global effort in which Liberia was a major player.

Background: Activities for Liberia's Comprehensive EPI Review (CER) actively commenced in August 2021. Earlier attempts in 2020 were called off due to many challenges including the COVID-19 pandemic that led to international travel restrictions. However, the desk review findings used for the CER were from the desk review conducted in 2020.

Data collection was conducted from July 15–29, 2022. It covered the national and sub-national levels, including health facilities. Key informant interview respondents included senior and junior government officials and development partners, along with health workers at various levels and caregivers.

Twelve external reviewers led the data collection, synthesis of findings, development of the Review report and generation of recommendations. The external reviewers came from the following five partner organizations: the World Health Organization (WHO), the United Nations Children's Fund (UNICEF), and the United States Agency for International Development (USAID), the US Center**s** for Disease Control and Prevention (CDC), and JSI Research & Training Institute, Inc. (JSI).

Rationale: The CER is designed to provide evidence for EPI/Liberia's strategic directions and priority activities. It will inform the development of the National Immunization Strategy**.**

Objectives: The primary objectives of the review were to: 1) to review internal and external environmental factors that affect the functions of the immunization system and 2) identify the strengths and weaknesses of the program at all levels.

Six counties (Bomi, Bong, Grand Kru, Margibi, Montserrado, and Maryland) were randomly selected to be reviewed from the five health regions of Liberia. Montserrado County was specifically selected because of its population size and number of private health facilities, in comparison to public health facilities, and large number and density of slum communities. Two districts per county were selected with three health facilities per district. In each district, two were public health facilities, one with high pentavalent vaccine coverage, the other, with low coverage. The third was a private health facility. In each health facility vaccination sessions were observed, and 3–5 caregivers were interviewed. In total, the review covered six counties, 12 districts, and 36 health facilities. The review focused on the seven pillars of the immunization program.

KEY REVIEW FINDINGS

1. Performance of the Program Pillar

Strengths: Engagement with other government ministries and the national legislature is in the best interest of the program. The program has a costed training plan that guides program activities. There is an Urban Immunization Strategy (UIS) developed by the EPI with Partners. The strategy was implemented in Montserrado by EPI, Partners, and Montserrado County Health Team.

Weaknesses: There are limited government contributions to the program (e.g., The Government of Liberia's contribution is about 10%); 98% of National EPI Staff is paid by partners. There is limited engagement with the Ministry of Finance and the National Legislature for the Program. EPI Staff and Committee terms of reference (TORs) exist, with the last revision on 8/30/2012. TORs should be updated to include COVID-19 vaccine introduction and, potentially, boosters for typhoid. The annual work plan is not available in district and health facilities. At the district and facility levels, there is a lack of field guides.

2. Human Resources Pillar

Strengths: The Director of the EPI unit is technically very strong, and very experienced. He also brings great passion to his work. He shows an extremely high level of commitment, and it is clear he wants to be a strong performer. For that reason, he is very hands-on. The same is true for the EPI staff at all levels. They show tremendous dedication despite resource limitations facing the EPI and the MOH budget for staff salaries.

Community Health Assistants (CHAs) play a role in defaulter tracing, community mobilization, and advocacy, as well as in disease surveillance. The level of these contributions differ from county to county

All district and facility levels report having received more than one supervisory visit in the past six months.

Weaknesses: The current EPI organizational chart is not updated to include the data manager and other potential staff. There are no recent assessments of staff capacity or training needs, but interviews with county and health facility staff indicate that there are knowledge gaps, particularly for new vaccines. Delegation of responsibilities at national and county levels needs to be reviewed. Private health facility vaccinators are not as comprehensively trained as those in the public health facilities. There is high staff turnover in private facilities.

3. Vaccine Supply, Quality, and Logistics Pillar

Strengths: The national cold store is being moved to a new Central Medical Store (CMS) which has a full capacity for storage, logistics, and in-built temperature monitoring. Annual forecasting is being done consistently, and there is partner support in some rural facilities for vaccine delivery from national to lower levels. At the national level, staffing and training levels for vaccination management are generally robust, with most positions reported to be filled and personnel adequately trained. At the county level, storage and management practices are sufficiently consistent to assure basic vaccine viability. Vaccines are now bundled with syringes to minimize risk of reuse when vaccines are in stock. Staff at the national level report receiving adequate training.

Data monitoring systems are strong enough to assure vaccine viability and avoid localized stock outs at facilities. Monitoring techniques (e.g., twice-daily temperature monitoring) were observed consistently across public sites, but less so in private ones. Vaccinators are well trained to recognize vaccine vial monitor (VVM) levels, check for expiry dates before administering vaccine, and maintain complete vaccination patient registers.

Weaknesses: There have been frequent national stock outs of vaccines, supplies, and tools and cold chain equipment (fridges & freezers). In some counties, there is insufficient storage capacity, and there are non-operational fridges. There were no freeze tags in any of the counties visited**.** Data monitoring systems fall short of the level needed to forecast vaccine needs, to identify any excursions from normal patterns of uptake or wastage in time, or to identify and address supply problems. There is limited capacity for cold chain maintenance at both national and sub-national levels. There are sub-optimal waste management practices (e.g., damaged incinerators, waste not being picked up regularly).

4. Service Delivery Pillar

Strengths: At national level**,** operational guidelines for service providers are available, they were written in 2016 and updated in 2019. Among other provisions, they provide guidance for conducting high-quality fixed immunization sessions and outreach vaccination. Other health interventions are integrated with immunization services (e. g., growth monitoring, Vitamin A supplementation, health education). At the sub-national level, health workers show a strong commitment and dedication to the program. Outreach sessions are planned and organized weekly, and fixed site sessions generally are well established and organized. They occur regularly when the operational issues allow.

Weaknesses: Stock outs of vaccines and supplies pose a major barrier to having quality immunization sessions. Insufficient transportation is a major barrier to conducting outreach sessions (e.g., motorbikes, no rain gear). The program does not have a structured approach to reach individuals living in urban poverty, which contributes to the growth of large populations of unvaccinated and/or underserved populations. guidelines are not

completely rolled out everywhere. Not all private providers who administer government vaccines are in DHIS; those not in DHIS2 report vaccination data to the nearest facility that is in DHIS2. Caregivers are not routinely told about the diseases against which the vaccine protects. Health workers are not routinely checking vaccination status of children being brought to health for other conditions/reasons Thus, missed opportunities for vaccination are high. Also, there were stock outs of child health cards.

5. Immunization Coverage and Monitoring Pillar

Strengths: Monthly reports are submitted to the higher level on time and without any extensive delays across counties. In some counties, basic vaccination logs and tally sheets are kept consistently and used for defaulter tracing and basic consumption monitoring.

Weaknesses: There is a stock out of monitoring charts**;** there has been no action taken on coverage monitoring since this stock out began. Though some charts were available in Montserrado county, there were concerns following the review of the available data, specifically extremely low coverage of Penta3 (<10%) or a negative value for the drop-out rate. Reviewers noted that there has been no action taken based on the coverage monitoring and a lack of knowledge is widely seen on the calculation of coverage monitoring and drop-out rate.

6. Surveillance and AEFI Monitoring Pillar

Strengths: Guidelines are available in districts and HFs. District staff are trained on vaccine preventable diseases (VPD) surveillance. VPD surveillance focal points are in place and trained in public health facilities.

Weaknesses: Private health facilities are insufficiently involved in VPD surveillance. The district focal persons are extensively trained. However, their knowledge or training doesn't seem to be sufficiently cascaded down. The guidelines require updates due to constant changes in epidemics and public health threats. Health facilities claim that they do not receive regular feedback on samples sent forward. AEFI case reports are available in some health facilities, but are not submitted to the national level, with the exception of inline lists.

Dating from the beginning of 2022, there are no monitoring charts, a situation that has led to poor coverage and monitoring of drop-out rates. There is underutilization of the data information for action, and no regular pace or schedule to review data quality. The emphasis seems to be on getting reports in on time, regardless of quality. There is irregular feedback downstream on reports submitted to higher levels**.**

7. Demand Generation Pillar

Strengths: Communication and demand generation are recognized as critical components of the EPI and immunization uptake at all levels. There is increased knowledge, along with positive attitudes and perceptions of caregivers and communities of vaccination. The finding is supported by a knowledge, attitude, and practice (KAP) study, which recorded an increase from 76% to 99.7% of caregivers believing that vaccination is beneficial to children. The EPI KAP studies compared data of 2017 and 2020. There are positive attitudes and acceptance of vaccination services among caregivers and communities, including satisfaction with immunization services (e.g., access, respectful treatment, schedules). There are strong partnerships with local and community leaders, partners, stakeholders, NGOs, and CSOs for communication and demand generation during vaccination campaigns.

Weaknesses: A national communication strategy to guide advocacy, social mobilization, and community engagement has yet to be finalized and operationalized. There is too much reliance on vaccination campaigns with very limited funding of activities for routine immunization. If integration of communication with EPI functions has enabled adequate communication and engagement, lack of funding has prevented implementation of targeted and strategic interventions to address low uptake and defaulters groups. IEC materials and key messages do not provide for newly introduced vaccines in routine immunization, response to specific persisting concerns and rumors, and immunization beyond nine months of age.

INTRODUCTION

The Republic of Liberia is located in West Africa. Geographically it is composed of mangrove forests and beaches along its western edge bordering the Atlantic Ocean, while the inland areas are composed of tropical forests intermixed with grasslands. From May to October, a significant rainy season occurs; the dry season occurs from November to April. Liberia sits along Africa's western coast near the Gulf of Guinea and shares its borders with Sierra Leone, Guinea, and the Ivory Coast. The total surface area of the country is 110,080 square kilometers. The capital city of Monrovia accounts for one-third of the population. It contains several urban slums and experiences a high level of population migration.

Figure 1: Map of Liberia with national, regions, and county boundaries

Liberia is subdivided into five regions, 15 counties, and 92 health districts, which are in turn subdivided into clans. Within clans are towns and/or villages. The main language spoken is English. Population density is about 93 people per square mile, but distribution is very uneven, with four counties (Montserrado, Nimba, Bong, and Lofa) hosting 70% of the total population. Liberia has a democratic system of government that is headed by a president. Each county is headed by a superintendent with the districts, clans, and towns headed by chiefs. Accessibility within the country is very difficult, especially when traveling from the county capitals to reach the districts. The rainy season extends almost 9 months of the year and the communications network is very limited.

1.1 Socio-Economic Context

Liberia is a low-income country that relies heavily on foreign assistance and remittances from the diaspora. It is richly endowed with water, mineral resources, forests, and a climate favorable to agriculture. Its principal exports are iron ore, rubber, diamonds, and gold. Palm oil and cocoa are emerging as new export products. The government has attempted to revive raw timber extraction and is encouraging oil exploration. Liberia's HDI value for 2018 is 0.465—which puts the country in the low human development category—positioning it at 176 out of 189 countries and territories. Three-fourths of the population live below the poverty line on less than US$1 a day.

According to the Demographic and Health Survey 2019-2020 (DHS 2019–2020), the average household size in Liberia is 4.6 persons. About one-third of households are headed by women. Forty-five percent of the population in Liberia is under the age of 15. Liberia has one of the highest population growth rates in the world, although it has fallen in recent years.

The DHS 2019-2020 calculated the maternal mortality ratio at 994 deaths per 100,000 live births. The total fertility rate was 4.2 and the contraceptive prevalence rate was just 25 percent. Infant and under–5 mortality rates are 63 and 93 deaths per 1,000 live births, respectively. The neonatal mortality rate is 37 deaths per 1,000 live births. At these child mortality levels, about 1 in 11 children in Liberia does not survive until their fifth birthday. After years of decline from the 1990s, under–5 mortality remains unchanged since 2013 while infant mortality has increased slightly, from 54 deaths per 1,000 live births in 2013 to 63 deaths per 1,000 live births in 2019.

1.2 Health System

The Ministry of Health established standards for the structural, spatial, material, human resources, and utility requirements for all types of service delivery points (SDPs) according to their level in the health system, the services provided, and the size and geographic location of the catchment population. The health system is defined and operates through three levels:

1. The primary level is composed of community-based services and clinics.
    - *Community-based services* Within the radius of a PHC facility catchment population (equivalent to one hour's walk), general Community Health Volunteers (CHVs), Household Health Promoters, and Trained Traditional Midwives link the communities to the nearest health facility.
    - *Clinics* The most basic public sector health facility is the clinic. It may take many forms and sizes and may have a laboratory. The common feature is that it offers the entire Essential Package of Health Services (EPHS). In urban areas, clinics are large structures with the capacity to deal with many outpatient users and occasionally to offer double shifts.

2. The secondary level is composed of health centers and hospitals.
    - *Health centers:* Health centers are the transition between primary and secondary levels of care. They offer 24-hour primary care services complemented by a small laboratory and inpatient capacity of up to 40 beds for a catchment population of up to 25,000 to 40,000.
    - *County hospitals*: A county hospital serves a catchment population of up to 200,000 people. The county hospital is the referral facility with direct territorial responsibility, playing the role of primary care facility for the county network of clinics and health centers. County hospitals provide the necessary laboratory and basic radiology services to meet the needs of general surgery, pediatrics, general medicine, obstetrics, and gynecology services at least.

3. The tertiary level has exclusively referral functions, without territorial responsibility. Tertiary care is provided by the John Fitzgerald Kennedy Medical Center (JFKMC), the national referral hospital in Monrovia, as well as by a limited number of county hospitals serving as regional referral hospitals.
    - *Regional referral hospitals:* Regional hospitals are located within reasonable access to the county hospitals that refer to them and provide specialized consultative care such as orthopedics and ear, nose, and throat services. Each regional hospital has a bed capacity of approximately 250 beds serving a catchment population of around 500,000 people.
    - *National referral hospital*: JFKMC is the national referral facility and the top teaching hospital for physicians and medical doctors and ensures a number of medical specialties that are not available at the regional hospitals.

Liberia's Ministry of Health (MOH) is attempting to increase funding for the health sector in order to achieve the United Nations Sustainable Development Goals for Liberia and to move the country toward universal health coverage.

The Government of Liberia's allocation of 14.6% of the overall government budget to the health sector in fiscal year (FY) 2017–18 is commendable, as it nearly achieves the 15% target set by the Abuja Declaration. However, it

should be noted that the overall government budget is relatively small at only US$527 million in total. (Global Fund Report April 2019: Achieving Sustainable Health Financing in Liberia)

With the end of the civil war and the growth of the economy, the government with the support of partners has increased spending on the health system, including infrastructure improvements leading to an increase in health services utilization. The DHS 2019-2020, showed that health services utilization outcomes have gradually improved during the last decade:

- The use of modern methods of family planning has increased steadily from 10% in 2007 to 24% in 2019. However, the use of traditional methods has remained unchanged at 1%.
- Nearly 9 in 10 (87%) women made four or more prenatal care visits as recommended, from 78% in 2013.
- Health facility deliveries have increased steadily since 2007 when 37% of births were delivered in a health facility to 80% in 2019

1.3 Expanded Program on Immunization

EPI/Liberia operates on a well-defined policy, which was introduced in the 1980s, formalized in 1993, and has been regularly updated. The latest revision was in 2018. The policy states the key objectives and responsibilities of the EPI, which include guaranteeing free and equal access to immunization services across every village and town in the country.

Currently, the program targets these thirteen vaccine-preventable diseases (VPDs): Tuberculosis (TB), Diphtheria, Pertussis (whooping cough), Tetanus, Poliomyelitis (polio), Measles, Hepatitis B, Hemophilus influenza b, Yellow fever, Rotavirus, Pneumonia, Human Papillomavirus, and Typhoid Fever. The Ministry of Health, with support from WHO, UNICEF, GAVI, and other partners introduce new vaccines based on the country's disease burden and the emergence of other diseases that pose public health concerns. The target age groups for routine immunization services are: a) children 0–23 months; b) adolescents 9–14; c) women of childbearing age 15–49.

Special Immunization Activities (SIAs) for the purpose of controlling and eliminating some diseases may have dissimilar target age groups based on scientific evidence and WHO recommendations. The Ministry may provide immunization services to children 0–59 months and the general population based on the epidemiological situation in Liberia.

EPI Structure and Related Functions

The EPI is operationalized and managed at four levels: a) national, b) county, c) district and d) health facility levels:

At the national level, the EPI Manager oversees and coordinates all EPI-related activities in health institutions designated by the MOH to carry out EPI in the country. The National EPI Manager reports to the Chief Medical Officer (CMO). Members under the national level structure of the EPI include the Deputy Program Manager, Surveillance and Data Officer, Communications Officer, Routine Immunization Officer, Supplementary Immunization Officer, and Vaccine Cold Chain and Logistics Officer.

At the county level, the County Health Officer (CHO) is ultimately responsible for all health services including planning, implementation, and evaluation of immunization activities. The Child Survival Focal Point (CSFP) is responsible for the day-to-day management of EPI operations. The County Surveillance Officer (CSO) is responsible for integrated disease surveillance and response (IDSR), including for VPDs.

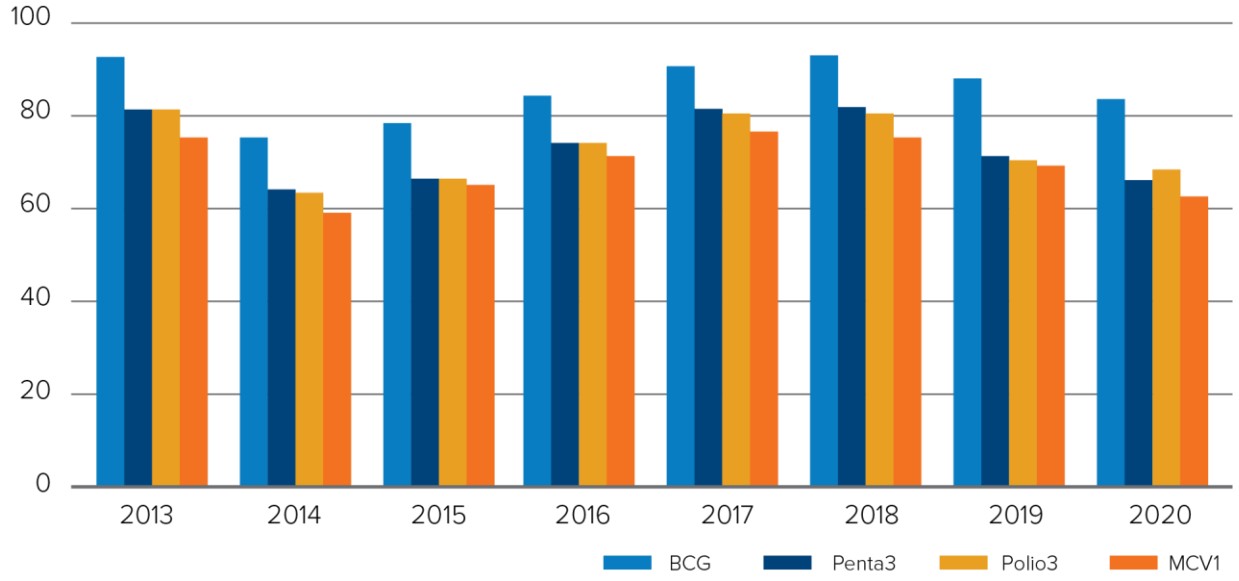
At the district level, each district has one District Health Officer (DHO) whose main responsibility is to conduct integrated disease surveillance and response. In some districts, DHOs may also provide supervision and management of health services.

At health facilities, the vaccinator is responsible for managing and delivering immunization services under the supervision of the officer in charge (OIC) of the health facility.

EPI Performance

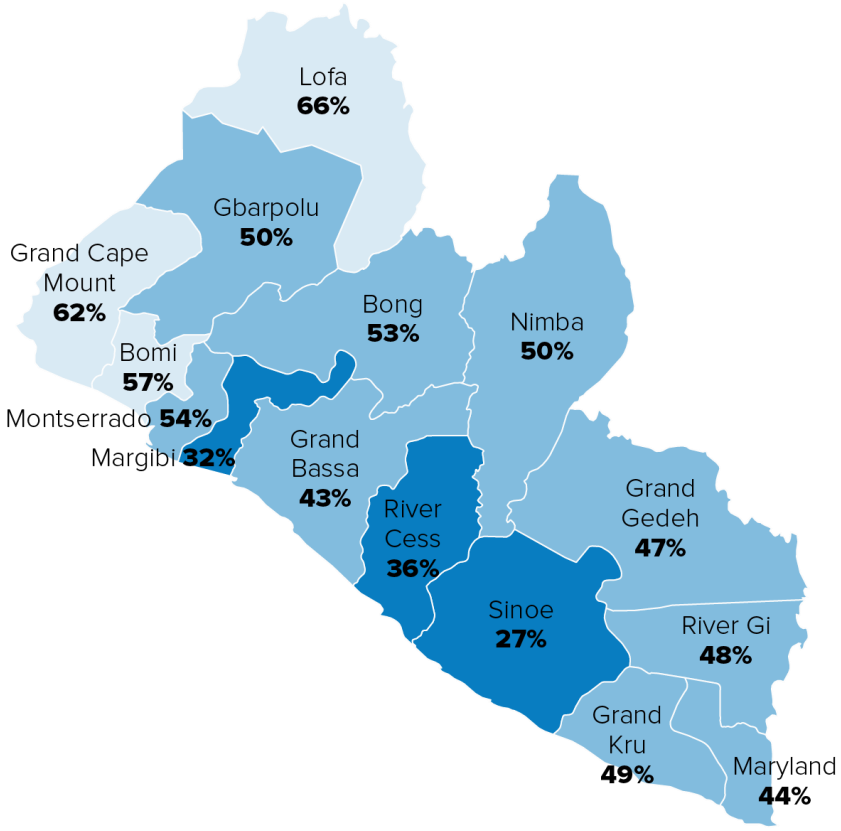
After the civil war, there was an increased number of health facilities, an expanded number of facilities with modern cold chain equipment, increased outreach activities and increased support from partners that resulted in an increase in immunization coverage from 2014 to 2018, but, since then, the immunization coverage has declined through 2020.

Figure 2: WHO and UNICEF estimates of immunization coverage from 2013-2020



The DHS 2019-2020 also shows large disparities in vaccination coverage for children aged 12–23 months who have received all basic vaccinations (i.e., one dose each of BCG and measles vaccine and three doses each of pentavalent [DPT-HepB-Hib] and polio vaccines). Only 27% of children in Sinoe have received basic vaccinations compared with 66% in Lofa.

Figure 3: Percentage of children aged 12-23 months who have received all basic vaccinations, DHS 2019-2020



REVIEW RATIONALE AND OBJECTIVES

2.1 Rationale

The Expanded Program on Immunization (EPI) policy goal is to reduce morbidity and mortality attributed to vaccine-preventable diseases within the targeted population. The key objectives and responsibilities of EPI/Liberia include guaranteeing free and equal access to immunization services across every village and town in the country.

To achieve equity immunization by a 'Reaching Every Community" approach, the United Nations Global Vaccine Action Plan (GVAP) recommended that National Immunization Programmes identify the underserved, have a detailed understanding of the barriers to effective access and utilization of immunization services, and review and revise micro-plans at the district and community level.

The last comprehensive EPI/Liberia review was conducted in 2012. Since then, many EPI activities have been implemented, including National Immunization Days for Polio (NIDS), Measles Campaigns, the introduction of new vaccines, and other surveys. Over the ten-year period, the program was affected by two major outbreaks, the Ebola Virus Disease Outbreak in 2014 and the ongoing COVID-19 pandemic which started in Liberia in March 2020.

The aim of the Comprehensive EPI Review (CER) is to document the successes and underperformances of the EPI program and to provide recommendations and suggestions to strengthen national strategies and activities to improve routine immunization coverage and decrease vaccine-preventable diseases (VPD) mortality and morbidity.

2.2 Review Objectives

The overall goal of this CER is to document the successes and shortfalls of EPI/Liberia and provide recommendations with a view to providing updated national strategies and activities for improving routine immunization coverage and decreasing VPD mortality and morbidity

General Objectives

1. To review aspects of the external environment and health system which affect the functions of the immunization system
2. To review immunization implementation at the national, county, district, health facility, and community levels
3. To conduct a strengths, weaknesses, opportunities, and threats (SWOT) analysis of the immunization system to identify the strengths and weaknesses at all levels of the service delivery system
4. To identify and recommend best practices that could be scaled up to improve the immunization system

REVIEW METHODOLOGY

3.1 Scope of Review

The CER was designed as a comprehensive assessment of all aspects of the program including enhancing lines of inquiry around the main issues that are affecting program performance. The seven basic immunization system components of the EPI that were selected to be assessed during the review are summarized below along with the specific aspects under each component.

	Component	Specific Areas
1	Program management and financing	Policy and guidelines, governance and accountability, planning and procurement, partner coordination, and budgeting and financing
2	Human Resources management	HR planning, capacity building, supervision, and performance management
3	Vaccine supply, quality, and Logistics	Cold chain, vaccine and devices, transport, and waste management
4	Service Delivery	HR and strategies, session quality and integration, missed opportunities for vaccination (MOV)
5	Immunization coverage monitoring and data quality	HR & systems, recording and reporting, data quality, coverage monitoring, and data use
6	Disease surveillance and AEFI	HR & systems, detection and response, performance, and adverse events following immunization (AEFI) monitoring
7	Demand creation	Demand, advocacy and communication, community engagement, and social mobilization

The assessment of all the seven program components was conducted from national to health facility levels, and conducted the following activities:

a. Held discussions with the national EPI teams and stakeholders to assess central-level program management, coordination, and financing,

b. Conducted reviews of the national EPI and surveillance program documents including strategic or annual plans, policy guidance documents, immunization and surveillance data databases, survey and assessment reports, and other relevant documents to identify strengths, weaknesses, opportunities, and challenges,
c. Conducted field visits at the national, county, district, and community levels to collect data using tools developed for the program review, analyzed operational and policy deficiencies, and identified opportunities, challenges, changing needs, and priority interventions to improve EPI and surveillance efforts in the country.

Activities for Liberia's CER) actively commenced in August 2021. Earlier attempts in 2020 were not successful due to many challenges including the COVID-19 pandemic which restricted international travel. A number of EPI documents (e.g., policy, plans, reports, assessments, guidelines) were collected and analyzed against the EPI core components to identify information about the barriers to supporting EPI program improvements. This desk review is required for turning a generic CER into one that reflects the country's context and draws attention to the most needed areas. The findings were used to adapt the generic questionnaires to the national context.

The table below summarizes the high-priority barriers identified by the desk review excel book tool, based on the information collected in the reviewed documents:

High priority barriers identified by the Desk Review	Priority
Budgeting and financing: Insufficient national financial resources for allocations to immunization	High
Budgeting and financing: Insufficient sub-national budgeting for immunization	High
Budgeting and financing: Sustainable funding of new vaccines uncertain/not available	High
Budgeting and financing: Availability and disbursement of funds from the central level is slow/unpredictable/not responsible to sub-national and local needs	High
Cold chain: Inadequate number of functioning refrigerators/cold chain equipment	High
Transport: Weak transport system (inadequate vehicles/fuel/maintenance) affects delivery of supplies, constraining service delivery	High
Waste management	High
Recording and reporting: Data on service utilization and equity are not optimally used for service delivery planning	High
Data quality: Mechanisms and funding in place for regular data quality review	High
AEFI monitoring: Poor AEFI reporting, monitoring and response	High
Disease surveillance: It reveals outbreaks of vaccine-preventable diseases (e.g., polio, measles, diphtheria)	High
Reporting and response: Availability of surveillance supplies	High
Reporting and response: Lab for vaccine-preventable diseases (VPD) surveillance	High

3.2 Management and Coordination

a. Review Management Team

The Review Management Team (RMT) composed of the National EPI Manager, WHO & UNICEF, is a high-level review coordination committee led by the EPI manager who is the Review Manager. The RMT is responsible for ensuring that required preparations are completed, as per the plan. The RMT has oversight responsibility for the entire program review process. The process was guided by three sets of coordinators.

b. Roles and responsibilities of review team members

1. *National coordinator* The national coordinator is the Deputy EPI Program Manager, Research Director/HMER**.** Together with the country team it is responsible to support planning/preparation, conduct of field data collection, collation, analysis, presentation, and report writing. The specific roles include: collating all reference materials and relevant program documents; conducting the desk review and preparing review protocol; adapting review questionnaires to the country context; managing the logistics of getting teams to the field; and coordinating orientation and debriefing sessions.
2. *External CER Coordinator* JSI Research and Training Institute (JSI), is serving as technical lead. The external CER Coordinator is responsible for overseeing the preparation, implementation, and reporting of the review findings. Duties and responsibilities include: coordinating and participating in the preparation or revision of data collection tools for review; finalizing methods and data collection tools; defining roles and responsibilities of the review team; identifying and assigning topic and field review team lead; organizing the national briefing presentation; facilitating orientation of reviewers on the review protocol and questionnaire; coordinating and overseeing data management and analysis; coordinating the preparation and submission of the final report.
3. *Field Team Lead* A field team lead is an external reviewer who will lead the field assessment in an assigned geographic area. His/her duties and responsibilities include: leading fieldwork in the area of assignment; ensuring that the selection of sites/health facilities follows the established approach; ensuring that the role of each team member is clear and well implemented. The field team lead also is responsible for data collection, entry, and reporting; conducting sub-national debriefing; finalizing a synthesis of review findings/recommendations and presentation; and writing a summary of field findings.
4. *Topic Lead* A topic lead is the designated review participant (usually external) responsible for leading analysis and reports writing of a specific topic/thematic area. The specific roles and responsibilities of the topic lead include: providing leadership on a topic of review; assessing review tools to ensure that queries in the topic areas are clear and adequate; after the field team presentation, facilitating the topic group work to review and revise presentations of topic areas from the different field teams; writing a report on the designated topic area that can be used for the final CER report.
5. *CER Field Team members* are responsible for conducting interviews in the field at assigned levels, consolidating the findings, presenting findings to sub-national teams, presenting findings to the other CER field teams, and providing input into the CER final report.
6. *Data Team* members' duties and responsibilities of the data team include: facilitating the generation of data for the selection of review sites using the set selection criteria; designing questionnaires in Open Data Kit (ODK); developing data entry and data analysis template in excel sheet, use of ODK for the orientation of the review participants; monitor data quality, daily online submission, and assist in data analysis

c. Review team composition, training, and assignment

Review team composition A total of 21 officers in seven teams from the Ministry of Health and partner organizations conducted the review. At least one external team member and two internal team members were assigned to each team. Each team was responsible to visit the county and two selected districts and six health facilities within a county. One team was assigned to conduct the national level reviews with the EPI team, surveillance, partners, national cold chain, national laboratory, other ministries and international organizations.

Training/orientation of the review team A two-day orientation/training was given to both the external and national participants. This was preceded by a one-day briefing/orientation and planning meeting with Topic and Team Leads to finalize protocol and tools. The training was focused on the review protocol, the adapted questionnaires at different levels, and the use of the ODK platform in data collection and online data submission.

Assignment External and national participants' assignment to the different regions was done through consensus building. The team assignment plan with the contact of participants was elaborated and shared with all participants.

3.3 Review Sites Selection

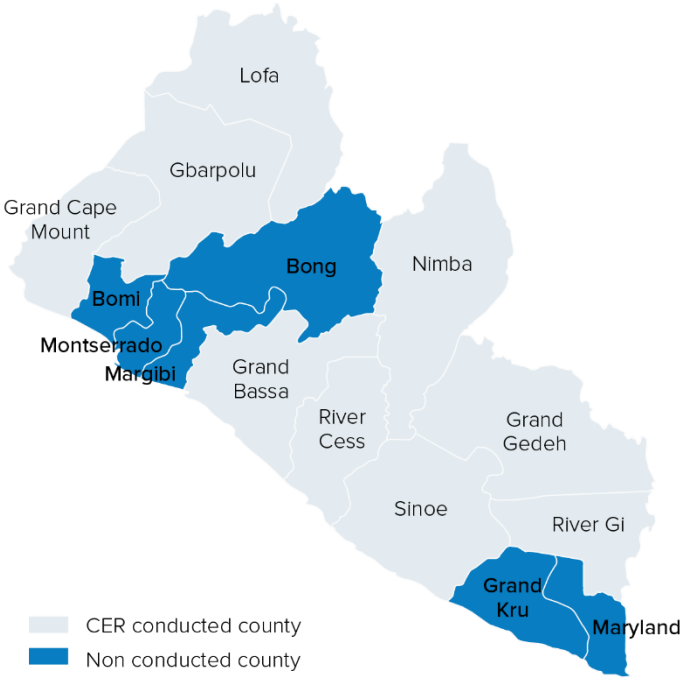
At national level The national level was purposely selected. Interviews were conducted with high officials in various institutions including the Minister of Health, Hon. Dr. Wilhelmina Jallah; Deputy Minister of Administration, Norwu G. Howard; Deputy Minister and Chief Medical Officer, Dr. Francis Keteh; National EPI Manager, Adolphus Clark; EPI Deputy Manager, Nicholas Blidi; Financial Comptroller, Atty. K. Jlayteh Sayor; Gavi Accountant, Issac O. Ross; USAID, Jessica Healey; UNICEF, Abebe Kassahun Afework and Evans Lablah; Routine Immunization Officer, Matirankie M. Kanneh; NPHIL Surveillance and Lab Leads, Ralph Jetoh and Fahn Taweh; WHO, Roland Tuopileyi and Dr. Peter Clement; Gavi; NPHIL, Public Health Surveillance Coordinator, Adventus Mianah; NPHIL Director, Dr. Jetoh; VPD Surveillance Coordinator, Rosalyn Gbokie; AEFI Surveillance Coordinator, Musand Kromah; EPI Data Manager, Joseph Yokie; National Cold Chain Officer, Jackson Naimah; EPI Logistician, Tommy Faulkner; Assistant Minister of Education for Student and Personnel Services, Tarnue Marwolu Bongolee; Director for School Health, Johnson T. Hinneh; Director for Human Resources (MOH), James M. Beyan; Director and Staff for Health Promotion, Chester A.Smith; and World Bank PIU, Sonpon Blama Sieh, Matthew Fromo, and Harry Neuriflle.

At county level All five regions have been selected for the comprehensive review. All regions have been visited and, in each region, one county has been randomly selected. Montserrado has been purposefully selected based on the population size and the number of health facilities, making the total counties for the assessment six. Two districts, one high- and and one low-performing, by county were selected using 3 years' (2019- 2021) average routine immunization performance indicators.

At district level Three health facilities were selected in each district. The selection of 3 health facilities per district was done by the review team together with the district team using performance selection criteria. Some of the criteria to consider include, health facilities having immunization sessions during the review week identified. Health facilities to be visited were selected from the list. If immunization performance data by health facility is available, low-performing, medium, and good-performing health facilities were selected; otherwise, the health facilities were selected randomly. For Montserrado, two public health facilities and one private health facility providing immunization services were selected in each district.

The county and district selection is done at the central level, but the health facility selection is done in the field, using selection criteria. Penta3 coverage and Penta1—Penta3 dropout rates were used as performance indicators to select health facilities.

Figure 4: Map of visited counties



3.4 Data Collection and Analysis

The WHO generic questionnaires at different levels were adapted to the country's context to collect information for the review at national and sub-national levels, including county, district, health facility, and community. Approaches to collect information at all levels included interviews with a relevant person (key informant), observation, as well as data, document, and report review.

Data collection and transfer were done using the ODK platform. The data team designed the questionnaire in the ODK platform, downloaded the platform into tablets, and trained review members on the use of the device to facilitate daily data submission from the field.

The national and field teams collected data using the ODK platform and submitted it online to the central server on a daily basis. At the central level, the review coordinator, with the help of the central data team, monitored the completeness and quality of daily submissions. The field team lead was responsible for the online data collection and daily submission to the central server. In addition, backup, paper-based data collection was provided to the teams.

At the end of the fieldwork, the review teams organized a brief debriefing to the respective regional health teams and EPI partners summarizing the findings of the field visits. The Team Leads summarized their findings and prepared a written report detailing the strengths, weaknesses, conclusions, and recommendations for each of the seven components of the immunization system.

At the national level, a three and one half day online meeting with Topic Leads was organized for synthesizing findings and recommendations, and for preparing reports by thematic area. Reports summarize the strengths, weaknesses, and recommendations to improve the EPI. Topic Lead reports were used by the review coordinator to prepare the review debriefing presentation for partners and senior officials from the Ministry of Health. The review coordinator led the writing of the final report.

Data cleaning and analysis were done by the data management team, and data analysis outputs were shared with the topic leads to draft the reports of components review and PowerPoint presentations to be consolidated by the review coordinator.

3.5 Limitations of the Review

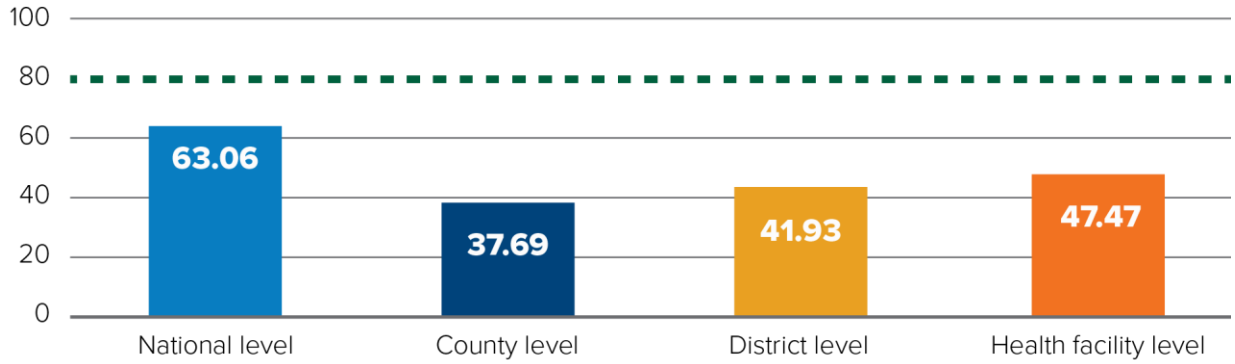
The results provide the information to understand the EPI/Liberia from a national perspective. The results and recommendations may not be applicable to all counties, districts and facilities. Counties, districts, and facilities selected for the review may not be representative of those that were not evaluated.

REVIEW FINDINGS (BY THEMATIC TOPICS)

The data collected during interviews and observations have been analyzed to identify the strengths and weaknesses of the EPI/Liberia. An improvement plan can leverage strengths and weaknesses to determine which strategic actions will be taken to improve the program performance. The data analysis also evaluated—thematic area by thematic area—the EPI overall performance rate at the national level, and performance rate at the sub-national level across the visited counties, districts, and health facilities.

At the national level, the overall performance of EPI/Liberia, integrating all pillars and all counties, is 45.21%. The national level has the highest performance (63.06%) and the county level has the lowest performance (37.69%).

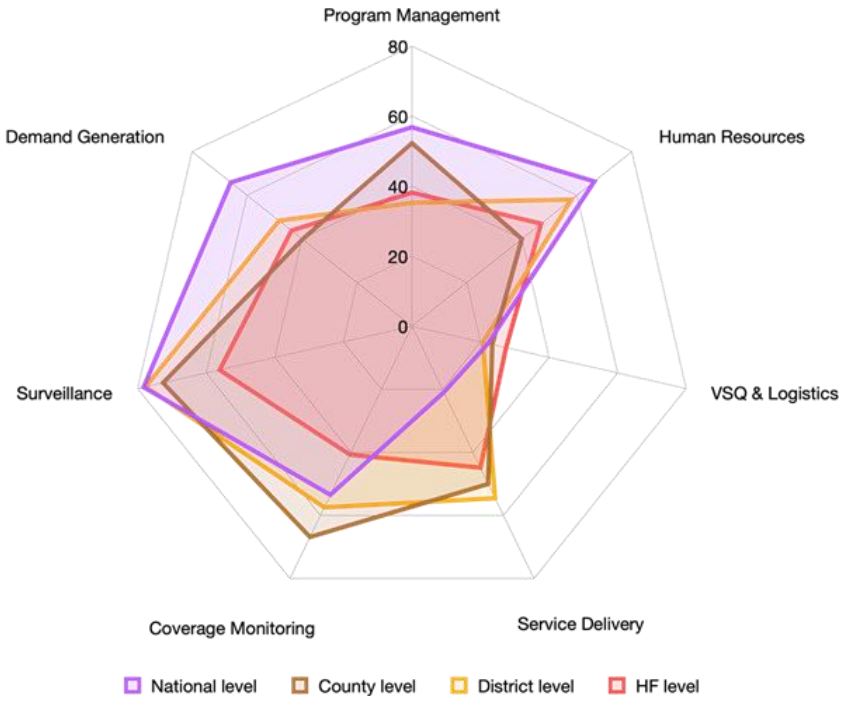
Figure 5: EPI performance at different levels of the health system



There are no significant differences among the county level, district level, and health facility level for the overall performance. However, per thematic area, the differences are high in almost all pillar thematic areas, except in vaccine supply. The national level is more performant than the peripheral level in program management, demand generation, and human resources but less performant in logistics and coverage monitoring. In surveillance, all levels are quite performant, except for the health facility level.

The analysis of the performance across the thematic areas shows that the pillar with the highest performance is Surveillance (63.54%) and the pillar requiring more input is Vaccines Supply Quality and Logistics (25.28%)

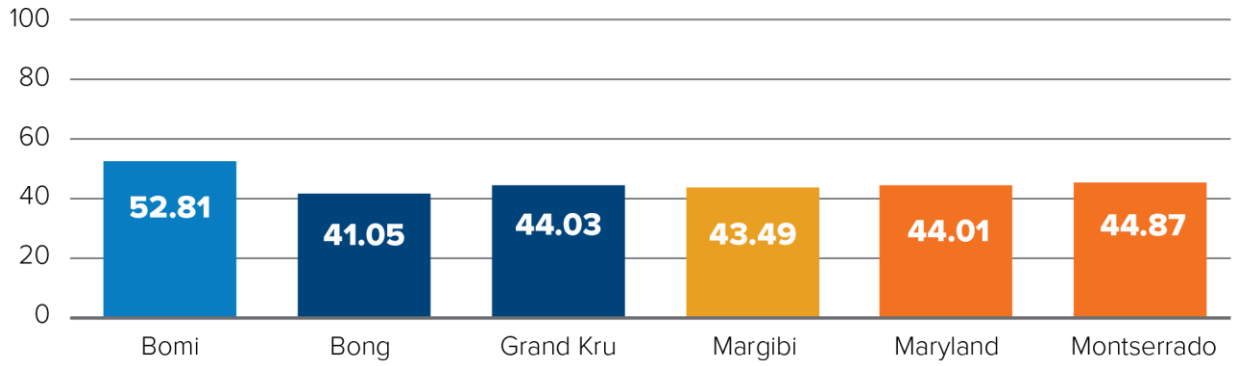
Figure 6: Performance of EPI per thematic area and per level of the health system



The strategies would aim to raise to a minimum of 80% of the overall performance, 75% of the performance of every pillar, and 75% of the performance of every district.

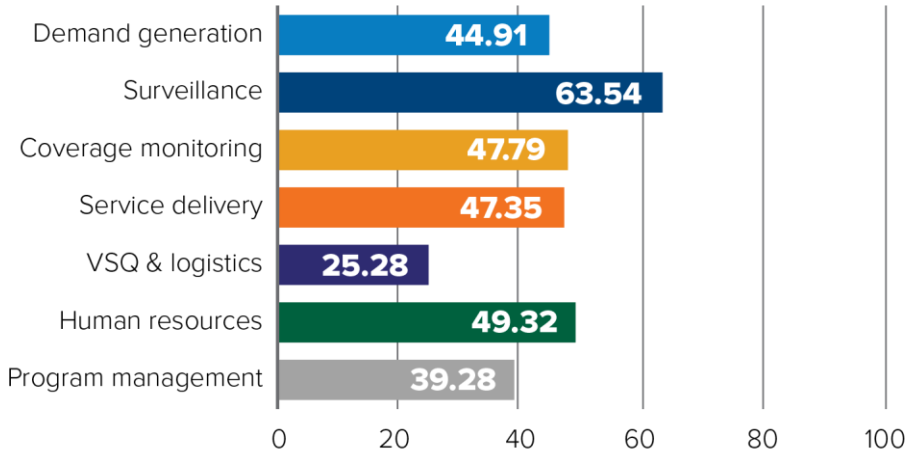
At the county level, the county with the highest performance is Bomi (54.04%) and the county requiring more input is Maryland (37.05%).

Figure 7: EPI Performance by county



The analysis of the performance across the thematic areas shows that the pillar with the highest performance is Surveillance (63.54%) and the pillar requiring more input is Vaccines Supply Quality and Logistics (25.28%)

Figure 8: EPI Performance by thematic area



4.1. Program Management and Financial Sustainability

4.1.1. Background

The first priority of the framework for action of the Immunization Agenda 2030 is to ensure that the immunization program is an essential part of primary health care, and thereby contributes to universal health coverage. One of the objectives of this strategic priority is to reinforce and sustain strong leadership, management, and coordination of immunization programs at all levels.

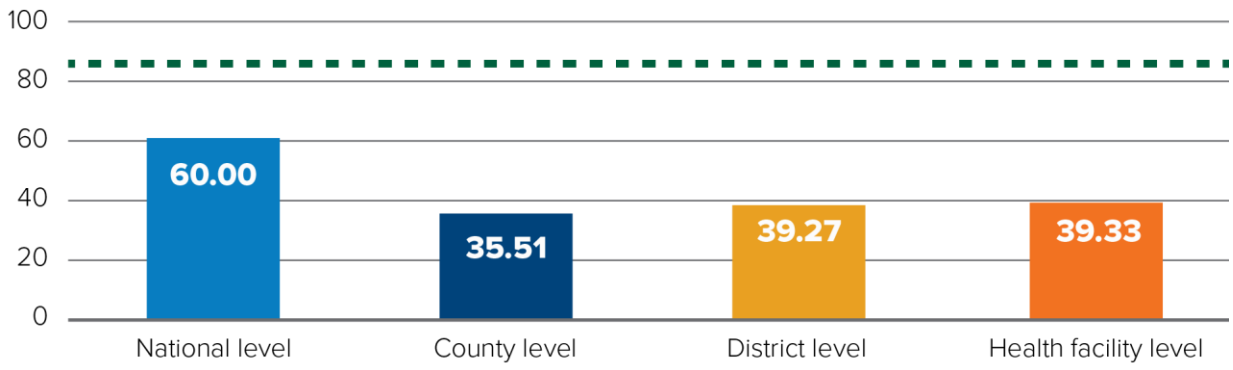
The desk review conducted prior to the CER has revealed missed opportunities for vaccination resulting from regulation/policy restrictions that prevent some health worker cadres or apprentice workers from administering vaccines. This was highlighted through the Wastage Rate Study. There are insufficient national financial resources for allocations to immunization. This was evidenced by the delay in co-financing by the Government of Liberia. Insufficient sub-national budgeting for immunization was detected through the limited time allocated for the budgetary process along with delay in accessing government allotment. Sustainable funding of new vaccines is uncertain/not available. There is usually a delay in co-financing. Availability and disbursement of funds from the central level are slow/unpredictable/not responsive to sub-national and local needs. This led to stock out, low coverage, and postponement of planned immunization activities (e.g., outreach).

4.1.2. Findings:

Performance of the program management and financing

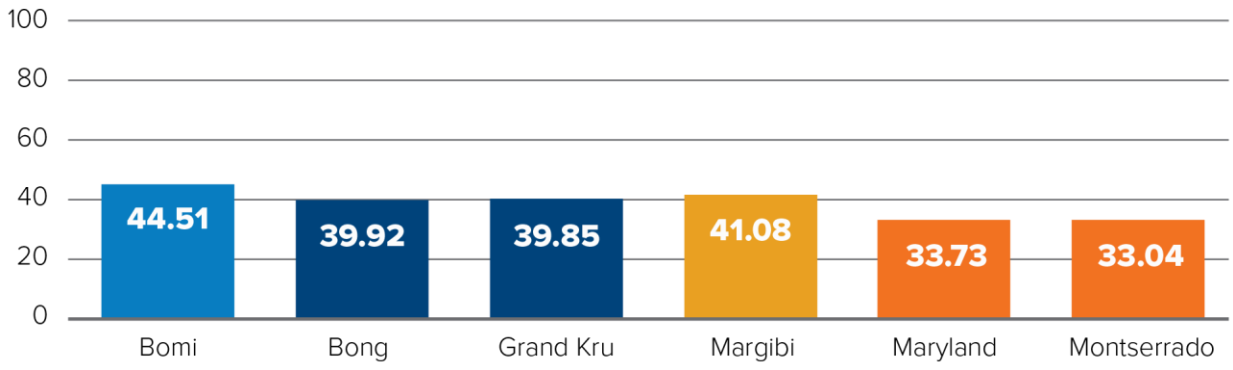
The analysis of the performance of the program management and financing across the different levels of the health system shows that the higher performance is at the national level (60%). At the lower levels, the performance is low at the county level (35.5%); the district level and the health facility level have the same performance (39.3%).

Figure 9: Performance of program management and financing across the levels of the Health System



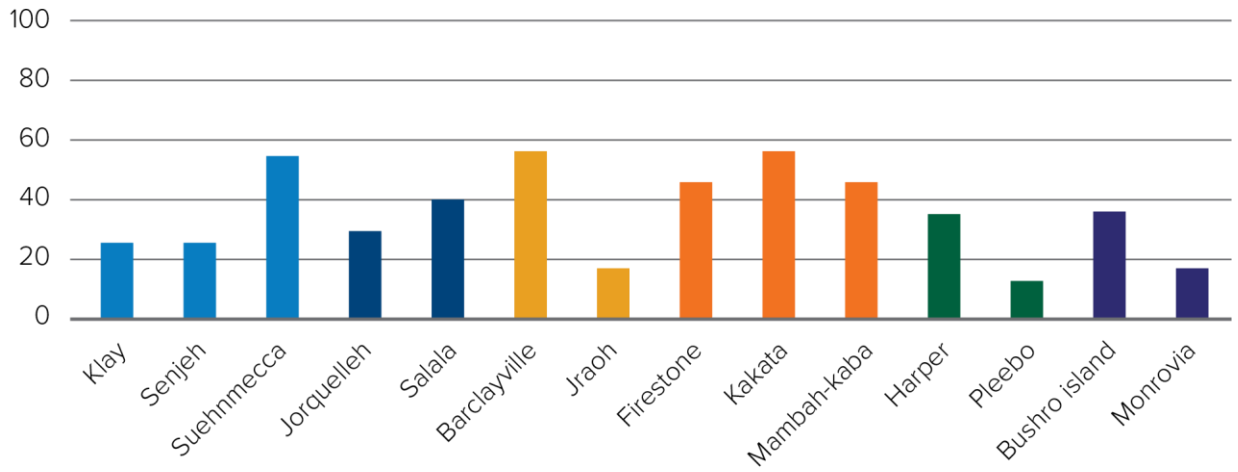
The performance of program management and financing in different counties is low (<50%). The county of Bomi has the highest performance (44.5%) and the county of Montserrado has the lowest performance level (33.4%).

Figure 10: Performance of program management and financing by county



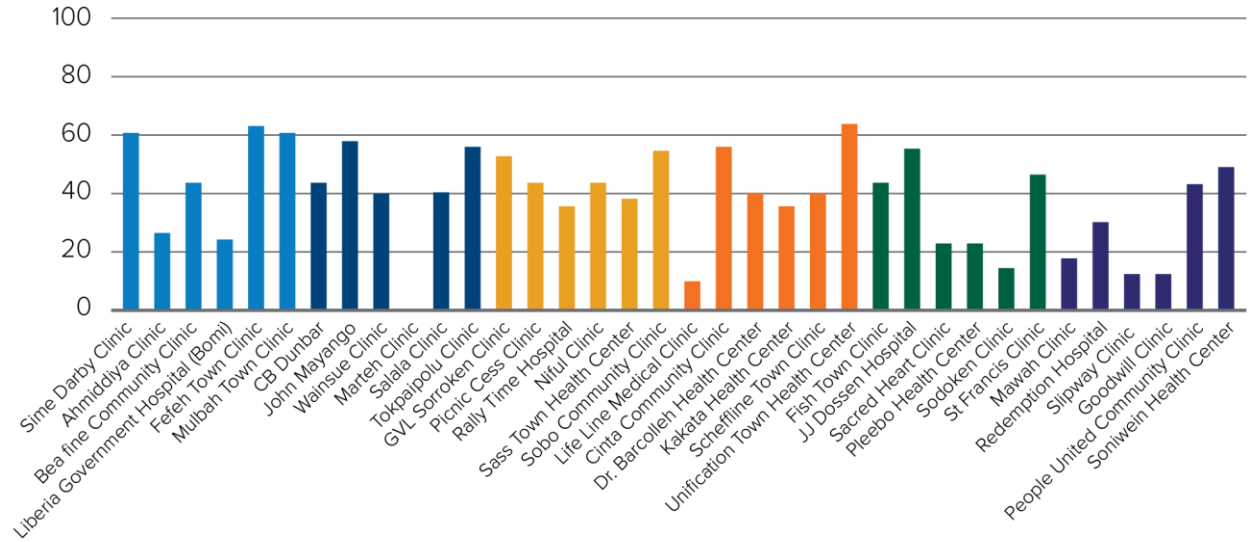
The performance of the program management and financing is generally low at the district level. The districts with higher performance are Suehn Mecca, Barclayville, and Mambah-Kaba whose performance is above 50%. The districts of Jraoh, Monrovia, and Pleebo have the lowest performance level, between 10% and 20%

Figure 11: Performance of program management by district level



At the health facility level, the performance of program management and financing varies from 60% to 10%. The health facilities with higher performance above 60% are Fefeh town clinic, Mulubah town clinic, and Unification town health center. Life line medical clinic has the lowest performance, below 10%.

Figure 12: Performance of program management by the health facility level



Policy and Guidance:

For the most part, there exist clear policies and immunization laws. However, some updating and revisions are needed. The EPI is included in Chapter 10 of the revised 2020 National Public Health Law. This law informs EPI policy and addresses financial provisions and tax exemptions. EPI policies follow WHO policies and were revised in 2014 including multi-dose policies, and procurement of only EUL-approved vaccines. The updated 2019 National EPI guidance provides a strong policy foundation to guide services from the county level.

While most policies and guidance exist, county, district, and health facility staff are not always aware of or understand the guidelines. All levels stated that Job Aids are limited and often outdated. At the health facility level, micro-planning is not addressed in the field guides. Most of the health facilities visited did not have up-to-date and clear immunization schedules on the wall. Often missing were the newly introduced vaccines, like Tetanus/Diphtheria, Typhoid, HPV, Rotavirus, and novel OPV.

EPI guidance does not include how to respond to epidemic-prone diseases like Ebola and COVID-19, and is not flexible to address emerging policy and disease-related changes. And, while the 2012 recommendation for the development of an urban immunization approach is said to have been addressed, the extent of implementation has been questionable.

Governance and accountability and partner coordination

The National Immunization Technical Advisory Group (NITAG) was established in April 2022 with Terms of Reference, but at the time of this review it had not yet met. Since 2015, The Interagency Coordination Committee (ICC) has been subsumed into the Health Sector Coordination Committee (HSCC) and the Health Coordination Committee (HCC). These Committees are chaired by the Minister of Health and the Chief Medical Officer respectively.

The HSCC and the HCC committees address all health issues and the EPI does not include detailed input from other ministries, parliamentarian chairs of the health committees, donor partners, and the private sector. These groups are more informed of plans and asked to sign off on GAVI applications. They are not actively engaged in the planning of activities nor, in the case of the Ministry of Education, adequately informed on what the vaccines are

for and how schools can be more engaged in the delivery of new vaccines and booster doses. While there is a school health law that all students are to be fully vaccinated, this law is either not known or easily enforced. Limited coordination with partner activities appears to exist at the county level and below. According to GAVI representatives, the EPI has been running with little strategic oversight and suboptimal coordination among partners. The desk review noted that no structural assessment has been done to evaluate the effectiveness of these committees.

With the COVID-19 epidemic and other outbreaks, the EPI director seems to be overstretched and without enough time to focus on routine delivery of immunization services.

Planning and procurement

The Comprehensive Multi-Year Plan ended in 2020. A new 10-year plan, based on the WHO Immunization Agenda 2030, is planned and will be based in part on the findings from this evaluation. Annual work plans are made to serve as the basis for the plans at all levels of the health system and are linked to the funding that has been established at the national level with some financial support from local governments and partners. County, district, and health facility levels are providing core EPI services despite structural limitations posed by limited budgets, staffing shortages, lack of transportation for outreach services, and access barriers, particularly during the rainy season. The private sector, faith-based and non-governmental organizations (NGOs) receive training and vaccines from the EPI. However, staff turnover in the private sector is cited as a problem by the county and district level staff for the delivery of quality services.

Budgeting and Financing

There is a line item for EPI in the health budget. The budget is primarily funded by GAVI, WHO, and UNICEF; at the county levels, NGOs and other government partners provide supplementary funds for outreach and response to vaccine-preventable outbreaks. Donor partners have provided support via the pooled fund in the past and currently through performance based financing (PBF). The MOH began implementing the PBF in 2013, in many different counties at different times. Primarily, U.S. Government (USG) support through FARA 1.0 and the first three years of FARA 2.0 was in three counties - Bong, Lofa, and Nimba. USG support increased to an additional three counties (Grand Cape Mount, Grand Gedeh, River Gee) for the remaining three years of FARA 2.0. From January 2022, two more counties are included - Grand Bassa and Margibi. Other donors (the World Bank and donors that funded the Pool Fund) supported PBF implementation in other counties. With the end of the Pool Fund in 2018, the USG and World Bank remain the major donors funding the PBF strategy of the MOH. PBF uses a fixed amount reimbursement mechanism to pay for agreed achieved milestones or outputs. For USAID the current design pays for achieved units of service for a list of services (in (maternal, newborn, and child health (MNCH), malaria, and family planning). The Immunization indicator is the percentage of children under age 1 year fully immunized. There is additional funding for central MOH level milestones that support service delivery. Once the MOH receives funding from the USG through USAID, they apply those funds to implement their PBF strategy.

At the MOH level, the PBF is used to incentivize health facilities and counties to improve their performance. Each health facility and county health team is provided incentives after they have achieved MOH set targets for select service delivery indicators and system strengthening indicators.

Funding from USAID for achieved milestones, is paid to the MOH through wire transfer into a dedicated bank account at the Central Bank of Liberia. Funds are then transferred into a MOH operation account in a commercial bank. Through MOH processes, funds are then transferred to dedicated accounts of the County Health Teams (CHTs). The funds transferred are managed by the CHT while adhering to the public financial management guidelines of the MOH. In FARA 1.0 and 2.0, the MOH retained funds meant for incentives, called bonuses. The bonuses, for achieved health facility and county targets, are paid to the counties and health facilities after verification by the MOH.

The funds paid to the CHTs are managed by them. The MOH Public Financial Management Policy provides guidelines on the persons (or their designates) approving requests for the use of funds for all activities including procurement for goods, services, and works. Funding is mainly used for county operations especially to achieve milestones and PBF indicators, including fuel, supervision, logistics, and equipment. CHT Funds are not used to pay

salaries. Since 2019, USG funds have not been used to pay salaries as occurred previously, and thus, the MOH and GOL pay the salaries of all staff.

There is currently a new PBF manual, to supersede the manual of 2013. The implementation of this new manual will be in an initial eleven counties (eight supported by the USG and three by the World Bank) with an expected expansion to the remaining four counties by 2024.

The operational plans are based on the funding provided and are not enough to fund all critical EPI activities. All levels cite the lack of sufficient funds for conducting outreach. Frequently cited is a lack of funds for transport, purchase of motorbikes, fuel, and management of the fleet. The number of vaccinators is, in most cases, one per health facility, and funds for their training are limited, and late, thus, often reliant on unpaid volunteers. Lack of funding has also resulted in stock out of vaccines, such as bacille Calmette-Guérin (BCG), polio, and measles. Many vaccinators rely on special campaigns for their payment, often leaving fixed facilities with no one to provide routine immunization services.

Costing and financing

GAVI provides support for 98% of the EPI Central Level staff, funding for new vaccines, and health systems strengthening. The government provides less than 1% of the total budget. WHO, UNICEF, the World Bank, and donor partners provide the funding and technical support for the purchase of vaccines, logistics at the county and local levels, advocacy, and supplementary salaries for outreach and response to outbreaks. The Government was delayed in meeting its co-financing obligation for two fiscal years (FY 2018–2019 and 2019–2020).

During the budget process, the budget request is channeled through the Chief Medical Officer (CMO) who can lobby for increased funds to the Minister of Finance (MOF). If the MOF does not increase the budget a request can be made to Parliament.

As previously stated, local governments, NGOs, donors, and the private sector provide financial and technical support at the local level for outreach, response to outbreaks, and some logistical needs. However, given there is no coordinated planning at the county, district, and health facility level with local partners, this has led to duplication of funds and a lack of funding for some line items and not planned on a timely basis if at all. This was the same finding as the 2012 EPI Evaluation review report.

4.1.3. Recommendations:

1. Revise the EPI Staff and Committee TOR dated 8/30/2012. This document should clearly define the roles and responsibilities of all stakeholders.
2. Reinstate the Interagency Coordination Committee (ICC).
3. Ensure robust engagement with local governments, parliament, and partners with clear roles and responsibilities all throughout the process of planning, implementation, monitoring, and evaluation.
4. Ensure transparency in planning at all levels so that all know who is financing what to avoid duplication of funding
5. Develop MOUs with other ministries, in particular the Ministry of Education.
6. Review after-action report for Ebola and COVID-19 to develop a plan for catch-up and recovery and sustaining routine EPI.
7. Document ongoing actions to address measles, pertussis, and other outbreaks; data should drive actions at sub-national levels.
8. Review the urban immunization strategy implemented in Montserrado and the potential needs for implementation in other countries aside Montserrado.
9. Disseminate clear guidelines, policies, and schedules to lower levels, and collect and destroy outdated materials.
10. Work with the Ministry of Finance and with Parliament to increase the Ministry of Health budget for EPI/Liberia.

4.2. Human Resources

4.2.1. Background

The health workforce is a key area focus of the Immunization Agenda 2030. The objective is to ensure the availability and appropriate distribution of health workers who are motivated, skilled, knowledgeable, and appropriately resourced to plan, manage, implement, and monitor the performance of immunization programs at all levels and locations, as part of primary health care.

The desk review conducted to inform the comprehensive EPI review revealed poor staff motivation by the level of unemployment of vaccinators. As evidenced by Missed opportunity for Vaccination (MoV) study and supportive supervision reports, amongst others, health worker misunderstanding of wastage policy and/or fear of criticism, resulting in them not opening the vial, led to missed opportunities.

There is inadequate training to prepare health staff for immunization or for new vaccines. This is evidenced by low demonstration of immunization skills by newly graduated health workers and newly employed immunization staff. Many, often uncoordinated, in-service trainings pull staff away from service delivery. Multiple trainings from central to counties have interrupted services also.

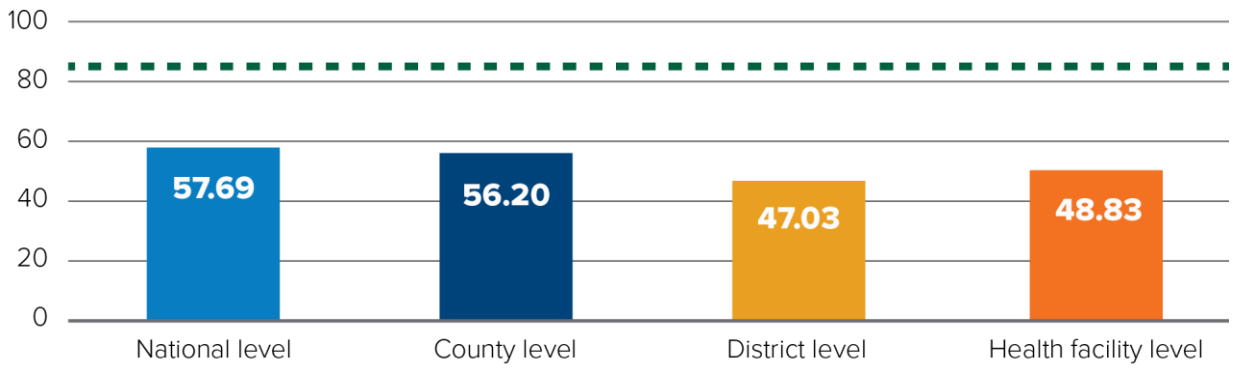
There is a suboptimal number and quality of supervisory visits. These findings are suggestive of issues associated with entry error and transcription error, inconsistencies, lack of data use for action, vaccine accountability, and limited supportive supervision.

4.2.2. Findings

Performance of Human Resources

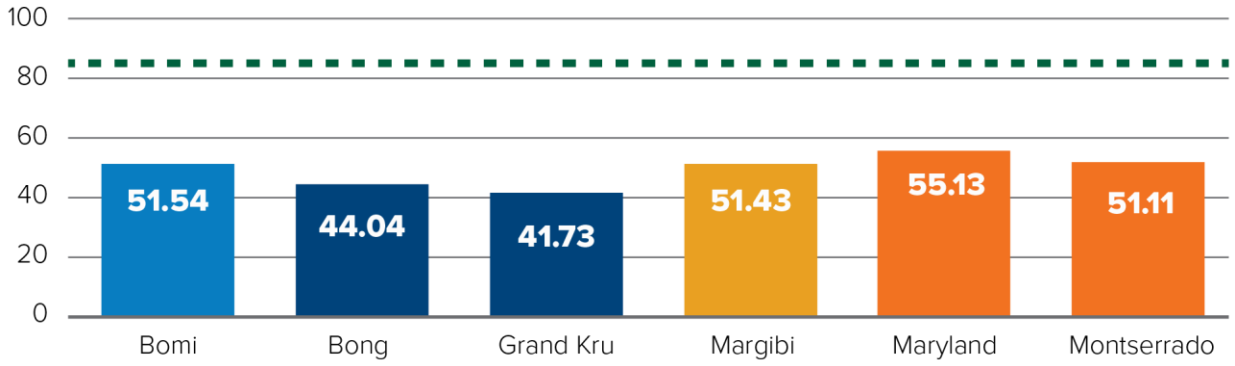
The analysis of the performance of the Human resources component across the different levels of the health system shows that the highest performance is at the national level (57.6%), followed by the county level (56.2%). To improve the performance of the component, the district level (47%) and facility level (48.8%) require more effort.

Figure 13: Performance of human resources at different levels of the health system



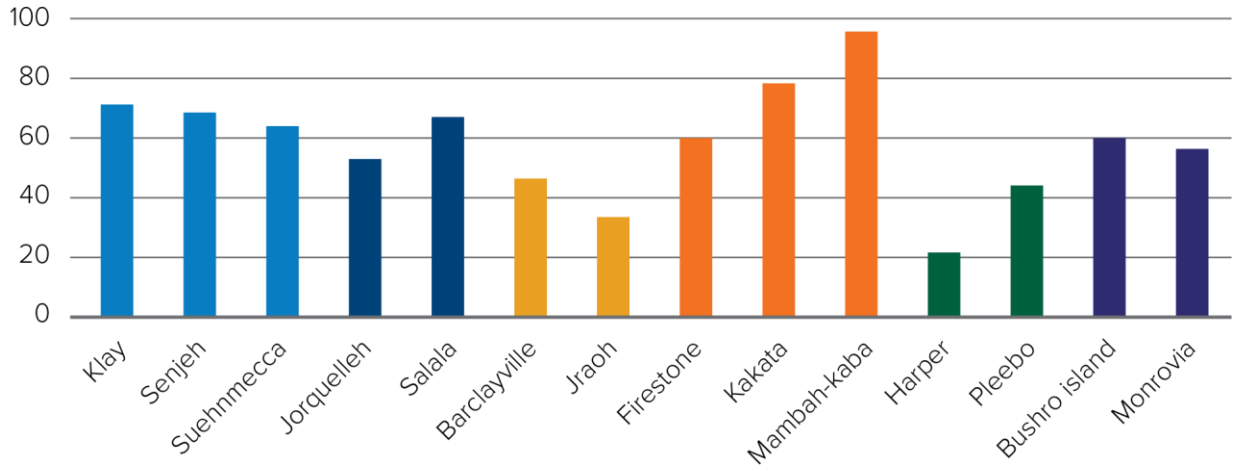
The graphic on the performance of the human resources thematic area at the county level shows that 4 of 6 counties scored more than 50%, with the best performance (55.1%) in Maryland County. Efforts are needed to improve performance at the county level, especially Grand Kru with the lowest performance (41.7%).

Figure 14: Performance of human resources at the county level



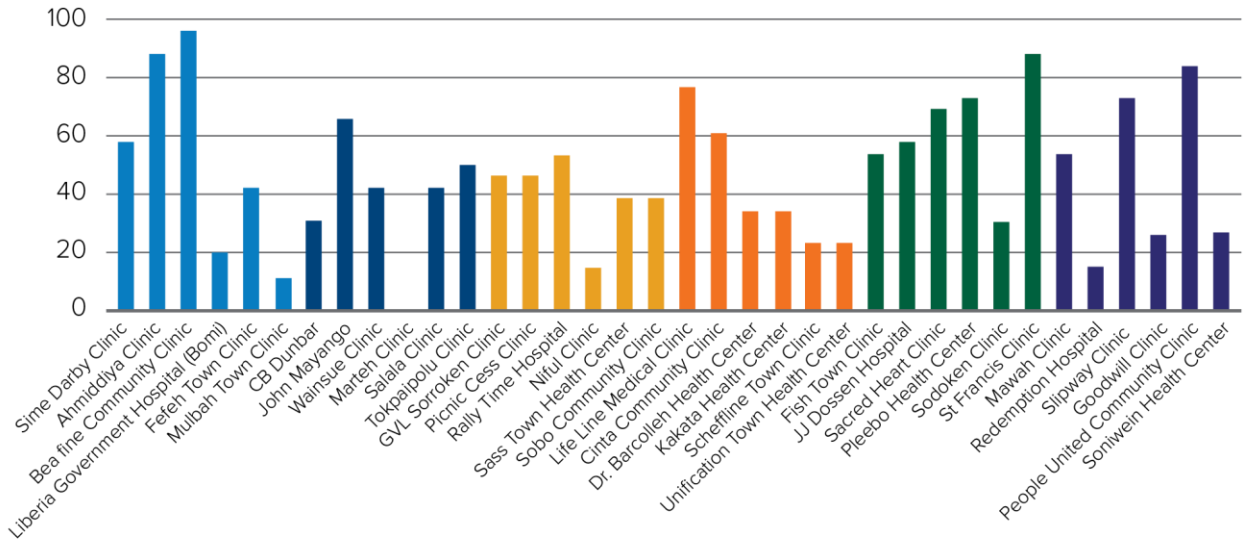
At the district level, Mambah Kaba (93%) and Kakata (89%) both in Margibi county have the highest performance in human resources. The districts of Jaroah and Barclayville in the county of Grand Kru, and Harper and Pleebo in the county of Maryland have performance below 50%. More efforts are needed in those districts, especially Harper which has the lowest performance (20%).

Figure 15: Performance of human resources at the district level



At the health facility level, the performance of human resources scores range from the Beafine community clinic (95%) to the Mulubah Town clinic (10%). Four health facilities scored more than (80%), while another four health facilities scored less than 20%. Efforts are mostly needed in the 15 health facilities scoring less than 50%.

Figure 16: Performance of human resources at the health facility level



The EPI structure and related functions

EPI staff at all levels show tremendous dedication, despite resource limitations facing the EPI and the MOH budget for staff salaries. Community Health Assistants (CHAs) play an important role in defaulter tracing, community mobilization, and advocacy, as well as in disease surveillance.

The Director of the EPI unit is very strong technically and is very experienced. He also brings great passion to his work. He shows an extremely high level of commitment and it is clear he wants to be a strong performer. For that reason, he is very hands-on. Feedback from various ministry personnel and donor partners thought the EPI manager works independently and does not always take an institutional approach (which undermines institutional systems). This leads to a greater focus on addressing immediate priorities in an organic fashion rather than a balanced systematic approach based on priorities. Interviewees thought the processes are over-centralized with limited administrative management capacity which results in the EPI Director being overstretched to cover the various dimensions of the work, especially for things that should be routinized. The EPI unit staff all defer to him, but this does not leave enough space for the partners' valuable inputs—especially since there is no ICC in place.

A 2005 document entitled Expanded Programme on Immunization, EPI Staff and Committee Terms of Reference was revised in August 2012. It provides detailed Terms of Reference for the EPI staff positions as well as the roles and responsibilities of the Inter-Agency Coordination Committee (ICC) and the technical working groups. The document needs to be updated to reflect the current or new organizational chart, job descriptions/functions, and preferred profile. Staff hiring is not transparent and tends to be based more on applications on file with the Human Resource Department than on the profiles required for the position. While overall staffing levels at the National level seem sufficient, the staff at the county, district, and health facility levels indicated that staffing for EPI functions was only partially sufficient and many indicated that staffing was insufficient in terms of the number of vaccinators, data management personnel and logistics and cold chain officers. Many vaccinators are working on a volunteer basis, some upward of two years and, if paid, payments are often delayed.

Capacity building

The findings from the desk review indicate that there were missed opportunities for vaccinations due to health workers' misunderstanding of the wastage policy and or fear of criticism resulting in not opening a vial of vaccine for one or two persons. The training was not always well-planned nor based on a master training plan addressing overall health system needs. This resulted in staff being pulled away from service delivery. Staff was not always well prepared for the introduction of new vaccines and their delivery modes. The 2012 EPI review recommended,

"For long-term planning and following the updating of national EPI policies, the MOH/EPI should assemble a comprehensive list of all training gaps (cross-cutting and technical) and prepare a master training plan addressing overall health system needs. National and County training could occur in phases, based on system priorities, and should be competency-based." It does not appear that this recommendation has been implemented.

At the county and district level, expressed training needs included HR management skills, strategic planning, immunization in practice/new vaccines, cold chain management, data management and use, and surveillance and AEFI. In short, refresher training in almost all areas of the health and EPI system was cited. At the health facility level training needs include a focus, in particular, on micro planning, immunization practice/new vaccines, data management and use, and cold chain and vaccine management. Training did not correspond to the needs. Half of the health facilities visited reported that there were too many uncoordinated sessions and the other half felt there were too few sessions.

Supervision and performance monitoring

The EPI manager said the supervision plan is a live document, guided by four actions: data to guide the program; go alone, not with other programs; have the right logistics; and have the right tool. There is a supervision officer, however, he was not interviewed and the supervision checklist was not obtained. The findings of the CER revealed that 6 districts out of 13 declared that they have a supervision plan.

All levels reported having received more than one supervisory visit in the past six months and feedback is provided, often written.

The 2012 EPI review recommended "assigning a national staff member to act as a sub-national supervisor to one well-performing and one underperforming county." This recommendation is still worth consideration and implementation.

By having a focal person assigned to each county, all counties can be provided with routine immunization supervision. The sub-national supervisor should engage national and county-level partners in the supervision plan. In addition, the expertise of the national and partner focal persons for surveillance, cold chain, logistics, and data management should be engaged as needed for consultation on county-level issues. These teams should conduct quarterly supervision visits to the counties and selected health facilities. Before their visit, a desk review of relevant documents should be conducted to identify problems and address any technical issues. Montserrado contains one-third of the under age one population in Liberia and presents unique challenges due to the urban environment. Given this unique environment, one experienced and one junior national staff member should be assigned to Montserrado as sub-national supervisors. Seven additional national staff members should be assigned to each of the remaining 14 counties. These seven national staff should be assigned a well-performing and underperforming county. By being assigned counties of varying performance, national staff can ensure there is an exchange of best ideas and practices between counties. Four of the more experienced national staff members should be assigned to Grand Cape Mount, Grand Kru, Maryland, and River Gee, the four counties with systemic issues across all immunization components.

4.2.3. Recommendations

1. Develop MOUs with other ministries, in particular the Ministry of Education.
2. Review the after-action report for Ebola and COVID-19 to develop a plan for catch-up and recovery and sustaining routine EPI.
3. Document ongoing actions to address measles, pertussis, and other outbreaks; data should drive actions at sub-national levels.
4. Disseminate clear and updated guidelines, policies, and schedules to lower levels, and collect and destroy outdated materials.
5. EPI manager to delegate more responsibilities to the staff at national and county levels, but remain engaged with regard to supervision/oversight.
6. Performance Based Financing at National and County Levels should be supported.
7. Increase the number of vaccinators (to at least two) to allow for fixed sessions and outreach at the same time.

8. Revise and update the EPI Staff and ICC TOR to clearly delineate roles and responsibilities.
9. Strengthen EPI supportive supervision at all levels to ensure quality vaccination services.
10. Strategize on ways that vaccinators who are not on payroll can be compensated/motivated.
11. Provide more frequent support training to the private sector.

4.3. Vaccine Supply Management and Logistics

4.3.1. Background

One area of focus of the Immunization Agenda 2030 is supply chain and logistics. It aims to strengthen supply chains to ensure that high-quality vaccines are always available in the right quantity and form at the right time, in the right place, and stored and distributed under the right conditions. It aims to promote integration with other supply chains for more effective delivery of primary health care, and to invest in systems and infrastructure to safely manage, treat and dispose of vaccine waste to help reduce their environmental footprint.

The CER is designed to document strengths and weaknesses in vaccine supply and quality issues around vaccine management and storage, vaccination record keeping and data reporting, and waste management at national, county, district, and facility levels observed by external review teams during fieldwork and through desk review.

The desk review revealed that, though there is an increasing number of health facilities providing immunization services with functional equipment, there is still an inadequate number of functioning refrigerators/cold chain equipment, and some cold chain equipment is non-functional due to weak repair and maintenance systems. There are also vaccine forecasting, stock distribution, and management problems. Suboptimal forecasting is evidenced by stock out, maldistribution, and overstocking in some health facilities. A weak transport system (e.g., inadequate vehicles, fuel, maintenance) affects the delivery of supplies and constrains service delivery. Also, long distances to remote service delivery sites are challenging for vaccine supply, especially during the rainy season. Supervisory visits and other assessment findings have noted the cancellation of vaccine and supplies distribution.

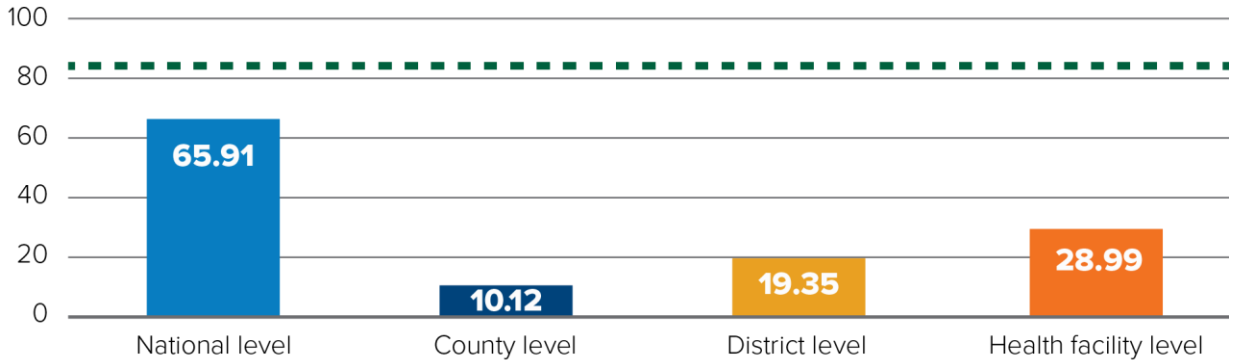
On waste management, vaccine wastage due to exposure to heat or freezing temperatures, and inappropriate storage conditions were highlighted at the health facility level, evidenced by vaccines being damaged due to malfunctioning cold chain equipment. The wastage rate calculation is inaccurately done, resulting in over or under-supply or maldistribution of vaccines. There are inadequate guidelines and infrastructure for waste management. Supervisory visits and other assessment findings on waste management and injection safety highlighted this issue.

4.3.2. Findings

Performance of vaccine supply quality and logistics

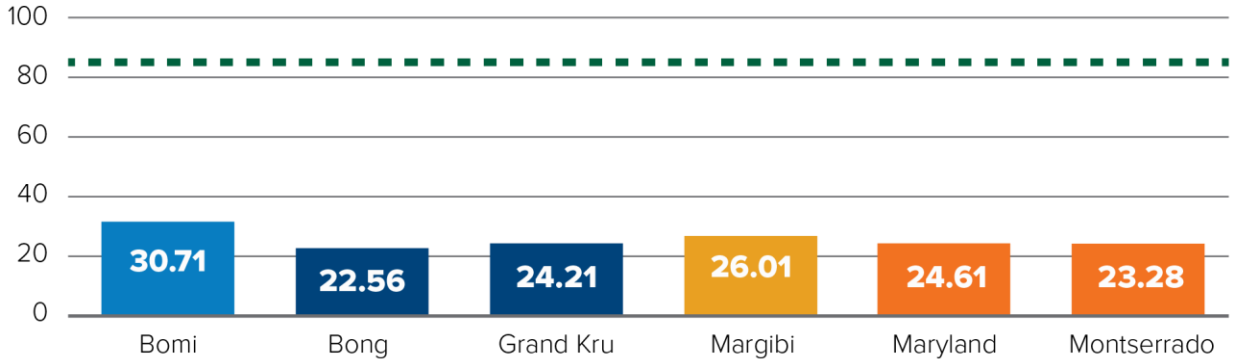
The analysis of the performance of the vaccine supply quality and logistics across the different levels of the health system shows that the higher performance is at the national level (66%). At the sub-national level the performance is very low <30%). The lowest performance is 10.1% at the County level, at the district level, the performance is 19.3% and it is 29.9% at the health facility level.

Figure 17: The performance of vaccine quality and logistics across the different levels of the health system



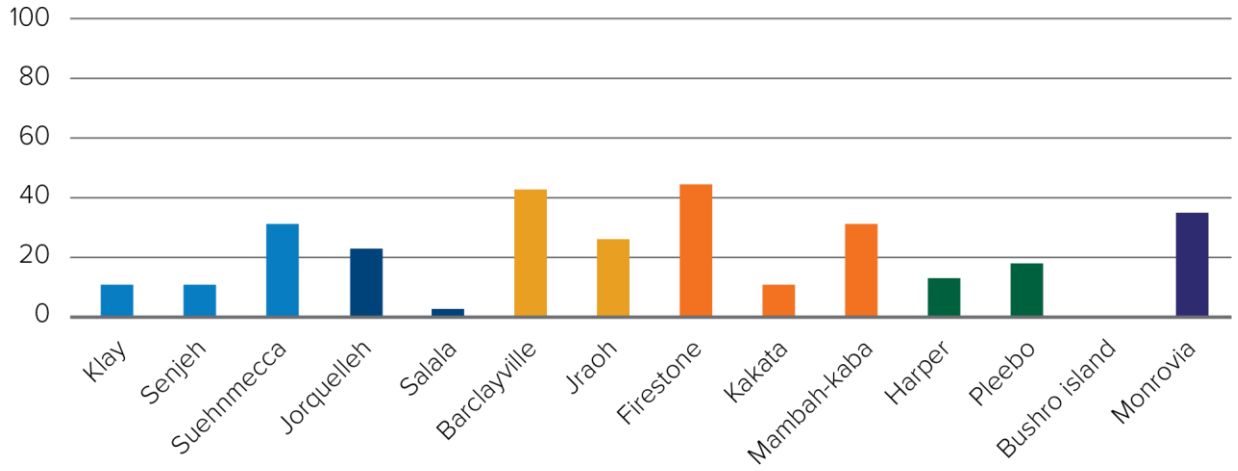
At the county level, the performance of vaccine quality supply and logistics is low. It ranges from 30.7% at Bomi, which has the highest performance, to 22.5% at Bong with the lowest performance.

Figure 18: The performance of the vaccine quality supply and logistics at the county level



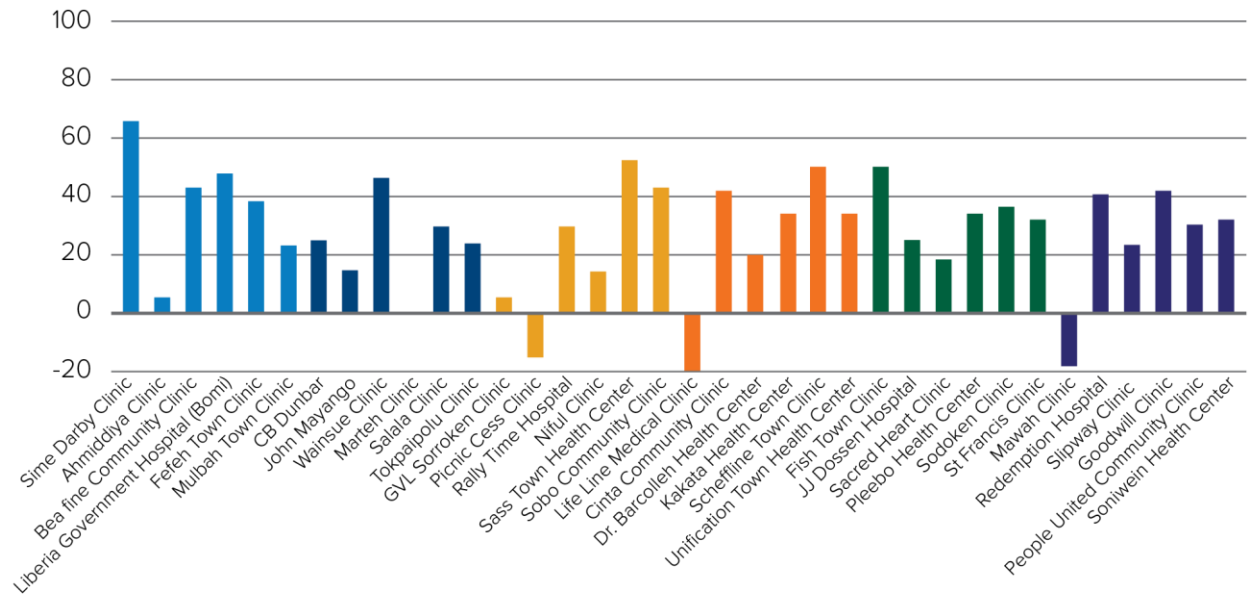
At the district level, the performance of the vaccine quality supply and logistics is low (<50%). A total of 4 districts have a performance level equal to or below 10% (Klay, Senjeh, Salala, and Kakata). Two districts with the highest performance (above 40%) are Barclayville and Firestone.

Figure 19: Performance of vaccine quality supply and logistics at district level



At the health facility level, Sime Darby clinic has the highest performance (66%) in vaccine quality supply and logistics at the health facility level. Another 8 health facilities have performance above 40%, while 5 health facilities have the lowest, performing below 10%.

Figure 20: Performance of vaccine quality supply and logistics at health facility level



Vaccine Supply

The CER findings identified strengths at national and sub-national levels. The national cold store for vaccines will be moved to a design-built structure at Central Medical Supplies (CMS) with full capacity for storage, logistics, and integrated temperature monitoring. Annual forecasting and monthly supply monitoring have benefited from stock management tools (SMT) and from UNICEF. Vaccines are now bundled with syringes to minimize the risk of reuse when vaccines are in stock. Staff at the national level report receiving adequate training. With the exception of Montserrado, county health offices were all equipped with sufficient transportation resources to distribute

vaccines to facilities in a timely manner. Stock outs reported at county level or below were generally attributed to interruptions or delays in importation or transportation from the national level to counties or regional hubs rather than problems with distribution within counties

The review findings also revealed some weaknesses to be addressed in order to improve immunization performances. All counties reported stock outs of key EPI vaccines including BCG, nOPV, and MCV in the last year as a result of interruptions at the national level. Similar interruptions were reported for syringes (2mm and 0.2mm), child health passports, and vaccine monitoring charts.

Quality of vaccines management and logistics

Strengths identified at the national level, including the staffing and training levels for vaccination management, were generally robust, with most positions reported to be filled and personnel adequately trained. At the county level, storage and management practices were sufficiently consistent to assure basic vaccine viability. For example, most public facilities followed recommended storage practices (e.g., keeping vaccines inside plastic bags to avoid freeze damage) and twice-daily temperature monitoring for refrigerators and freezers, safe vaccine transport methods (although temperature monitoring during transport was less consistent), and monitoring sufficient to prevent regular stock outs or vaccine wastage. A number of clinics were observed to run refrigerators and freezers from solar power, addressing concerns from the previous EPI review in 2012.

The review identified a number of remaining challenges in the management and storage of vaccines. At the national level, there was no central inventory showing age and functionality of cold chain equipment across the country and inadequate funding for maintenance, repairs, and mobility of officers to provide more frequent logistical and supervisory support. At the facility level, while digital thermometers were in wide use, freeze tags were frequently missing and temperature monitoring was not consistent during the transport of vaccines in what often appeared to be old, well-weathered vaccine carriers. A number of remote facilities were observed to store other medications (e.g., oxytocin) in the same freezers as vaccines due to limited space. Among the small number of private facilities visited, quality standards appeared more variable across all aspects of the vaccination program as seen in sometimes inadequate storage space and equipment, lack of consistent temperature monitoring, and inconsistent record keeping which might warrant additional scrutiny in this sector. Inadequate transportation for vaccine collection/distribution at various levels is another challenge. Some of the districts visited don't have adequate transportation. A total of 4 districts out of 13 visited said that they have insufficient and adequate transport to deliver vaccines.

Waste management

Strengths were identified in the review findings. Waste management was one of the stronger elements of the 2012 EPI review and continued to be strong in the 2022 EPI review. Consistent use of special waste containers for used sharps was widely reported and confirmed by observation. Most facilities reported having access to incinerators to dispose of vaccine waste, even in remote counties of Grand Kru and Maryland where open burn pits often without recommended fencing were more common in 2012.

The weaknesses revealed by the review are that, despite a more uniform standard of waste management in the more recent review, some of the same problems that were reported in 2012 persisted in 2022. Several counties reported problems with incinerators being in a poor state of repair and needing maintenance or replacement. With the limited capacity of county and sub-county levels for cold chain maintenance, health teams have over-reliance on the national level leading to delays in repairing needed equipment. In Bomi County, for example, it was estimated that 70% of incinerators were not currently functional. In Grand Kru County, districts had been transporting waste from facilities without functional incinerators to central sites for over a year in some cases. Another weakness was the lack of a separate line-item budget for waste management which may limit resources available to address observed problems.

Record keeping and data reporting

The findings of the review revealed strengths including data monitoring systems that were just strong enough to assure vaccine viability and avoid localized stock outs at facilities but fell short of the level needed to forecast vaccine needs or identify any excursions from normal patterns of uptake or wastage in time to identify and address supply problems early. As noted above, monitoring techniques (e.g., twice-daily temperature monitoring) were observed consistently across public sites, although less so in private ones. Vaccinators were well-trained to recognize vaccine vial monitor levels, check for expiry dates before administering the vaccine, and maintain

complete vaccination patient registers.

Weaknesses identified by the review include stock outs of child health booklets, vaccine stock registers, and vaccination monitoring charts in a number of facilities. In the case of vaccination monitoring charts, stock outs stretched for more than 2 years in some cases. In other cases, vaccine stock registers were present but unused or left uninterpreted. Even where these tools were present, staff did not consistently demonstrate an understanding of how to interpret data in ways to inform vaccination programs.

One high-level conclusion possible from these mixed results on vaccine safety is that current systems have reached a quality equilibrium where vaccines are stored and maintained safely and monitored closely enough to avoid stock outs, but short of the level needed to track changes in supply, demand, and vaccine wastage to anticipate problems and adjust services or supplies accordingly

4.3.3. Recommendations

1. Establish a vaccine management system focusing on stock monitoring and management by ensuring an alert system will notify when stocks are running low at the national level.
2. Improve vaccine management by ensuring there is appropriate training and supervision for cold chain management at sub-county levels.
3. Conduct annual inventory of the cold chain at all levels.
4. Conduct incinerator mapping and install new incinerators strategically where they are lacking.
5. Ensure budget for waste management.

4.4. Service Delivery

4.4.1. Background

Vaccination services are delivered at the facility level in public, private, and faith-based facilities. At the facility level, the vaccinator is responsible for day-to-day EPI services under the supervision of the facility's officer in charge (OIC).

The desk review identified barriers and weaknesses to an equitable and quality vaccination service delivery. Long distances and travel time led to poor access to health facilities. Several assessments and supervisory visits findings demonstrated the impact of geographical accessibility on health.

Some populations are underserved (e.g., ethnic minorities, marginalized persons, working caregivers), and an inadequate number of outreach sessions were planned or held. Assessment, supervision, and other field findings were used to convey this issue. Fragile or conflict settings disrupt and/or challenge immunization service delivery.

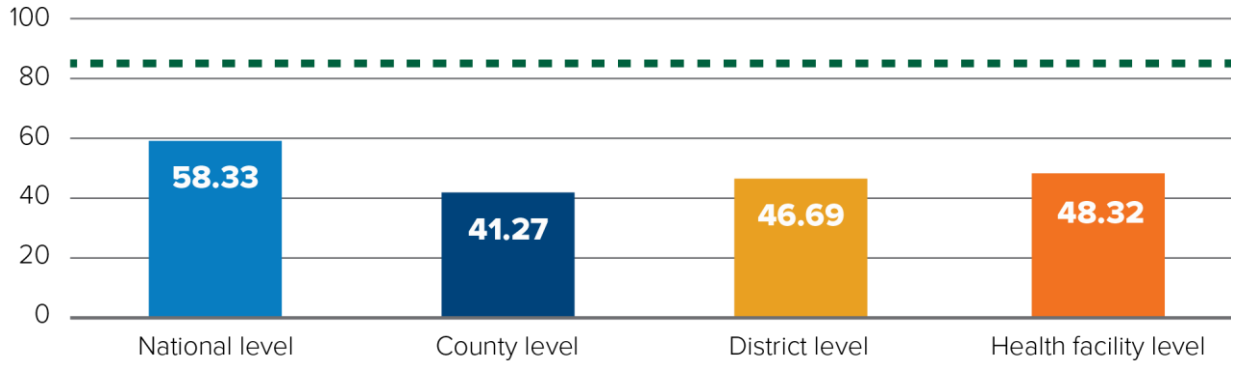
Operating procedures for vaccinating a late child are not clearly outlined, or translated into practice, and no clear guidance and practice for recording and reporting vaccines given after 1 year of age.

4.4.2. Findings

Performance

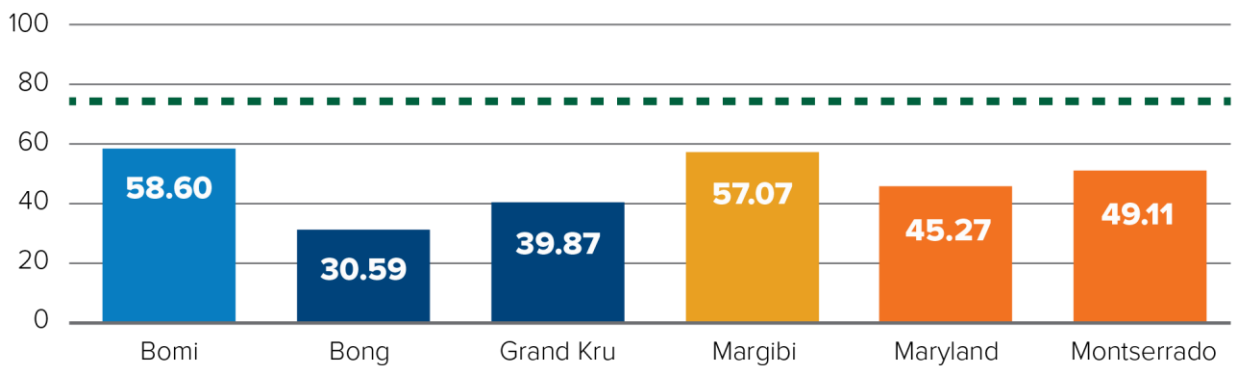
The analysis of the performance of service delivery across the levels of the health system shows that the national level has the best performance at 58.3% and the county level has the lowest performance at 41.2%. The performance at the district level and at the facility level are similar respectively 46.7% and 48.3%.

Figure 21: Performance of service delivery at different levels of the health system



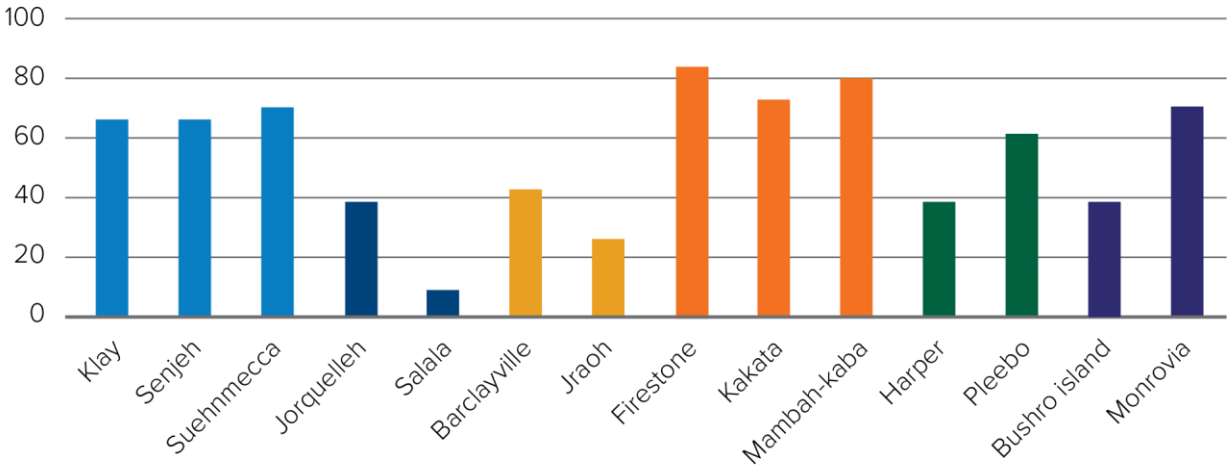
At the county level, the high-performing counties are Bomi (58.6%) and Margibi (57.1%). Other districts are below 50%, the district of Bong has the lowest performance (30.6%).

Figure 22: Performance of service delivery at the county level



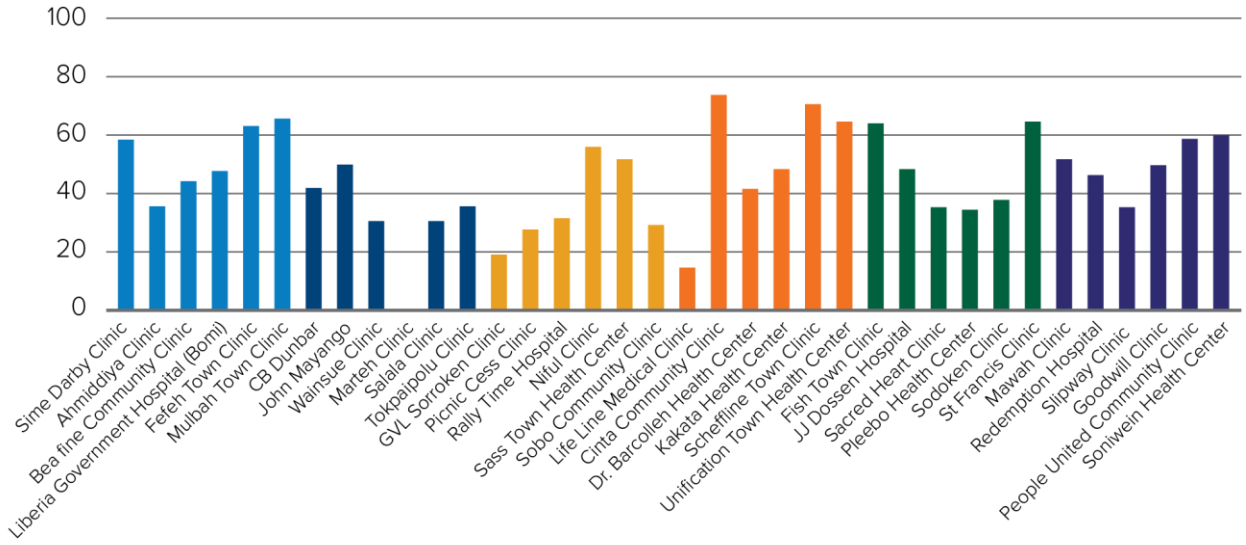
At the district level, the districts from Margibi County are the highest performing. All the districts from Margibi scored more than 70% (Firestone district 82%, Mambah Kaba district 80% and Kakata district 72%. The district with the lowest performance is Salala (less than10%) in Bong County.

Figure 23: Performance of service delivery at the district level



At the health facility level, two health facilities of Margibi County (Cinta community clinic and Schefflin town clinic) have the highest performance above 70%. In total 7 health facilities have a performance higher than 60%. Two health facilities (GVL Sorroken clinic and Life Line medical clinic) have the lowest performance, less than 20%.

Figure 24: Performance of service delivery at the health facility level



Across all regions, strong commitment and dedication by health workers was noted. Despite all challenges noted, they tried their best to ensure the children in the community were vaccinated.

At the national level operational guidelines for service providers are available and they cover both fixed site immunization sessions and outreach sessions. The guidelines were written in 2016, and were updated in 2019.

In addition, it is commendable that selected private providers deliver government-provided vaccines at their facilities. However, the service provision is weaker compared to the public facilities. In particular, lack of adequate training was noted, especially for vaccine management. Some of the private facilities do not have appropriate cold chains or they use what is available inappropriately (e.g., in a facility without a refrigerator, a cold box might be available but not used). Moreover, not all private providers who administer government vaccines are in DHIS2, those not in DHIS2 report vaccination data to the nearest facility that is in DHIS2.

The Urban Immunization Strategy (UIS) was developed by the EPI with Partners. The strategy was implemented in Montserrado by both EPI, Partners, and Montserrado County Health Team. However, observations from the field indicate the inability of the program to reach individuals living in urban poverty (e.g., example slum communities), leads to the accumulation of large populations of unvaccinated and/or underserved populations.

Fixed site sessions were generally conducted well, and sessions were rarely canceled. For the most part, the incomplete and/or delayed sessions were attributable to prolonged stock outs of vaccines extending for several months. In general, there is good integration of health interventions with immunization services at all levels (e.g., growth monitoring, vitamin A, and COVID-19 vaccination for caregivers). However, in terms of health education, there is a general health talk conducted at the beginning of the session, though caregivers are very rarely given an explanation about the diseases against which the given vaccine protects. Caregivers have identified this as one of the key points for improvement, they believe that more information about the diseases and the vaccines could increase demand for vaccines.

Outreach sessions are consistently planned, usually once a week. The main barrier to organizing outreach sessions and main reason for their cancellation is insufficient transport (25 of 36 facilities identified this barrier). Depending on the health facility, this barrier is experienced differently. For instance, in urban settings the lack of rain gear (boots, umbrellas) is a major problem. In more remote facilities lack of motorbikes, or insufficient funds for repair of the motorbikes is a problem. Moreover, the cost for fuel is reimbursed quarterly, and thus towards the end of the quarter some vaccinators reported that they did not have enough financial resources to pay. Other reasons for cancellation include vaccine stock outs and weather conditions.

In addition, given that most health facilities have one vaccinator, when the vaccinator is conducting an outreach session there is limited backup at the health facility to continue with vaccination; those who should vaccinate at the health facility have different levels of training and many are not trained on new vaccines.

Guidelines for defaulter tracing are available, as well as defaulter tracking tools, such as ledger books and tickler file boxes, although they have not been seen at national level. However, the guidelines are not rolled out everywhere, resulting in very different levels of defaulter tracing in health facilities. Usually, the vaccinator is responsible for defaulter tracing but the success of the tracing is facility dependent (e.g., some facilities use tickler boxes effectively, other facilities do not have tracking systems at all). Defaulter tracing is a challenge in private facilities as it is not done consistently. Moreover, at all levels, no clear strategy is implemented for tracking 'zero-dose' children, especially children who were born but did not have contact with the health facility.

In addition, there is no clear strategy for catch-up on vaccines missed due to the prolonged stock outs of BCG, OPV and MCV, as well as a result of the disruptions due to the COVID-19 pandemic. Missed opportunities for vaccination are high; health workers are not routinely checking children being brought to the health facility to see their vaccination status and provide the necessary service.

There is a lack of clear understanding and practice on how many children should be present to open a measles vaccine vial. Some health workers explained that while they understand that the priority is to vaccinate the child, in cases when the vaccine is scarce they would not open the vial unless a critical number of children is present. However, some said that they would open the vial if the caregiver brought the child from far away, and it is unlikely that they will return. Caregivers predominantly responded that they would come back if they are told that the vaccine cannot be administered on the day, and they need to come another day.

There was a lack of clarity on which vaccines to give to a late child. Only 9 of 36 interviewees gave the correct answer. Moreover, there is lack of guidance on how to document a late child and tools on where to document. Some health facilities were documenting it in the register regardless of the age of the child, while others used separate pieces of paper and simply noted the age.

4.4.3. Recommendations

1. Strengthen defaulter tracking mechanisms with a national roll out of the guidance. Provide training and through supportive supervision further strengthen the application.
2. Develop strategies to address missed opportunities for vaccination and late vaccination, and provide clear guidance and tools to document late vaccination.
3. Strengthen defaulter tracing mechanisms, and ensure supportive supervision is used to ensure the tools available for defaulter tracing are available. Develop a clear strategy and training of vaccinators on how to identify 'zero dose' children. Align this strategy with the strategy on missed opportunities. Plan for catch up vaccination for children who did not receive vaccines due to disruptions as a result of the COVID-19 pandemic or the national stock outs of vaccines.
4. Use the opportunity of special immunization services (SIAs) and other special vaccinations to reach out to hard-to-reach areas with a wider vaccination package.
5. Ensure logistics and mobility support to vaccinators for conducting outreach immunization sessions; in particular, ensure sufficient transport is available.
6. Ensure implementation and operationalization of the *Urban Strategy for Immunization*.
7. Define and strengthen the role of CHAs. Develop a unified strategy and clear integration in the immunization program with clear TORs.
8. Strengthen the implementation of national policy for opening multiple dose vials (MDV).

4.5. Demand Creation

4.5.1. Background

Health communication is widely considered to be a major aspect of any public health intervention. One of the specific objectives of the priority called "Commitment and demand" of the Immunization Agenda 2030, is to

ensure that all people and communities value, actively support and seek out immunization services. National EPI Policy on immunization includes demand generation as a key strategy to achieve immunization targets. The demand generation component enables social accountability by maintaining integrated platforms for community engagement and community feedback loops.

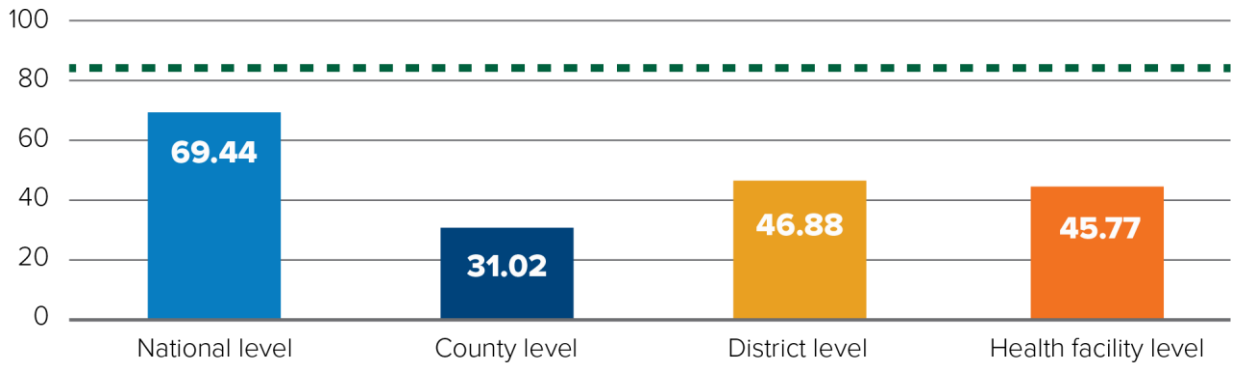
The desk review revealed some barriers and weaknesses that affected the performance of demand generation. There is inadequate communication with the community and community leaders about immunization. Hesitancy from caregivers/parents and low uptake of immunization services were evidenced by assessment reports and immunization coverages. Vaccine hesitancy from caregivers/parents due to rumors about vaccine quality or adverse events leads to low uptake of immunization services.

4.5.2. Findings

Performance

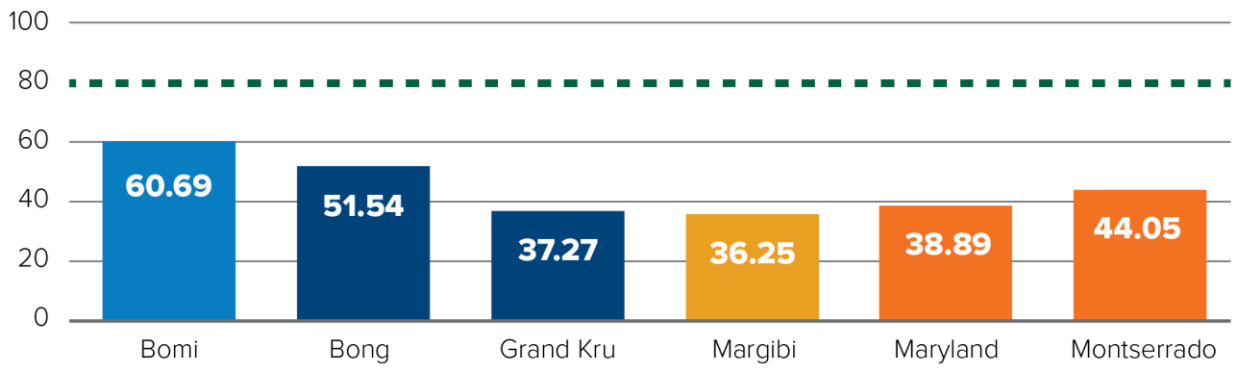
The analysis of the performance of the demand generation component across the level indicates that the national level has the highest performance (69.4%) The sub-county level has low performance and the lowest performance is at the county level (31.0%). The performance of the district level and the facility level are similar with 46.9% at the district and 45.8% at the health facility level.

Figure 25: Performance of demand generation at different levels of the health system



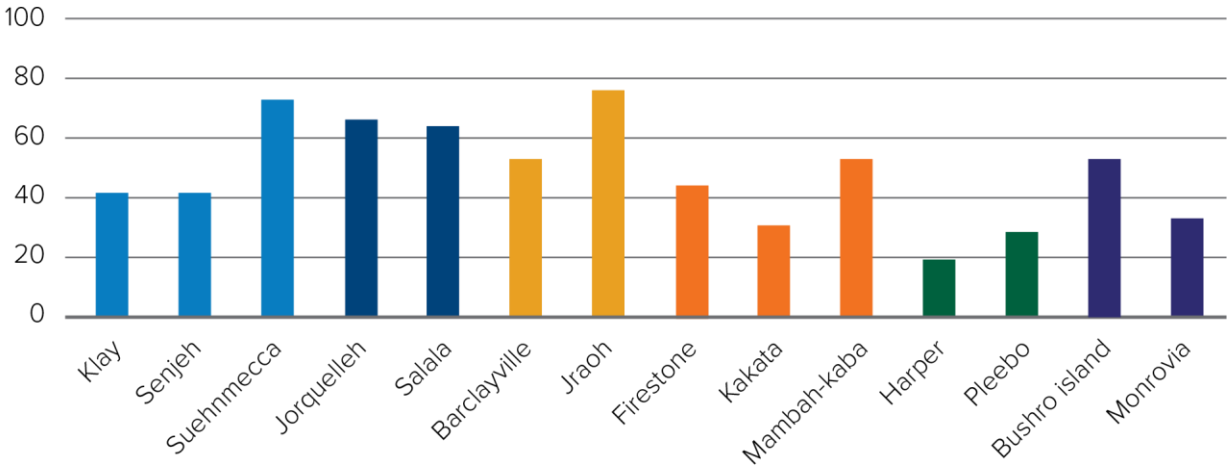
At the county level, the county of Bomi has the highest performance (60.7%), while the county of Margibi has the lowest performance (36.2%). The performance of other counties ranges from 37.2% for Grand Kru to 51.5% for Bong.

Figure 26: Performance of demand generation at the County level



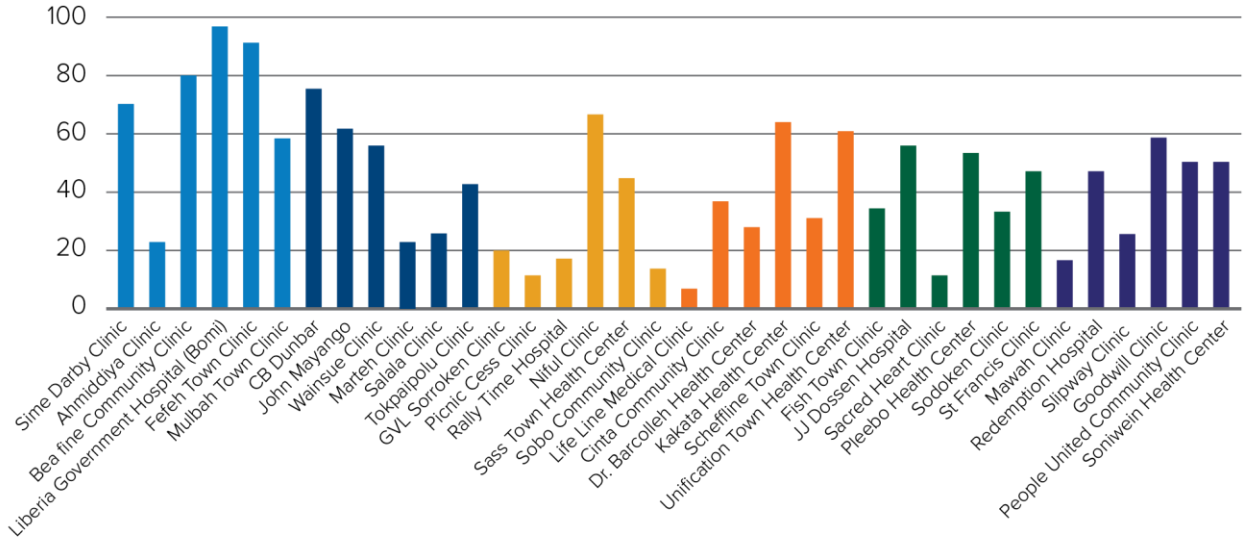
At the district level, two districts have a performance level equal or higher than 70% (the districts of Suehn Mecca and Joraoh). A total of 6 out of 14 districts have a performance higher than 50%. The district of Harper has the lowest performance at 20%.

Figure 27: Performance of demand generation at the district level



At the health facility level, three health facilities from Boma County have a performance level equal to or higher than 80%. They are the Beauffine community clinic, the Liberia government clinic and the Fefeh town clinic. Line life medical clinic has the lowest performance at 5%. A total of 12 out of 36 health facilities have a performance equal to or higher than 60%.

Figure 28: Performance of demand generation at the health facility level



The performance of the demand component was reviewed through 4 areas: demand creation strategies and plans; human resources and capacities; IEC materials and messages; social mobilization and community engagement. Irrespective of medium-level level performance rates (44.9%) obtained during the review, the review found that

demand generation was consistently cited as a major and critical component of quality immunization services and vaccine uptake. Notably, the recent experience of COVID-19 vaccination had influenced considerations about the importance of strong advocacy, communication, and social mobilization activities to support uptake.

The CER revealed strengths and weaknesses at the national level. The importance of advocacy, communication and social mobilization (ACSM) for vaccine demand and acceptance is well reflected in the EPI structure, where communication is integrated as a full component. At the national level, communication is led by a dedicated and fully trained staffed communication unit within EPI. This unit is responsible for all vaccine-related demand generation, information, education and communication (IEC), community engagement and social behavior change communication activities, working in concert with the Ministry of Health's National Health Promotion Division (NHPD). Responsibilities for communication and community engagement are clearly delineated in the organogram of the county and district health teams, and to a certain extent, in health facilities, with particular emphasis on vaccinators—CHSS and CHAs. This integration of communication within EPI and community health structures was found to be one of the major strengths of the current system, helping to leverage and sustain linkages and partnerships.

The high percentage of mothers interviewed for DHS 2019-2020 who reported ever having a child health book (92%) or ever receiving preliminary doses of early infant basic vaccinations (BCG 91%, polio 0%–6%, Penta 1%–91%) suggests almost universal acceptance of childhood vaccination where these services are accessible. Exit interview data from the CER confirmed wide-acceptance, with 99 percent of interviewees "believ(ing) in vaccines" and "friends and family" supportive of children taking the vaccines (90%). Eighty-six percent of caregivers said they "knew when next to come" to complete their vaccination schedule, with a reported high number (86%) of children checked that were "up to date." Noteworthy, if 38% of caregivers said that they were "ever turned away and told to come back later," an impressive 90% declared they came back afterwards. Those data were also similar to the findings of two last national Knowledge, Attitudes and Practices (KAP) surveys conducted in 2017 and 2020. For example, about three-quarters (76%) of all women stated that vaccines were good for children and a negligible number (1% or less) of women said that vaccines either did not work, were hard to get, were expensive, spread Ebola, spread illnesses or were not safe. Overall exposure to national immunization campaigns was high with most of the women surveyed reporting that they heard of a National Polio Campaign (88%) or a measles campaign (81%) and with 95% indicating their children were vaccinated during these campaigns. The undertaking of national KAP surveys also demonstrated the attention put by EPI on collecting evidence of social and behavioral drivers of vaccination for informing demand activities.

In regard to weaknesses, the field review noted limited remembrance and awareness of those surveys in staff at all levels and it was unclear how the findings were disseminated and informed advocacy, communication and social mobilization (ACSM) strategies and interventions for routine immunization. Overall, the lack of a validated and operationalized national EPI communication strategy might have created missed opportunities to formalize, institutionalize and guide advocacy, social mobilization, and community engagement for routine immunization, as well as ensure proper funding of demand creation. Communication plans and activities were found to be mainly linked to vaccination campaigns—supplementary immunization—often with limited space for integrating routine immunization promotion messages. Considering the integration of vaccination activities with other health care services, the review found that collaboration and better definition of leadership, roles, and responsibilities between the EPI Communication Unit and the Health Promotion Division teams could be strengthened, including by clarifying responsibilities and functions in the job description of the communication officers in the 2012 EPI staff and Committee TOR.

At the sub-national level, the CER identified strengths and weaknesses. Integration of communication functions within routine activities helped achieve reach, and strong awareness and trust of vaccines and vaccination services with caregivers and communities, as confirmed during the field review. Vaccine promotion was commonly integrated into health talks conducted in all health facilities and often organized on vaccination days, as well as during outreach. In this regard, vaccinators, CHSS, and CHAs were found to play a critical role in the engagement of caregivers, communities, and community leaders that significantly supported acceptance, timely uptake, reach of the hard-to-reach and under-served communities, and defaulters tracking. Based on the field review, 98% of caregivers were satisfied with vaccination services, and health workers were the most often cited source of

information (52%), before family and friends and radio stations. Good collaboration with local authorities and partners was also reported at county and district levels along with the implementation of a large range of social mobilization activities, with the lack of clarity of coordination mechanisms used.

Despite the positive steps taken by county and district health teams, and health facility staff to deliver communication as part of their routine activities, the review found a deficit in arrangements made to support and enable staff to deliver communication activities, starting with a lack of separate line item funding for promoting routine EPI services in the current multi-year planning budget. A downside to high-level integration of EPI promotion with the National Health Promotion Division was the practical restriction of promotion activities to funded health campaigns, usually devoted to specific vaccines or other health interventions. ACSM activities at county and district levels were almost exclusively funded during vaccination campaigns which, while offering opportunities to scale up vaccine promotion and acceptance, refocused messages and social mobilization efforts on specific vaccines and short-term interventions. They provided little integration and linkages with longer-term routine immunization communication plans. Key informants across settings reported that partnerships with district and local leaders, stakeholders, NGOs, and CSOs established during vaccination campaigns often did not translate into longer-term support. Revealing those challenges, the question about adequacy of promotion budgets received a zero score for all counties and districts.

Overall, the lack of communication strategies and guidance, and the absence of costed communication plans provided limited opportunities for resource mobilization, and sustained and strategic interventions, (e.g., targeting under-vaccinated and under-served groups). More broadly, this exposed a significant gap for promoting expanded immunization platforms for second year of life vaccines (2YL) and newly introduced vaccines currently under consideration for malaria and typhoid conjugate vaccines. While all counties visited reported pockets of individual resistance and/or unvaccinated and underserved groups, there was little evidence of the use of participatory engagement approaches in communities to help identify zero doses, hesitancy and refusal factors, and more generally defaulters and missed doses in 2YL. Similarly there was little evidence of efforts to co-design actions with these communities to address barriers and drivers to vaccination and encourage vaccination uptake. For communities more than five kilometers from the nearest health facility, the CHA workforce has strong potential as a mechanism to identify, report and even respond to community level barriers to access as well as tracing of defaulters and missed doses. For the majority of the population that lives within five kilometers of the nearest health facility, alternative strategies for community outreach in addition to or in collaboration with normal defaulter tracing activities and local community partnerships should be considered to ensure full promotion of routine immunization in Liberia.

More generally, the review found that communication efforts tend to focus almost exclusively on primary key messages on the importance and benefit of the vaccines, without appropriately addressing practical concerns and misperceptions that could influence vaccine acceptance and uptake, such as side effects. Observation of vaccination sessions confirmed limited information provided to caregivers on routine immunization or side effects and AEFI, limited interpersonal and risk communication. The message guide, despite having been widely disseminated and found in use in health facilities (but yet to be updated), provided little guidance beyond key messages and those related to the first 9 months of vaccination. Planning and organization of communication sessions as part of communication training were identified as key weaknesses across all levels. This was confirmed through the results of caregivers' exit interviews during the field review with 38% of caregivers identifying the need for additional information on vaccines given as the main recommendation to improve uptake, and reporting the lack of knowledge of caregivers of second dose Measles-Rubella vaccine among the main reasons explaining low uptake.

4.5.3. Recommendations

1. Review and operationalize the EPI Communication Strategy/Plan developed in 2018 by updating the analysis using behavioral and social drivers (BeSD) principles and the most recent population-level survey data; mapping influencers and key partners and relevant coordination mechanisms; supporting the review/update and dissemination of key messages and materials; and developing an operationalization/implementation costed plan with clear responsibilities and timelines and linkages with National Health Communication.
2. Support/Provide separate funding for routine immunization demand generation activities at the national, county, district, and health facility level.
3. Conduct a national level effort to remove all outdated promotional materials and guidance documents down to the most remote health facilities and replace them with updated guidance and IEC materials to include newly introduced vaccines and schedules.
4. Clarify EPI communication organogram and budget authority at all levels—including for the Health Promotion Division and EPI Communication Unit National, and ensure proper staffing.
5. Develop and implement a comprehensive capacity development plan to improve the capacity of EPI and healthcare staff in designing, implementing, and monitoring demand generation activities for routine immunization and primary healthcare.
6. Make use of BeSD principles and participatory approaches, including human-centered design, to promote proactive demand for EPI vaccines and vaccination across the life-course. With over 90 percent uptake of first EPI doses and only 51% of children completing all required doses, the main challenges are more likely to involve access barriers and other practical issues that prevent parental intentions to vaccinate from being actualized in practice. Demand strategies will need to be tailored for urban areas in line with nationally approved urban immunization strategies.
7. Strengthen partnership and coordination with local partners and stakeholders for increased and sustained commitment and support to routine immunization interventions

4.6. Coverage and Monitoring

4.6.1. Background

Immunization activities in Liberia are monitored as part of the regular M&E process for the entire health sector. All immunization activities are recorded at service delivery and the immunization information is collected and shared for analysis and feedback with higher levels through DHIS2. Supportive supervision is also conducted towards lower levels to appreciate their performances and discuss corrective measures. Review meetings are organized to discuss the progress of the implementation of EPI plans. At the national level, a Joint Reporting Format is conducted annually and shared with partners.

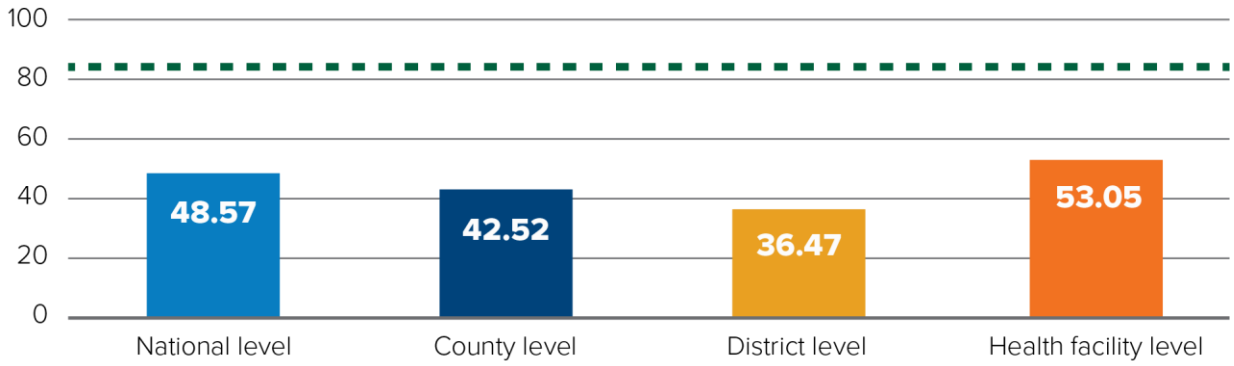
The desk review conducted prior to the CER showed that data on service utilization and equity are not optimally used for service delivery planning. There is an inefficiency in the use of data for decision-making. Other weaknesses are data incompleteness, untimely data, and inappropriate quality of data. A huge backlog of data had to be supported beyond the prescribed reporting time. Too few AEFI were reported; vaccinators have a lack of awareness about AEFI or the need to report AEFI, and inadequate plans with media to counteract rumors or false reports about AEFI. There is limited reporting on AEFI, coupled with little involvement with the media.

4.6.2. Findings

Performance

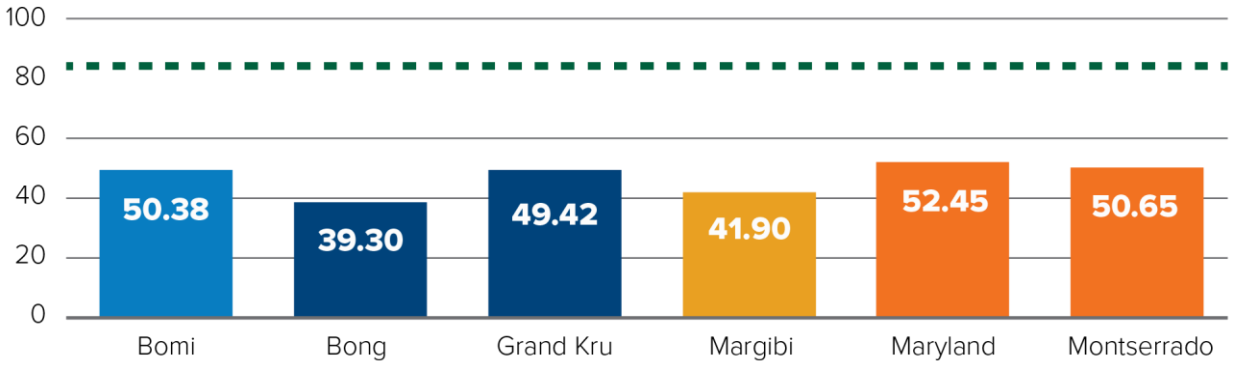
The performance of coverage monitoring across all levels is commonly low at all levels, and the best performance is at the health facility level (53%). The district level has the lowest performance (36.5%). The national and the county level have also a low performance of 48.6% and 52.2% respectively.

Figure 29: Performance of coverage monitoring at different levels of the health system



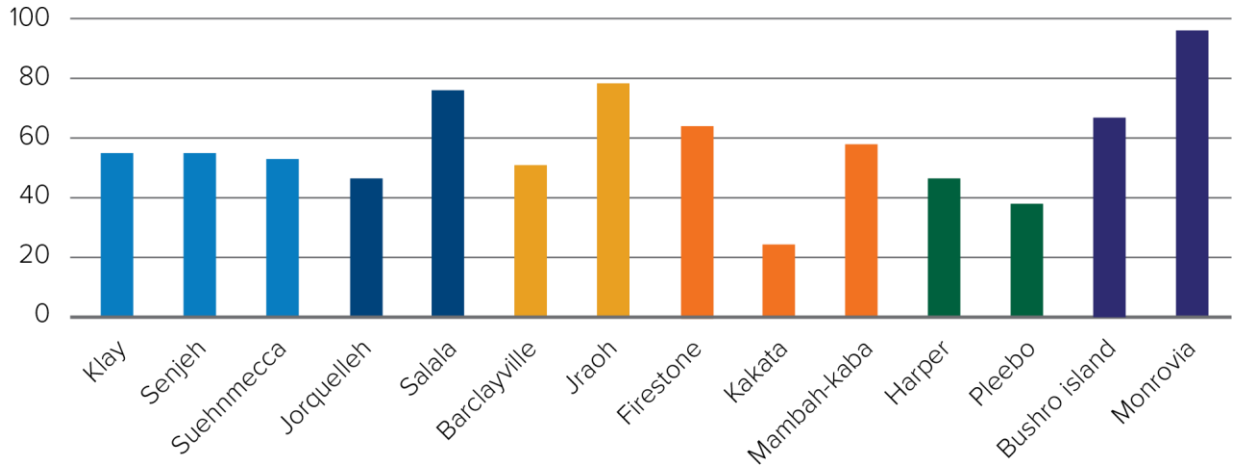
The performance of coverage monitoring at the county level is low. There is no big difference between the best performing counties (Bomi, Gran Kru, Maryland, and Montserrado). Their performance ranges from 52.4% in Maryland to 50.4% in Bomi. The low-performing counties are Bong (39.3%) and Margibi (40.9%).

Figure 30: Performance of coverage monitoring at the county level



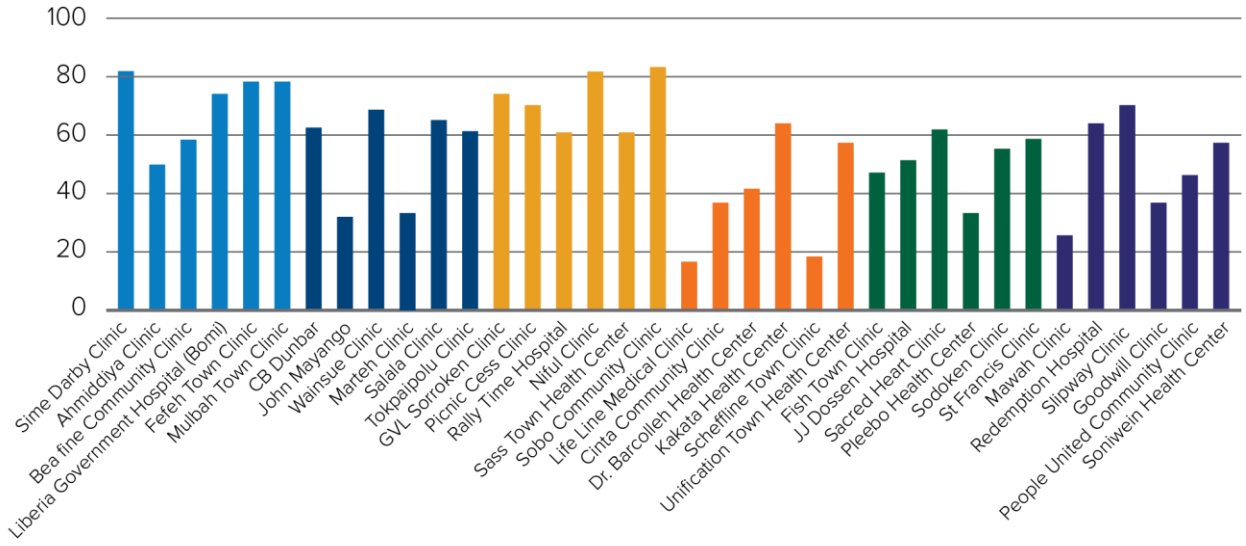
At the district level, the district of Monrovia has the highest performance (94%). Two other districts also have a good performance above 60%, Salala district, and Jroah district. Ten of the 13 districts have a performance level above 50%. Kakata district has the lowest performance (23%).

Figure 31: Performance of coverage monitoring at the district level



At the health facility level, only 4 out of 36 of health facilities have a performance equal to or higher than 60% (Fefeh town clinic, Cinta community clinic, St Francis clinic, and JJ Dossen hospital). PicnicCess Clinic and Mawah Clinic have the lowest performances, respectively at 14% and 17%. The performance of the remaining health facilities ranges from 20% to <60%.

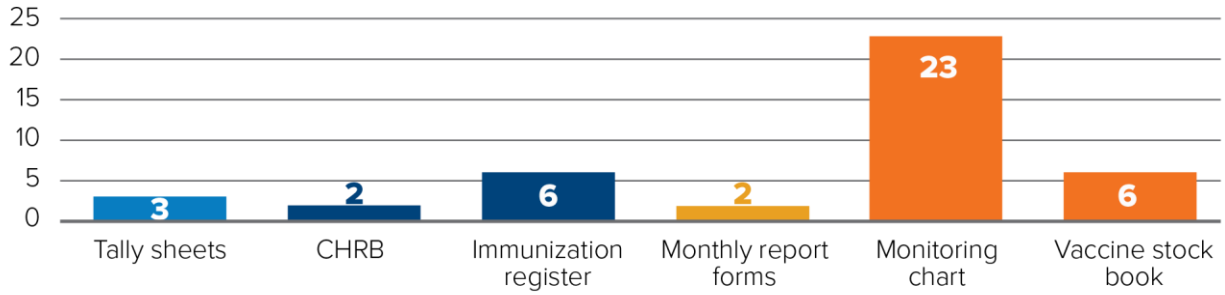
Figure 32: Performance of coverage monitoring at the health facility level



One important finding from the field visits was that monitoring charts were not observed in all counties due to national-level stock-outs. At the health facility level, 23 of 36 health facilities have monitoring charts.

Therefore, many of the health facilities observed did not monitor coverage or drop-out rates in their respective catchment areas.

Figure 33: Number of health facilities with monitoring tools (n=36)



Field interviews revealed all counties have a person responsible for data management; however, two districts (15%) and eight health facilities (26%) did not have a person responsible for data management. Although a person was available, many requested for further training on data management and use.

Another finding was that the national census (with a 2.1% growth rate) is mainly used to estimate the catchment area population. However, the national census is based on 2008 data. When asked, less than half of the interviewees find the estimate accurate while around two-thirds of the others find the estimate too low.

Figure 34: Monthly report from HF to District level

The findings of the review identified strengths and weaknesses at national and sub-national levels. Overall, most reviewers noted that the coverage monitoring activities did not sufficiently meet the expected level and urgently needed improvements.

Reviewers noted that monthly reports are reported to the higher level on time and without any extensive delays. This was seen at almost all counties and at all levels. Also, the report is filled out clearly (Figure 1), therefore, it was rarely missed or late.

In some counties, basic vaccination logs and tally sheets are kept consistently and used for defaulter tracing and basic consumption monitoring. Once defaulters are identified, outreach sessions are planned and conducted to catch up with these populations.

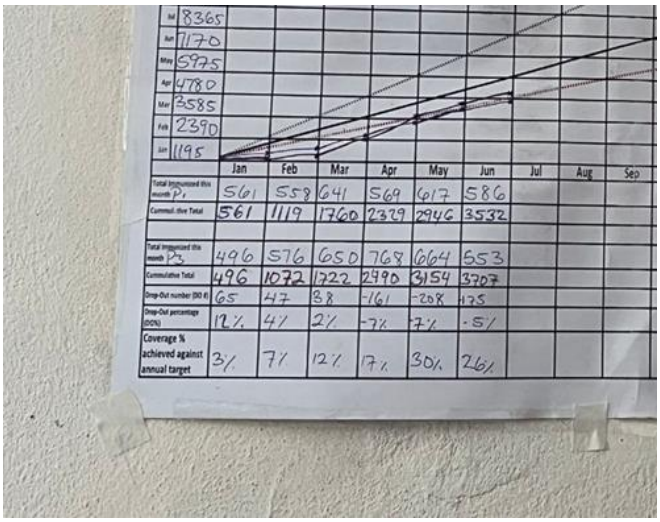
At the national level, data quality work was conducted on a quarterly basis and supported by Gavi funding. Existence of a trained data manager and data management UNIT. In the past 12 months, most of the monthly reports were submitted to a higher level in a timely manner (most counties). There are digital tools and DHOs have instant access to data (Margibi).

In some counties, there are systematic quarterly meetings at the county with discussion on performance (Margibi). Basic vaccination logs and tally sheets are kept consistently and used for defaulter tracing and basic consumption monitoring (GKC). Health facilities report using coverage data to guide outreach sessions (Maryland)

The main weakness was that there has been no action taken on coverage monitoring since the stock out of monitoring charts. Even though some charts were available in Montserrado County, there were concerns following the review of the available data, specifically extremely low coverage of penta3 (<10%) (Figure 34) or a negative value for the drop-out rate (Figure 35). Reviewers noted that there has been no action taken based on the coverage monitoring and a lack of knowledge is widely seen on the calculation of coverage monitoring and drop-out rate.

Figure 35: Extremely low coverage of penta3 (<10%)

Figure 36: Negative value for drop-out rate (penta3 > penta1)



Reviewers noted the lack of training and supervision on data management across the country. Lack of knowledge among health workers might be attributed to there being no EPI-specific training for data management and use. While there is a strong emphasis on timely reporting, there has been no regular cadence to review data quality.

The national level is aware of the stock out of data monitoring tools; however, no particular action has been taken at the time of this review. Another noted weakness was that data managers are not well integrated into the EPI team, resulting in limited staff and time to conduct monitoring and evaluations on the EPI program.

4.6.3. Recommendations

1. Training and supervision in data interpretation and how to use the data for corrective action are needed. Extensive training and regular supervision are needed to identify zero-dose children or defaulters and estimate vaccine forecasts, which has not been observed at each level. CER revealed that most districts, counties, or health facilities have not monitored coverage or drop-out rates. Urgent actions are needed to improve coverage monitoring activities.
2. Develop an electronic platform that includes a dashboard of coverage and drop-out rates at the district and/or county level. Develop a dashboard to help health workers better understand the data. The dashboard should remain as simple as possible. For example, an Excel sheet with a basic Macro function requiring only data input from monthly reports can be used. This will allow for automatic visualization of coverage and dropout, which will help districts and counties to identify zero-dose children or defaulters in their catchment area.

3. Population estimates need to be reviewed and updated. Since the national census was last completed in 2008, population estimates should be reviewed and updated. Also, demographic trends including migration, infant mortality rate, and changes in fertility patterns should be taken into consideration.

4.7. Surveillance and AEFI

4.7.1. Background

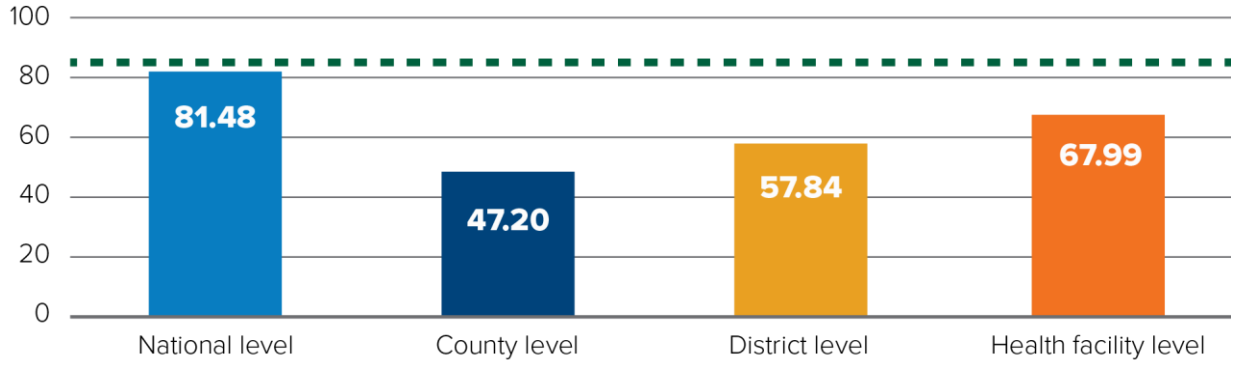
One of the specific objectives of the Framework for Action for the Immunization Agenda 2030 is to build and strengthen comprehensive vaccine-preventable disease surveillance as a component of the national public health surveillance system, supported by strong, reliable laboratory networks. In the desk review, the Integrated Disease Surveillance and Response (IDSR) epidemiological report for week 10 of 2020 revealed the absence of the measles outbreak investigation report and low vaccination coverage in some counties. Sample collection kits and reagents for surveillance activities were not available at all levels. The lack of necessary laboratory resources for regular functioning was revealed in the IDSR of the same week. Too few AEFI are reported, vaccinators have a lack of awareness about AEFI or the need to report AEFI. There are inadequate plans with the media to counteract rumors or false reports about AEFI. Limited reporting on AEFI couples with little involvement with the media.

4.7.2. Findings

The findings of the CER revealed that surveillance had the highest performance (63.54%) of immunization thematic areas in Liberia. The effort to raise surveillance's performance would then not be much, but it would contribute to raising the overall performance of EPI. Moreover, recent outbreaks of polio (cVDPV2), measles, diphtheria, and other VPDs keep surveillance at the forefront of maintaining the legacy of all investments following the Ebola outbreak and moving the system forward.

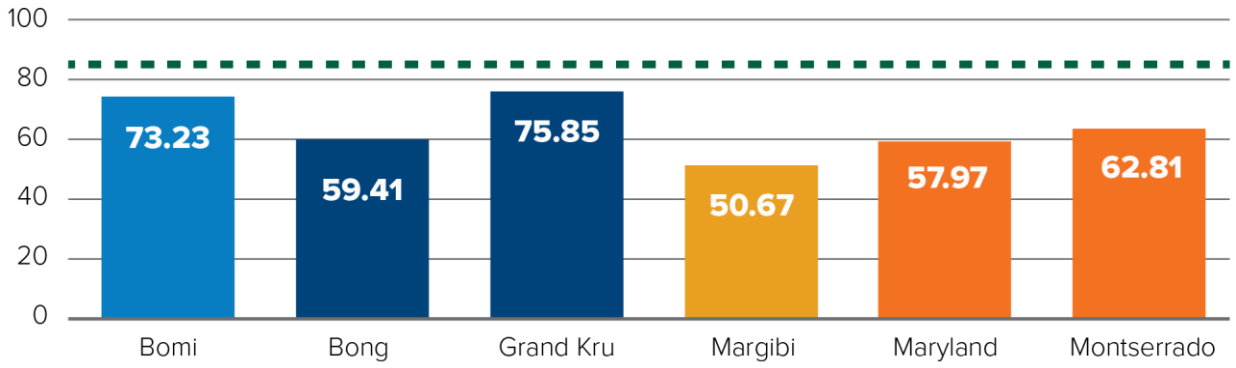
The field data analysis shows the performance of the Surveillance and AEFI monitoring component across all levels (national, county, district, and health facility). The national level has the highest performance (81.48%), while the county level (47.20%) has the lowest performance.

Figure 37: Performance of Surveillance and AEFI monitoring pillar per level of the health system



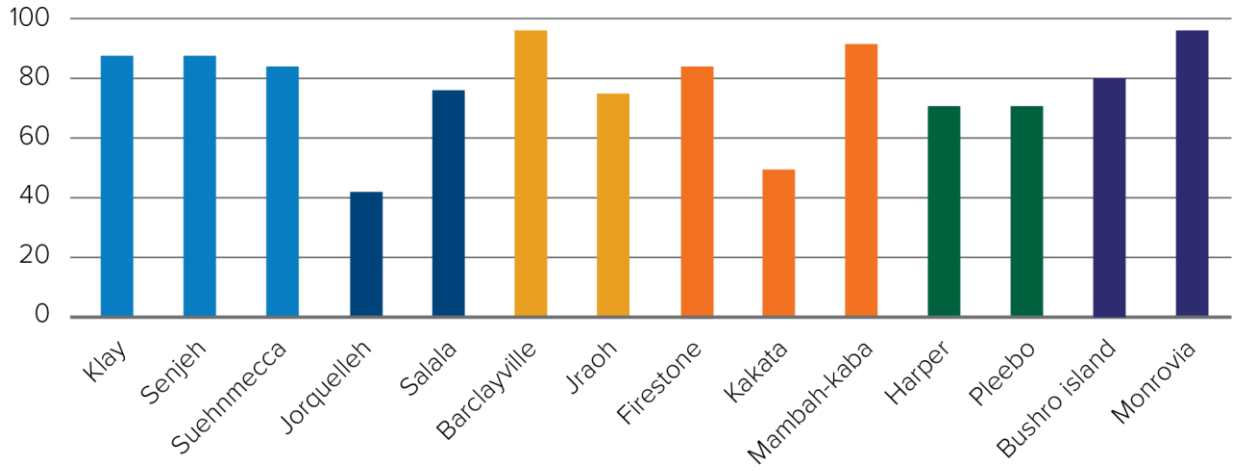
Individually almost all counties except Grand Kru (75.85%) and Bomi (73.23%) had low performance in surveillance (Figure 35). The specific questions with the lowest scores are related to staff capacity (e.g., training, supervision, knowledge of key definitions, SOPs). Other challenges involve the follow-up and feedback of case detection and sample collection. Elevating the score of surveillance pillars in counties would require organizing capacity building for surveillance officers.

Figure 38: Performance of surveillance and AEFI monitoring pillar in counties



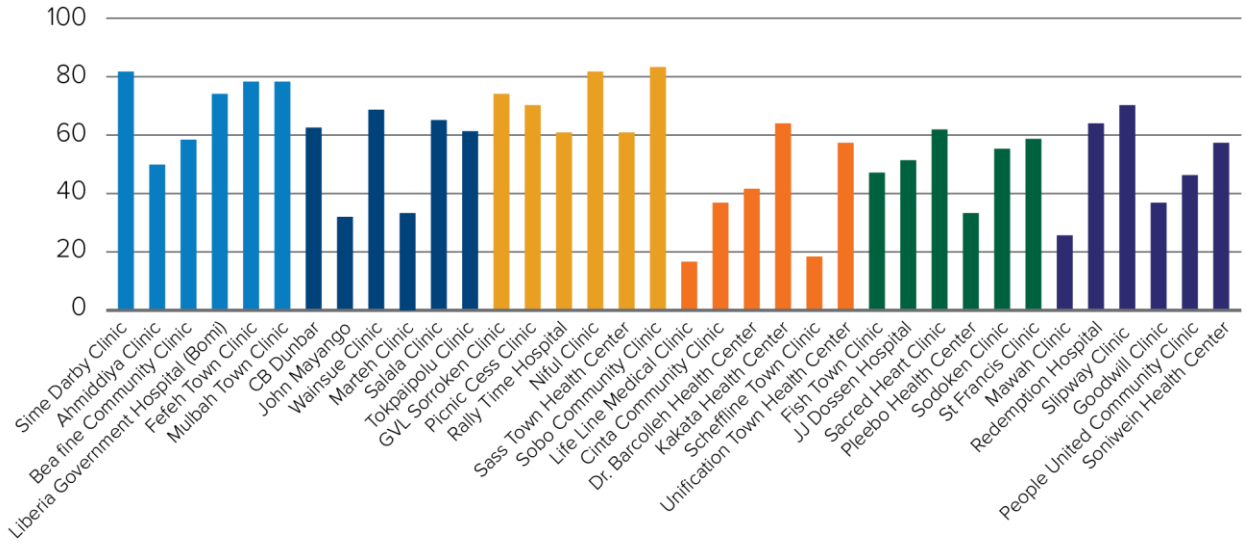
Many districts had surveillance performance above 70% (Figure 36). The input to reach 85% would be less than the one required at the health facility level. Barclayville district, Mambo Kaba district, and Monrovia districts have the highest scores above 90%.

Figure 39: Performance of surveillance and AEFI monitoring pillar in districts



The health facilities barely went beyond 60% for the performance of the surveillance pillar, especially in Margibi, Maryland, and Montserrado (Figure 37). The performance per county takes into account the county health office, all districts, and all health facilities in the county.

Figure 40: Performance of surveillance and AEFI monitoring pillar in health facilities



The findings of the CER have revealed strengths and weaknesses in the implementation of surveillance activities. Surveillance guidelines and tools were available in districts and health facilities. Disease notification and reporting are electronic. The IDSRs are regularly issued and district officers have constant access electronically via a mobile app. On human resources, district staff was trained on VPD surveillance. In health facilities, VPD surveillance focal points were in place and trained, especially in public facilities

Besides public facilities which are quite well-equipped for VPD surveillance, private health facilities were insufficiently involved in VPD surveillance. VPD surveillance focal points were not always in place or trained in private health facilities. Having most staff trained but some health facilities without VPD surveillance and with low vaccine coverage is harmful to the country, as demonstrated by the measles outbreak from the districts least involved in VPD surveillance. Moreover, VPD surveillance seemed not to take into account ledgers from hospital activity in all places

Considering the levels of the health system, the district focal persons are extensively trained, but this doesn't seem to be sufficiently cascaded down.

The guidelines require updates due to constant changes in epidemics and public health threats. Health facility staff complained about not receiving regular feedback on samples sent in the course of VPD surveillance. The interviews showed the same situation for all VPDs and AEFI. In addition, there was confusion on the information given to the surveillance officers.

4.7.3. Recommendations

1. Offer training on surveillance more frequently, to be extended to all teams in districts, and to be cascaded down to lower levels.
2. Worked on investigations with an emphasis on timeliness and the lab component, with feedback on the result.
3. Constantly monitor that the surveillance focal person at every level is in place.
4. Provide a formal onboarding mechanism with refresher training and supervision at all levels.
5. Increase and disseminate performance monitoring using surveillance indicators.

CONCLUSION

Liberia's Ministry of Health is striving to increase funding for the health sector in order to achieve the United Nations Sustainable Development Goals for Liberia and to move the country toward universal health coverage. The current EPI policy advocates for immunization services being provided free of charge in all health facilities and outreach sites. Within that policy direction, all health professionals trained in EPI and deployed throughout the country should provide accessible, equitable, and quality immunization services. Faithful to this strategic orientation, efforts have been made in past years to improve immunization service core indicators, despite challenges triggered by the Ebola and COVID-19 outbreaks.

The Comprehensive EPI Review (CER) was conducted to document the successes and underperformances of the EPI program and to provide recommendations and suggestions to strengthen national strategies and activities for improving routine immunization coverage. The findings of the CER will lay the foundation for the design of the new National Immunization Strategy.

The review findings revealed strengths that can be leveraged to build efficient strategies for immunization program enhancement. Despite resource limitations facing the program, staff at all levels voiced a strong commitment and tremendous dedication to achieving the goals and objectives of the EPI. Reliable infrastructure for vaccine management at the national level now includes a new cold store for vaccines which is a design-built structure with full capacity for storage, logistics, and integrated temperature monitoring. Positive perception of vaccines and satisfaction with vaccination services among caregivers were reported by the two last national KAP surveys conducted in 2017 and 2020. For quality service delivery, operational guidelines for service providers are available and cover both fixed-site immunization sessions and outreach sessions. In addition, it is commendable that private providers are involved in immunization programs and deliver government-provided vaccines at their facilities.

However, the CER identified weaknesses and barriers that should be addressed to ensure quality and equitable immunization services. First, the government allocates insufficient financial resources to the immunization program; thus, the program depends largely on the support of partners. In the recent past, the Government of Liberia delayed co-financing for vaccine purchase. Second, the absence of a national EPI communication strategy may have created missed opportunities to formalize, institutionalize, and guide advocacy, social mobilization, and community engagement for routine immunization, as well as to ensure proper funding of demand creation. Third, coordination with immunization partners doesn't have an immunization-specific coordination structure; the Interagency Coordination Committee (ICC) was subsumed into broader coordination structures.

To further improve performance towards achieving universal health coverage, there is a need to address issues raised by the CER in core aspects, specifically regarding sustained funding of the National Immunization Program. The increasing focus of the international community on Universal Health Coverage in the framework of the Immunization Agenda 2030 is a great opportunity to seize in addressing the findings of this review.

Recommendations

Program Management and Financing

1. Revise the EPI Staff and Committee TOR dated 8/30/2012. This document should clearly define the roles and responsibilities of all stakeholders.
2. Reinstate the Interagency Coordination Committee (ICC).
3. Ensure robust engagement with local governments, parliament, and partners with clear roles and responsibilities all throughout the process of planning, implementation, monitoring, and evaluation.
4. Ensure transparency in planning at all levels so that all know who is financing what to avoid duplication of funding
5. Develop MOUs with other ministries, in particular the Ministry of Education.

6. Review after-action report for Ebola and COVID-19 to develop a plan for catch-up and recovery and sustaining routine EPI.
7. Document ongoing actions to address measles, pertussis, and other outbreaks; data should drive actions at sub-national levels.
8. Review the urban immunization strategy implemented in Montserrado and the potential needs for implementation in other countries aside Montserrado.
9. Disseminate clear guidelines, policies, and schedules to lower levels, and collect and destroy outdated materials.
10. Work with the Ministry of Finance and with Parliament to increase the Ministry of Health budget for EPI/Liberia.

Human Resources Management

1. Develop MOUs with other ministries, in particular the Ministry of Education.
2. Review the after-action report for Ebola and COVID-19 to develop a plan for catch-up and recovery and sustaining routine EPI.
3. Document ongoing actions to address measles, pertussis, and other outbreaks; data should drive actions at sub-national levels.
4. Disseminate clear and updated guidelines, policies, and schedules to lower levels, and collect and destroy outdated materials.
5. EPI manager to delegate more responsibilities to the staff at national and county levels, but remain engaged with regard to supervision/oversight.
6. Performance Based Financing at National and County Levels should be supported.
7. Increase the number of vaccinators (to at least two) to allow for fixed sessions and outreach at the same time.
8. Revise and update the EPI Staff and ICC TOR to clearly delineate roles and responsibilities.
9. Strengthen EPI supportive supervision at all levels to ensure quality vaccination services.
10. Strategize on ways that vaccinators who are not on payroll can be compensated/motivated.
11. Provide more frequent support training to the private sector.

Vaccine Supply, Quality, and Logistics

1. Establish a vaccine management system focusing on stock monitoring and management by ensuring an alert system will notify when stocks are running low at the national level.
2. Improve vaccine management by ensuring there is appropriate training and supervision for cold chain management at sub-county levels.
3. Conduct annual inventory of the cold chain at all levels.
4. Conduct incinerator mapping and install new incinerators strategically where they are lacking.
5. Ensure budget for waste management.

Service Delivery

1. Strengthen defaulter tracking mechanisms with a national roll out of the guidance. Provide training and through supportive supervision further strengthen the application.
2. Develop strategies to address missed opportunities for vaccination and late vaccination, and provide clear guidance and tools to document late vaccination.
3. Strengthen defaulter tracing mechanisms, and ensure supportive supervision is used to ensure the tools available for defaulter tracing are available. Develop a clear strategy and training of vaccinators on how to identify 'zero dose' children. Align this strategy with the strategy on missed opportunities. Plan for catch up vaccination for children who did not receive vaccines due to disruptions as a result of the COVID-19 pandemic or the national stock outs of vaccines.
4. Use the opportunity of special immunization services (SIAs) and other special vaccinations to reach out to hard-to-reach areas with a wider vaccination package.
5. Ensure logistics and mobility support to vaccinators for conducting outreach immunization sessions; in particular, ensure sufficient transport is available.
6. Ensure implementation and operationalization of the Urban Strategy for Immunization.

7. Define and strengthen the role of CHAs. Develop a unified strategy and clear integration in the immunization program with clear TORs.
8. Strengthen the implementation of national policy for opening multiple dose vials (MDV).

Demand generation

1. Review and operationalize the EPI Communication Strategy/Plan developed in 2018 by updating the analysis using behavioral and social drivers (BeSD) principles and the most recent population-level survey data; mapping influencers and key partners and relevant coordination mechanisms; supporting the review/update and dissemination of key messages and materials; and developing an operationalization/implementation costed plan with clear responsibilities and timelines and linkages with National Health Communication.
2. Support/Provide separate funding for routine immunization demand generation activities at the national, county, district, and health facility level.
3. Conduct a national level effort to remove all outdated promotional materials and guidance documents down to the most remote health facilities and replace them with updated guidance and IEC materials to include newly introduced vaccines and schedules.
4. Clarify EPI communication organogram and budget authority at all levels—including for the Health Promotion Division and EPI Communication Unit National, and ensure proper staffing.
5. Develop and implement a comprehensive capacity development plan to improve the capacity of EPI and healthcare staff in designing, implementing, and monitoring demand generation activities for routine immunization and primary healthcare.
6. Make use of BeSD principles and participatory approaches, including human-centered design, to promote proactive demand for EPI vaccines and vaccination across the life-course. With over 90 percent uptake of first EPI doses and only 51% of children completing all required doses, the main challenges are more likely to involve access barriers and other practical issues that prevent parental intentions to vaccinate from being actualized in practice. Demand strategies will need to be tailored for urban areas in line with nationally approved urban immunization strategies.
7. Strengthen partnership and coordination with local partners and stakeholders for increased and sustained commitment and support to routine immunization interventions

Coverage and Monitoring

1. Training and supervision in data interpretation and how to use the data for corrective action are needed. Extensive training and regular supervision are needed to identify zero-dose children or defaulters and estimate vaccine forecasts, which has not been observed at each level. CER revealed that most districts, counties, or health facilities have not monitored coverage or drop-out rates. Urgent actions are needed to improve coverage monitoring activities.
2. Develop an electronic platform that includes a dashboard of coverage and drop-out rates at the district and/or county level. Develop a dashboard to help health workers better understand the data. The dashboard should remain as simple as possible. For example, an Excel sheet with a basic Macro function requiring only data input from monthly reports can be used. This will allow for automatic visualization of coverage and dropout, which will help districts and counties to identify zero-dose children or defaulters in their catchment area.
3. Population estimates need to be reviewed and updated. Since the national census was last completed in 2008, population estimates should be reviewed and updated. Also, demographic trends including migration, infant mortality rate, and changes in fertility patterns should be taken into consideration.

Surveillance and AEFI monitoring

1. Offer training on surveillance more frequently, to be extended to all teams in districts, and to be cascaded down to lower levels.
2. Work on investigations with an emphasis on timeliness and the lab component, with feedback on the result.
3. Constantly monitor that the surveillance focal person at every level is in place.
4. Provide a formal onboarding mechanism with refresher training and supervision at all levels.
5. Increase and disseminate performance monitoring using surveillance indicators.

ANNEX

List of Interview Questions By Thematic Area

List of Reviewers

National Reference Documents