COMPREHENSIVE FACILITY SURVEY REPORT FOR THE MATERNAL SYPHILIS PROGRAM IN LIBERIA

February 2023

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Acronyms

ANC	Antenatal Care
ART	Antiretroviral Treatment
ARVs	Antiretrovirals
BZP	Benzathine Penicillin G
CFS	Comprehensive Facility Survey
DHIS2	District Health Information Software 2
DQA	Data Quality Assessment
HMIS	Health Management Information Systems
HTC	HIV Testing and Counseling
KPIs	Key Performance Indicators
MCH	Maternal and Child Health
NACP	National AIDS and STI Control Program
SSRR	Stock Status Report and Requisition
ToT	Training of Trainers
TKG	The Khana Group

Executive Summary

As of June 2020, the National AIDS and STI Control Program (NACP) of the Ministry of Health of Liberia recommended the use of HIV/syphilis dual testing when screening pregnant women and partners in the "National Guidelines for HIV Testing Services (HTS) & Psycho-Social Support (PSS)." By September 2021, the NACP began its dual test scale up efforts in partnership with Evidence Action. The initial phase of scale-up included training and capacity building of over 1,300 healthcare providers across 157 facilities in three counties: Montserrado, Margibi, and Grand Bassa.

As part of its technical assistance to NACP, Evidence Action implemented a Comprehensive Facility Survey (CFS) across 48 randomly sampled health facilities and utilized the findings to estimate coverage of syphilis screening and treatment and assess program quality. The survey focused on various aspects of the program, including assessments of provider knowledge and adherence to clinical guidelines on HIV and syphilis counseling, screening, and treatment during antenatal care; supply chain management and product availability; and data recording and reporting practices. In addition to qualitative and quantitative interviews, the survey included a data quality assessment (DQA) module where facility source records and reporting forms were reviewed for data accuracy and completeness. The intention was to adjust nationally reported figures using the DQA results for the number of 1st ANC visits, the number of pregnant women tested for syphilis, the number of pregnant women who tested positive for syphilis, and the number of syphilis-positive pregnant women that were treated for syphilis.

Due to the absence of facility-level data tools in 21% (10/48) of the sampled facilities, a triangulation approach was used to estimate syphilis screening coverage, combining survey results for commodity availability, provider knowledge and adherence to clinical guidelines, and patient consent. Using data from January to August 2022, it is estimated that 68% (39,594/57,924) of pregnant women attending their first ANC were screened for syphilis across the three counties and that 2.3% (900/39,594) were positive. Lower and upper treatment rate estimates were also calculated using two approaches: (1) a patient-by-patient review of health records and patient charts for syphilis-positive pregnant women, yielding a lower-bound treatment rate of 36% (322/900), and (2) a similar triangulation of survey results as was done for the screening rate, resulting in an upper-bound treatment rate of 64% (578/900). The treatment rate of 36% is likely an underestimation due to poor documentation in patient charts, as among the six charts that were available, there were records of treatment in five instances (83%) and no record of treatment in only one instance where the facility in-charge recalled the patient refusing treatment (17%).

One of the most important areas of evaluation in the survey was the extent to which providers knew to use the HIV/syphilis test when screening a pregnant woman for syphilis. All 48 facilities reported using the dual test as standard operating procedure when testing ANC-going pregnant women for syphilis, and 93% of providers knew that dual test should be the first test administered when screening for HIV and syphilis. Only one facility reported a syphilis test refusal in the three months preceding the survey.

When it comes to syphilis treatment, 47 out of 48 facilities reported treating syphilis-positive pregnant women as standard operating procedure. Two facilities reported they had each experienced a single case of a syphilis-positive pregnant woman who refused treatment in the three months preceding the survey.

Providers overwhelmingly knew syphilis should be treated with benzathine penicillin (BZP), with 97% and 95% listing BZP among the prescriptions they would write for a syphilis-positive pregnant woman or a syphilis and HIV positive pregnant woman (a co-infection), respectively.

Results from the stock availability assessment indicate that supply chain management is a key area of improvement for program strengthening and is the largest contributor to gaps in syphilis screening and treatment coverage. Significantly, 25% of facilities reported having experienced a stock out of HIV/syphilis dual tests, and 27% reported experiencing a stock out of benzathine penicillin, both in the three months prior to the survey. As supply availability is crucial for adherence to screening and treatment guidelines, improving the consistent supply of these commodities is a necessary condition for increasing screening and treatment coverage.

Lastly, data collected during the facility record review was compared to the online DHIS2 dashboard for each of the key performance indicators. Results suggest that when data is available at both the facility level and the national database, there is good consistency between the two sources in all instances except the total number of ANC visits. However, for the indicators related to HIV testing and syphilis testing, positivity, and treatment, there was a significant number of missing observations from either facility records or the DHIS2, indicating that this is an area for improvement.

The remainder of this report details the (1) program background; (2) the survey methodology and sampling; (3) the estimated coverage of syphilis screening and treatment; (4) the program quality assessment across key areas of care; and (5) recommendations for strengthening the program moving forward.

Program Background

In Liberia, 2.7% of pregnant women, on average, are infected with active syphilis.[1] If left untreated, these infections result in at least 1,260 stillbirths, 530 neonatal deaths, 940 cases of congenital syphilis, and 350 cases of preterm birth each year. In addition, women with HIV and syphilis co-infection are 2.5 times more likely to transmit HIV to their children.

Historically, fewer than 10% of all pregnant women have been tested for syphilis in Liberia despite over 95% attending at least one antenatal care visit. At the same time, HIV screening among pregnant women has been above 80% since 2018. The persistent gap in syphilis testing is a result of (a) a lack of dedicated STI funding, which has resulted in low levels of procurement of syphilis testing commodities; and (b) a reliance on lab-based syphilis tests, where only some facilities are capable of implementing the test.

Since late 2020, Evidence Action has been providing comprehensive support to Liberia's National AIDS and STI Control Program (NACP) for the scale-up of HIV/syphilis dual testing and syphilis treatment

[1] According to the 2017 sentinel surveillance survey which measured HIV and syphilis prevalence among pregnant women.

among pregnant women across the country through a robust training-of-trainers (ToT) model and supportive supervision cascade.

Survey Methodology

The Comprehensive Facility Survey (CFS) is one of the primary data sources for the monitoring and evaluation plan of the Maternal Syphilis Screening and Treatment program in Liberia. This survey was designed to collect data on process and performance which is then used to calculate key performance indicators (KPIs), including syphilis screening and treatment coverage.

The objectives of the CFS are to:

- Assess the quality of and adjust government-reported statistics on syphilis screening and treatment coverage, otherwise referred to as a data quality assessment (DQA);
- Measure providers' knowledge of HIV and syphilis testing and treatment guidelines;
- Assess providers' quality of care, the facility's management of commodities, the extent and quality of recording in facility registers, and the accuracy of reporting in the Health Management Information System (HMIS) database (otherwise referred to as the DHIS2);
- Evaluate facility-level availability of syphilis screening and treatment commodities; and,
- Identify trends in challenges and barriers to facility-level program implementation.[2]

The CFS is conducted at health facilities offering antenatal care where healthcare providers have been trained to use the HIV/syphilis dual test for screening and administer treatment for syphilis-positive cases. The survey uses a mixed methods approach to collect quantitative and qualitative data across four modules:

- Module 0 collects the names of focal persons responsible for each aspect of service delivery related to maternal syphilis care provision at the facility. These are the staff interviewed in Module 1.
- Module 1 captures qualitative data on standard procedures for each aspect of maternal syphilis care provision at facilities in a bid to contextualize the data captured in Module 2 and 3, providing insight on patterns that may be identified in the data.
    - Providers are also asked to list all respondents available at the facility on the day of surveying that provide ANC. These are the staff interviewed in Module 2.
- Module 2 captures both quantitative and qualitative data on provider skills, knowledge, and practices as it relates to providing care for pregnant women who are attending ANC and those who are testing positive for syphilis. This module focuses on asking pointed knowledge questions in addition to presenting patient cases, and includes an HIV/syphilis dual test skills assessment.
- Module 3 consists of the records review where enumerators collect data from the ANC register, the HIV Testing and Counseling (HTC) registers, injection room ledgers, and HMIS forms from the preceding three calendar months (May-July 2022). This module also assesses supply availability

[2] Identification of trends is only possible once multiple rounds of the CFS are completed. Thus, there is no discussion of trends in this report.

and stock management practices, including a review of commodity stock/bin cards for the preceding six calendar months (Feb-July 2022).

Supplemental Quality Assessment

The survey is lengthy and requires a minimum of one day per facility in order to complete all of the modules, particularly the qualitative aspects. In designing the survey, there were qualitative questions identified which were deemed important but not essential to the primary goals of the survey (being able to estimate coverage of syphilis screening and treatment and being able to assess program quality). Thus, these questions were included in a supplement which was only administered at nine of the facilities. The intention was that the responses to the supplemental questions would be utilized to attain additional insight into the DQA and to better understand the quality of ANC more generally. The findings from these supplemental questions are indicative, rather than generalizable, given the sample size and method of facility selection.[3] Throughout this report, it is noted where the findings are resulting from the facilities which received the supplemental questions.

Data Collection

Evidence Action hired a data collection firm, The Khana Group (TKG), who led the training, deployment, and management of enumerators during data collection. TKG recruited 24 data collectors and led a three-day training on the data collection protocols, tools and field visit strategies. The trained data collectors then participated in a one-day field practice session where they visited two pre-selected facilities to administer selected sections of the survey, with the purpose of consolidating the knowledge gained during in-class training and observing the enumerators to provide corrections and feedback to the team. After administering a post-training test, a final team of fourteen enumerators and three supervisors were engaged for data collection. Enumerators were deployed in teams of two and assigned the facilities to visit over a period of fourteen days. The data collection process was successfully implemented through daily feedback sessions with enumerators, daily supervisory visits to facilities by team supervisors, weekly back-checks to select surveyed facilities,[4] and field monitoring by both TKG and Evidence Action teams.

[3] The nine facilities which received the supplemental questions were selected through purposive sampling. These facilities, selected from the larger CFS sample, reported anomalous testing rates for HIV versus syphilis and anomalous treatment rates between syphilis positive results and recorded treatment in the HMIS. Eight facilities from the larger sample initially fit these criteria, but the program team requested that an additional facility in Grand Bassa be administered the supplemental questions, as the other facilities were distributed only in Montserrado (six) and Margibi (two) counties. The facility in Grand Bassa was selected given the anomalous testing rate between HIV and syphilis, as well as that the number of reported HIV tests among pregnant women was larger than the number of total 1st ANC visits.

[4] A back-check survey was deployed for quality control. A total of seven facilities were randomly drawn from the list of surveyed facilities to be back checked using the back-check survey. The back-check team visited the selected facilities and completed two randomly selected sections from Module 1, out of the six sections, and one randomly selected section from Module 2, out of the four sections.

Sampling

Facilities surveyed with the CFS were selected through a two-stage sampling strategy:

- In the first stage, the sampling frame included the 157 health facilities trained on the HIV/syphilis dual test by NACP and Evidence Action in late 2021 as a part of the first phase of the program roll-out to Montserrado, Margibi, and Grand Bassa counties.[5] This is the level at which sampling for facility-level results took place, such as facility standard operating procedures and the source documents review (Modules 1 and 3).
- The second sampling stage included a sampling frame of the population of providers from the 48 surveyed health facilities. This was the level at which provider interviews on routine ANC practices, HIV and syphilis pre- and post-test counseling, screening, and treatment knowledge took place (Module 2).

The sampling strategies for both levels are described below.

Facility Sampling

Methodology

The sampling frame was stratified by county and facility caseload. The sample was then selected through stratified random sampling using probability proportionate to size. A sample size of 48 facilities was chosen to allow estimating program quantitative KPIs with a 90% confidence level and a 10% margin of error around the point estimates.

Facility Demographics

The 48 facilities sampled vary across several key characteristics, including facility type, ownership, and geography, as shown in **TABLE 1**.

TABLE 1. SAMPLED FACILITY CHARACTERISTICS

Facility EPHS Classification		Locality		Ownership	
PHC Level 1 Clinic	21 (44%)	*Urban*	33 (69%)	*Public*	27 (56%)
PHC Level 2 Clinic	16 (33%)	*Rural*	15 (31%)	*Private*	21 (44%)
Health Center	6 (13%)				
Hospital	5 (10%)				

[5] In Montserrado, training began in September 2021 and concluded by October 2021 although there were a few facilities trained in 2020 and early 2021 as part of the early piloting phase of the Maternal Syphilis Screening and Treatment program. In Grand Bassa and Margibi, training began in November 2021 and concluded by December 2021.

Provider Sampling

Methodology

An expectation during survey design was that there would be multiple respondents for different survey sections and modules, as maternal syphilis screening and treatment can be provided by multiple providers at one facility (depending on the facility size). The range of respondents expected was between one and eighteen per facility, and were identified as follows:

- **Module 0** - Upon arrival at the facility, the enumerator requested for and interviewed the Officer-in-Charge (OIC) to identify the focal persons responsible for each aspect of service delivery related to maternal syphilis care provision at the facility. The OIC, or their representative, listed out the names of focal staff for these aspects of care: (A) HIV and syphilis testing, (B) ANC, (C) HIV and syphilis pre- and post-test counseling, (D) HIV and syphilis treatment, (E) commodity management and stock supply requisition, and (F) facility recording and reporting.
- **Module 1** (facility-level assessment) - At all facilities, the enumerators interviewed focal persons responsible for the six areas of care listed as provided by the OIC in Module 0. Data from this module was analyzed at the facility level. Depending on facility size and staffing structure, this module may have targeted multiple respondents as follows:
    - **Section A** administered to the focal person responsible for HIV and syphilis testing
    - **Section B** administered to the focal person responsible for the ANC
    - **Section C** administered to the focal person responsible for overseeing pre- and post-test counseling
    - **Section D** administered to the focal person responsible for HIV and syphilis treatment
    - **Section E** administered to the focal person responsible for managing the commodity inventory and stock requisition
    - **Section F** administered to the focal person responsible for data recording and reporting
- **Module 2** (provider-level assessment) - This module also may have targeted multiple respondents depending on facility size and staffing structure. At the end of each focal person interview (Module 1), the focal person was asked to list the names of other staff who provided care in the same area and were present and available on the day of the interview. The number of respondents for this module varied depending on provider availability and facility size, with up to three staff interviewed for each section of Module 2 at each facility. For example, if five providers at a facility that day all did HIV and syphilis testing among pregnant women, the enumerator would randomly select three providers from the list to complete Section A. However, if the facility only had two providers who did HIV and syphilis testing among pregnant women, then both providers would be automatically selected for Section A. Potential respondents for this module included ANC providers (nurses, physicians, midwives, etc.), lab technicians, HIV counseling staff, injection room nurses or midwives, etc.

In practice, on average, just four or fewer respondents per facility were needed to complete the survey, totaling 167 providers interviewed across all facilities (**TABLE 2**). Often, the MCH focal person answered most of the questions on facility SOPs regarding ANC care, HIV and syphilis screening, HIV and syphilis

treatment, and data recording practices in Module 1, then responded to similar questions again in Module 2 when asked directed knowledge questions and presented with patient cases. This likely introduced bias in multiple ways – (1) order-effects bias: respondents may have been inadvertently primed during Module 1, as they would be unlikely to say they don't follow a stated SOP in Module 2, and; (2) response fatigue: being asked similar questions multiple times led to exasperation by respondents. This was an important learning from the first survey deployment, which will lead to survey design changes to be better suited for facilities with few staff.

TABLE 2. TARGETED AND ATTAINED SAMPLE SIZES

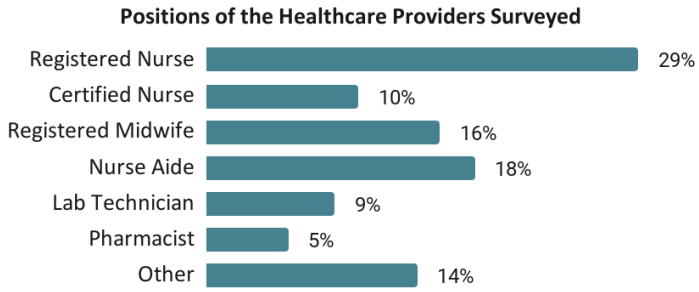
			Target sample size	Actual sample size
Survey type				
Comprehensive Facility Survey			48	48
Supplemental Quality Assessment (a subset of the 48 sampled facilities)			9	9
Modules		**Targeted healthcare provider respondents**		
0	Services Provided at Health Facility	Facility Officer-in-Charge (OIC)	48	48
1A	HIV-Syphilis Screening Provider Interviews	Focal person responsible for HIV and syphilis testing	48	48
1B	Antenatal Care Provider Interview	Focal person responsible for the ANC	48	49
1C	Pre-Test and/or Post-Test Counseling Provider Interview	Focal person responsible for overseeing pre- and post-test counseling	48	47
1D	Syphilis Treatment Provider Interview	Focal person responsible for syphilis treatment	48	47
1E	Supply Management Staff Interview	Focal person responsible for managing the commodity inventory and stock requisition	48	51[6]
1F	Reporting Staff Interview	Focal person responsible for data recording and reporting	48	48
2A	Antenatal Care Provider Skills and Knowledge Test	Up to three antenatal care providers	27	18
2B	Pre-Test and/or Post-Test Counseling Provider Skills and Knowledge Test	Up to three providers who do pre- and post-test counseling	27	20
2C	HIV-Syphilis Screening Provider Skills and Knowledge Test	Up to three providers who do HIV and syphilis testing	144	94
2D	HIV-Syphilis Treatment Provider Skills and Knowledge Test	Up to three providers who treat pregnant women for syphilis	144	92
		Total Number of Unique Healthcare Provider Respondents	-	167

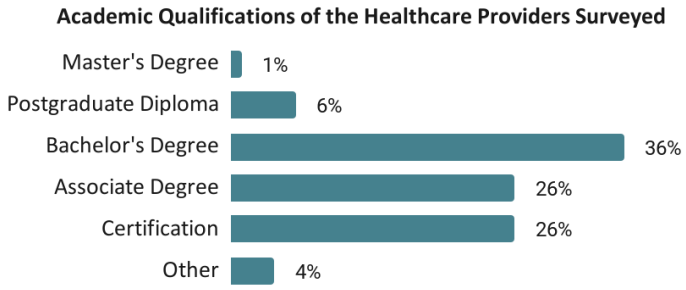
[6] At three facilities, two people were surveyed related to supply chain management because the person who handled the inventory management was different than the person who filled in the Stock Status Request and Requisition forms.

Provider Demographics

The respondents for the CFS included healthcare providers working in ANC, HIV and syphilis testing and counseling, HIV and syphilis treatment, facility data reporting, and commodity management. The most common position of survey respondents was registered nurse (28%) and nurse's aid (18%). Nearly half of respondents (43%) reported education of at least a bachelor's degree (**FIGURE 1**). Respondents reported having held their current position for an average of seven years, and had worked on average at least five years at their present facility. This suggests that most facility staff involved in syphilis testing, treatment, and recordkeeping had some working knowledge and experience in the ANC field and were present at the beginning of the maternal syphilis program roll out which began in 2021.

FIGURE 1. HEALTHCARE PROVIDER RESPONDENT'S POSITION AND QUALIFICATIONS





Coverage of Syphilis Screening & Treatment

The primary objective of the Comprehensive Facility Survey was to collect data which would enable the program to estimate the coverage of syphilis screening and treatment services that was achieved in Montserrado, Margibi, and Grand Bassa counties following the adoption of HIV/syphilis dual testing. Coverage of syphilis screening and treatment would be evaluated by estimating each of four underlying performance indicators:

1. The number of pregnant women attending at least one antenatal care visit;
2. The number of pregnant women screened for syphilis;
3. The number of syphilis cases detected in pregnant women;
4. The number of syphilis-positive pregnant women treated with benzathine penicillin.

The goal from the outset had been to estimate coverage via a data quality assessment (DQA). Each of the four performance indicators are reported in the national DHIS2 online database, and so the survey would trace and validate the data reported by reviewing facility records for May to July 2022 to produce 'verification factors' which would be used to correct the data reported in the DHIS2. The main records which would be reviewed at the health facility include the ANC register, the HTC register, patient charts, the injection room ledger, and the paper HMIS forms.

Anticipating that there could be issues of data completeness and availability at both the facility and in the DHIS2 database, alternatives to a DQA were delineated with pre-specified decision rules. The pre-conditions for utilizing a DQA to estimate coverage were not fully met for all of the performance indicators.

The facility-level data tools required for validating the number of pregnant women screened for syphilis and the number found positive for syphilis were absent in 21% of the surveyed health facilities (10/48).

The DHIS2 dashboard was missing 26% of the required data elements for the number of syphilis-positive pregnant women treated with benzathine penicillin (74/288).

Thus, the DQA was only used in estimating the first performance indicator (the number of pregnant women attending at least one ANC visit) and alternative triangulation approaches were used to estimate the three remaining performance indicators. Further detail related to data completeness and the pre-specified decision rules can be found in **ANNEX 1**.

The final results of the coverage estimation are presented in **TABLE 3** (the total number of pregnant women reached in Montserrado, Margibi, and Grand Bassa from January to August of 2022 for each performance indicator) and **TABLE 4** (the overall estimate of screening and treatment coverage).

TABLE 3: FINAL ESTIMATE OF COVERAGE PERFORMANCE INDICATORS; TOTAL REACHED JAN-AUG 2022

	# 1st ANC visits[7]	# pregnant women that were tested for syphilis[8]	# pregnant women who tested positive for syphilis[9]	# syphilis-positive pregnant women treated with 2.4IU benzathine penicillin[10]
Grand Bassa	9,372	6,406	123	Lower estimate: 44 Upper estimate: 79
Margibi	8,440	5,769	329	Lower estimate: 117 Upper estimate: 211
Montserrado	40,112	27,419	448	Lower estimate: 160 Upper estimate: 288
Total	**57,924**	**39,594**	**900**	**Lower estimate: 322** **Upper estimate: 578**

[7] Calculated via a DQA.

[8] Calculated by multiplying the syphilis screening coverage rate by the adjusted # of 1st ANC attendees. The syphilis screening coverage rate was estimated via a triangulation approach combining the rates of HIV/syphilis dual test availability, provider knowledge and adherence to clinical guidelines, and patient consent.

[9] Calculated by multiplying the estimated # of pregnant women tested for syphilis by the county-level prevalence of active syphilis as determined by the 2017 national sentinel surveillance study.

[10] Calculated by multiplying the syphilis treatment coverage rate (both lower estimate and upper estimate) by the estimated # of syphilis-positive pregnant women. The lower estimate of syphilis treatment coverage (36%) is based on a patient chart review. The upper estimate of syphilis treatment coverage (64 %) was estimated via a triangulation approach combining the rates of BZP availability, provider knowledge and adherence to clinical guidelines, and patient consent.

TABLE 4: SUMMARY OF KEY COVERAGE ESTIMATES

Syphilis Screening Coverage Rate	68%
Syphilis Treatment Coverage Rate	Lower estimate: 36% Upper estimate: 64%

Estimating the # of 1st ANC Visits

According to the national guidelines, all pregnant women in Liberia are to be tested for HIV and syphilis at the first ANC visit. Therefore, in discussing the impact of adopting HIV/syphilis dual testing on overall syphilis screening coverage, the appropriate performance indicator to consider is the number of pregnant women who attend at least one ANC visit.

The DQA analysis revealed that, on average, data from the national DHIS2 online dashboard is underestimating the number of 1st ANC visits as compared to the facility records. A 'verification factor' of 103.3% was calculated to correct the national DHIS2 data. See the data review section **BELOW** for further detail. The verification factor of 103.3% was multiplied by the number of 1st ANC visits reported in the DHIS2 to arrive at the adjusted number of ANC visits across the three counties (**TABLE 5**).

TABLE 5: UNADJUSTED AND ADJUSTED 1ST ANC VISITS; JANUARY - AUGUST 2022

	# 1st ANC Visits	
	Unadjusted (reported in DHIS2 as of Nov. 16, 2022)	**Adjusted** (using verification factor)
Grand Bassa	9,077	9,372
Margibi	8,174	8,440
Montserrado	38,849	40,112
Total	**56,100**	**57,924**

Estimating the # of Pregnant Women Tested for Syphilis

As stated above, a DQA was not used to estimate the number of pregnant women that were tested for syphilis because 21% of the facilities (10/48) did not have the requisite data tools to be able to validate the reported data (namely, the HTC register was missing). Thus, a triangulation approach was utilized to estimate syphilis screening coverage by multiplying the rates of HIV/syphilis dual test availability, provider knowledge and adherence to clinical guidelines, and patient consent. The underlying estimates used in triangulation are as follows:

- Stock availability – 75% of facilities reported there had *not* been a stockout of the HIV/syphilis dual test kits at any point during the three months under review.

- Provider knowledge – 93% of providers interviewed said they would use the HIV/syphilis dual test as the first test when testing a pregnant woman for HIV and syphilis.[11]
- Patient behavior – 98% of facilities stated that no pregnant women had declined syphilis testing in the months under review.

Multiplying together, this resulted in an estimated syphilis screening coverage rate of 68%, indicating that on average, 68% of pregnant women get screened for syphilis during their first ANC visit at facilities trained in HIV/syphilis dual testing. This estimated screening rate was then multiplied against the estimated number of 1st ANC visits to arrive at an estimate of the number of pregnant women screened for syphilis shown in **TABLE 6**.

TABLE 6: ESTIMATED NUMBER OF PREGNANT WOMEN TESTED FOR SYPHILIS AT THE 1ST ANC VISIT; JANUARY - AUGUST 2022

	Estimated # of pregnant women that were tested for syphilis
Grand Bassa	6,406
Margibi	5,769
Montserrado	27,419
Total	**39,594**

Estimating the # of Pregnant Women Who Tested Positive for Syphilis

Again, a DQA approach could not be used to estimate the number of pregnant women who tested positive for syphilis because 21% of the facilities (10/48) did not have the requisite data tools to be able to validate the reported data (namely, the HTC register was missing). Instead, the estimated number of pregnant women tested for syphilis was multiplied by the active syphilis prevalence measured for each county during the 2017 sentinel survey to estimate the number of pregnant women who tested positive for syphilis during their 1st ANC visit (**TABLE 7**).[12]

[11] Across all facilities, the focal person responsible for ANC reported that their facility uses the dual test when asked what test is administered when screening a pregnant woman for syphilis.

[12] Prevalence data from the sentinel survey was calculated using two different tests to confirm a syphilis diagnosis, which together identified active cases of maternal syphilis. All reactive samples from the study were also confirmed at a separate lab. As such, no further adjustments to the positivity rate to account for non-active syphilis or false positives were required.

TABLE 7: ESTIMATED NUMBER OF PREGNANT WOMEN WHO TESTED POSITIVE FOR SYPHILIS; JANUARY - AUGUST 2022

	Active syphilis prevalence	Estimated # of pregnant women who tested positive for syphilis
Grand Bassa	1.93%	123
Margibi	5.70%	329
Montserrado	1.63%	448
Total	-	**900**

Estimating the # of Syphilis-Positive Pregnant Women Treated with Benzathine Penicillin

Here, again, a DQA approach could not be used to estimate the number of syphilis-positive pregnant women who were treated for syphilis with benzathine penicillin. In this case, there was insufficient reported data in the DHIS2 to meet the set pre-condition (26% of the required data was not present; 74/288). Thus, one approach was utilized to estimate a conservative lower rate syphilis treatment coverage and a different triangulation approach was utilized to estimate an upper rate of syphilis treatment coverage. The triangulation-approach combined the rates of BZP availability, provider knowledge and adherence to clinical guidelines, and patient consent.

The approach used to estimate a conservative lower rate of syphilis treatment coverage involved conducting a patient-by-patient review of facility records for the nineteen pregnant women who were reported positive for syphilis in the HTC registers during the months of May to July 2022.[13] These nineteen cases were found among eleven of the surveyed health facilities; the remaining 37 health facilities either had no record books or had no recorded syphilis-positive cases for the three months under review. The results of the patient chart review are presented in **TABLE 8.**

[13] The patient-by-patient records review was conducted by two Evidence Action staff approximately two months after survey enumeration was concluded by The Khana Group. During survey design, patient-by-patient records review and tracing for proof of ANC attendance, syphilis screening, and syphilis treatment was dropped from the survey due to expected challenges with conducting such a review. Experience from the survey pilot suggested that tracing patients across facility records would be too difficult to do during full survey rollout as the use of master registration numbers (or unique identifiers) is not uniform at facilities. However, upon further consultation with the program team after the survey was completed, it was decided that patients should be traced for treatment for two main reasons: (1) syphilis treatment is most likely to be recorded in patient charts, making patient charts review the only feasible way of verifying treatment, and (2) the number of patients recorded as syphilis positive in the HTC registers was quite low, making tracing more feasible for this indicator.

TABLE 8: RESULTS OF THE PATIENT CHART REVIEW FOR SYPHILIS-POSITIVE PREGNANT WOMEN

Number of syphilis-positive pregnant women recorded in the HTC registers	19
Number observations excluded because the patient chart indicated a syphilis-negative diagnosis in contradiction to what was recorded on the HTC register[14]	5
Number of syphilis-positive pregnant women where syphilis treatment was confirmed on the chart	5
Number of syphilis-positive pregnant woman where there was no record of treatment on the patient chart; OIC recalled the pregnant woman was HIV and syphilis positive and had declined treatment	1
Number of syphilis-positive pregnant women were no patient chart could be found	8

Based on the patient chart review, the conservative lower bound estimate of syphilis treatment coverage would be 36% (five confirmed cases of treatment out of fourteen confirmed syphilis-positive pregnant women). This is a conservative estimate because patients were assumed to not be treated in the instances where no charts could be found; in reality, these women may have been treated or may not have been treated, but it is not known. In the six instances where a patient chart was found for a syphilis-positive pregnant woman, 83% had a record of treatment and 17% had recorded no treatment where the facility in-charge recalled the pregnant woman (who was co-infected with HIV and syphilis) declined treatment.[15]

The underlying estimates used in the upper rate of syphilis treatment coverage, which is calculated via triangulation, are as follows:

- Stock availability – 73% of facilities reported BZP had *not* been out of stock at the facility at any point during the three months under review.
- Provider knowledge
    - 88% of syphilis-positive test results were correctly interpreted by providers to be syphilis positive.[16]

[14] During the patient chart review, the team found that some patients were recorded as syphilis positive in the HTC register but were then recorded as syphilis negative in their patient chart. While it is not certain these patients were in fact syphilis negative, the patient chart is believed to be accurate because, based on observations at facilities, clinicians often fill out the patient chart during the ANC visit itself but may fill out the HTC register one or two days after the ANC visit took place. Furthermore, the healthcare provider who is making the decision whether or not to treat the pregnant woman is acting on the information on the patient chart. Thus, it would be unfair to include syphilis-negative patient charts in the evaluation of syphilis treatment.

[15] Based on past experience, patients are more likely to reject syphilis treatment in the event they are found co-infected with HIV and syphilis as the diagnosis of HIV takes emotional precedence. Further efforts to strengthen post-test counseling are required to ensure that at least pregnant women in these circumstances are treated for syphilis (which is curable).

[16] Although confusing a positive syphilis test result for a negative result isn't directly related to treatment coverage, a provider who thinks a positive result is actually negative would diagnose the patient as syphilis-negative and therefore would not think to treat the patient. Thus, this discount was included in treatment coverage to account for the fewer patients who would be treated as a result of the misread test result.

- 97% of providers interviewed said they would treat a pregnant woman who is positive for syphilis with at least BZP for the syphilis positive patient case.
- 95% of providers said they would treat a pregnant woman who is positive for HIV and syphilis (co-infected) with at least BZP.

- Patient behavior – 96% of facilities reported to not have had a case where a syphilis positive pregnant woman refused treatment.

This resulted in an upper bound estimate of syphilis treatment coverage rate of 64%. Both the upper and lower bound estimates were then multiplied against the estimated number of syphilis-positive pregnant women to arrive at the estimated total number of syphilis-positive pregnant women who were effectively treated with benzathine penicillin; see **TABLE 9**.

TABLE 9: ESTIMATED NUMBER OF SYPHILIS-POSITIVE PREGNANT WOMEN TREATED WITH BZP; JANUARY - AUGUST 2022

	Lower estimate (based on the patient chart review)	**Upper estimate** (based on the triangulation approach)
Grand Bassa	44	79
Margibi	117	211
Montserrado	160	288
Total	**322**	**578**

Program Quality Assessment

The secondary objective of the Comprehensive Facility Survey was to evaluate program quality, identify gaps, and put forward recommendations to strengthen the program.

All of the facilities which were trained as part of the maternal syphilis screening and treatment program are expected to provide services in several key areas of care. Thus, the survey began with an assessment of whether the facilities are in fact providing these services. The results are as follows:

- 100% of facilities provide pre- and post-test counseling to pregnant women;
- 100% of facilities provide HIV and syphilis testing;
- 96% of facilities provide syphilis treatment;[17]
- 100% of facilities report data to District/County Health teams using the HMIS forms.

[17] Two facilities (Liberia Coast Guard and Gbaye-Ta Clinic) reported that they do not provide treatment to syphilis-positive pregnant women. In explanation, Gbaye-Ta Clinic indicated they did not do so because they had no drugs available, while Liberia Coast Guard stated they have insufficient staff at the facility trained to administer treatment. Both of these facilities were trained in the program and provided an initial stock of commodities so further investigation is needed to assess what has occurred at these two facilities.

The following sections describe results from different aspects of the program quality assessment, including reported standard operating procedures, provider knowledge, supply chain management, and data recording and reporting.

HIV and Syphilis Pre- and Post-Test Counseling

Pre- and post-test counseling is an important component of a high-quality ANC visit as the difference between good and bad counseling can mean the difference between whether a pregnant woman gives her consent to testing and subsequently, whether she accepts her test results and takes action in the event of a positive test result.

The quality of HIV and syphilis pre- and post-test counseling was only assessed in the nine health facilities where the supplemental quality assessment questions were administered, due to time and resource constraints. Thus, the results presented here refer only to those nine facilities and the twenty providers from these facilities whose knowledge in counseling was assessed, and therefore, the results are indicative, rather than generalizable. To assess quality, providers were questioned on the content of their counseling messages and questioned the facilities on whether they've encountered pregnant women who have refused consent to either testing or treatment and what happened in those instances.

Turning first to pre-test counseling, most providers (75%; n=15/20) reported encouraging pregnant women to take the syphilis test by communicating risk factors for her unborn child and how early treatment eliminates the risk of mother-to-child transmission, as taught during the training. At the same time, in six out of the nine facilities, it was reported that pregnant women had expressed concerns during HIV and syphilis counseling. Some of these concerns included the implication of a positive test result for their babies, how the result may affect their relationship with their partners, whether the disease is curable, and availability and accessibility of drugs for treatment.

Looking now to post-test counseling, providers were asked what messages they relay to pregnant women in the event their test results are negative or positive. These are shown in **TABLE 10**. Overall, many providers recalled the counseling messages which were taught during training. For example, 60% of the providers said that they would want to be clear that syphilis treatment needs to take place immediately and 85% would encourage the pregnant woman to bring in her partner in the event she is positive for syphilis.

TABLE 10: KEY POST-TEST COUNSELING MESSAGES SHARED BY HEALTHCARE WORKERS TO PREGNANT WOMEN, BY TEST RESULT (N=20)

If the pregnant woman is negative for syphilis	
Positive encouragement that the pregnant woman did the right thing for herself and her child by getting tested	75%
Encourage the use of safe sex practices	75%
Encourage the patient to do tests after every three months	10%

If the pregnant woman is positive for syphilis	
Positive reinforcement that the pregnant woman was right to have gotten tested and now her health and the health of her child can be protected	50%
Syphilis is easily treatable with benzathine penicillin	50%
Be clear that treatment should occur immediately to best protect the child	60%
Encourage the pregnant woman to bring in her sexual partners for testing and treatment free of charge	85%
Encourage the pregnant woman not to have unprotected sex while taking the treatment	5%
If the pregnant woman is positive for HIV	
Encourage the pregnant woman that HIV can be managed with medicine and she can live a long and healthy life	65%
Encourage the pregnant woman to enroll in Prevention of Mother-To-Child Transmission (PMTCT) immediately	65%
Explain that she can prevent her child from contracting HIV by taking her medicine	65%
Encourage the pregnant woman to bring in her sexual partners and children under seventeen for testing and treatment, free of charge.	65%
Positive reinforcement that the pregnant woman was right to have gotten tested and now her health and the health of her child can be protected	35%
Encourage the pregnant woman to eat nutritional foods	10%

Finally, in regard to result acceptance, all nine facilities reported that no syphilis-positive pregnant women had ever refused to believe the results from their test. Still, the staff who answered this set of questions on behalf of the facility reported being instructed to take additional steps if the patient refuses to believe a test result. The reported steps included continued counseling focusing on the benefits of knowing their result and the consequences of refusing treatment. Where this fails, it was also mentioned that they may refer the pregnant women to another facility for another test. One provider attested that speaking in the pregnant woman's local language is helpful to make them feel safer.

Findings from the Case Studies[18]

To further understand providers' knowledge in regard to counseling, two patient cases were presented to the twenty respondents randomly selected from the nine facilities that received the supplemental quality assessment questions. In the **first case**, a 23-year-old is three months pregnant, attending her first ANC visit, and needs HIV and syphilis testing. This first case included several questions on pre-test counseling tactics. In response, a majority of providers (90%) said they talked to the patient about the risks of syphilis

[18] The results in this section stem from facilities receiving the supplemental quality assessment questions and primarily relied on qualitative analysis.

in pregnancy, and more than half (60%) emphasized that there was a treatment option available to positive patients. Two providers (10%) mentioned that the test will need to be re-taken after three months.[19]

In the scenario that the patient is hesitant to get tested,[20] 63% of providers gave additional counseling focused on the consequences of untreated syphilis in pregnancy. Some providers (21%) also reassured the patient that the results will be private and confidential. A couple of providers (11%) recommended the patient get tested at their next ANC visit. In the scenario where the patient remains adamant and refuses testing, some providers (25%) mentioned engaging the help of a colleague, including antiretroviral therapy (ART) focal person(s). Only one of the providers mentioned that they refer such cases to other facilities for testing.

Several other themes emerged in providers' responses to questions on pre-test counseling, including:

1. Understanding the importance of establishing rapport and trust with the patient as a first step in counseling, including an emphasis on confidentiality;
2. Emphasizing to the patient that their partner will need to be tested if the patient tests positive;
3. Mentioning to the patient that the HIV/syphilis dual test is a policy from the government of Liberia but still requires the patient's consent.

Box 1. A healthcare provider's response when what information they would share with the patient before having her tested for HIV and syphilis.

"*When I finish cleaning her finger I will prick her finger with the lancet and wipe before I use the capillary tube to collect the blood, and then place it to the colon where the blood is supposed to be, and then place the one drop of the buffer to where it is supposed to be placed, and while doing that I am also telling her that I have to do her Malaria test while that test is reading, and I will also ask her if she has taken her vaccine before and I will also ask her if she has any questions. We would even go to her diet because sometimes we have a health talk outside and all the people come. In that period where we are discussing I will be asking her– because I have already created that friendship between her and myself– she will be telling me other things while the result is reading. Before she leaves the screening room for me to complete her chart, her result would have come. I will tell her, thank you, Annie, your HIV and Syphilis result is here and everything is negative but I don't want you to rely on the fact that it is negative and you begin to go here and there, the best to use or you encourage your man to use a condom all the time because the condom will prevent you from getting pregnant and from getting STI and HIV*."

In the **second patient case**, a woman is three months pregnant and attending a routine ANC visit, but the case specifies that the pregnant woman tests positive for both HIV and syphilis in order to assess post-test counseling behavior. The providers were asked what they would do first upon knowing the test results and all providers rightly mentioned post-test counseling to the patient as the first step. Several questions related to that post-test counseling were then posed to providers. Importantly, only five providers (25%) would

[19] According to the national guidelines, HIV testing is to be repeated after three months if the first test during pregnancy is negative.

[20] Note that only nineteen of the twenty respondents answered this case question.

counsel the patient to bring in their partner for testing. Only two providers (10%) recommended a secondary confirmatory test for HIV.[21] Both of these recommendations (bringing in one's partner and doing a confirmatory test for HIV) are a part of the national guidelines and so further reinforcement may be needed for providers to retain these next steps.

Several other themes emerged in providers' responses to questions on post-test counseling including:

1. Emphasizing confidentiality of results to the patient;
2. Emphasizing the availability of free medication for HIV and the potential for high quality of life for them and their child given proper medication adherence;
3. Noting ways in which the patient can reduce the risk of transmitting HIV to others;
4. Empathizing with the patient and attempting to reduce feelings of social isolation.

Understanding of Syphilis Disease

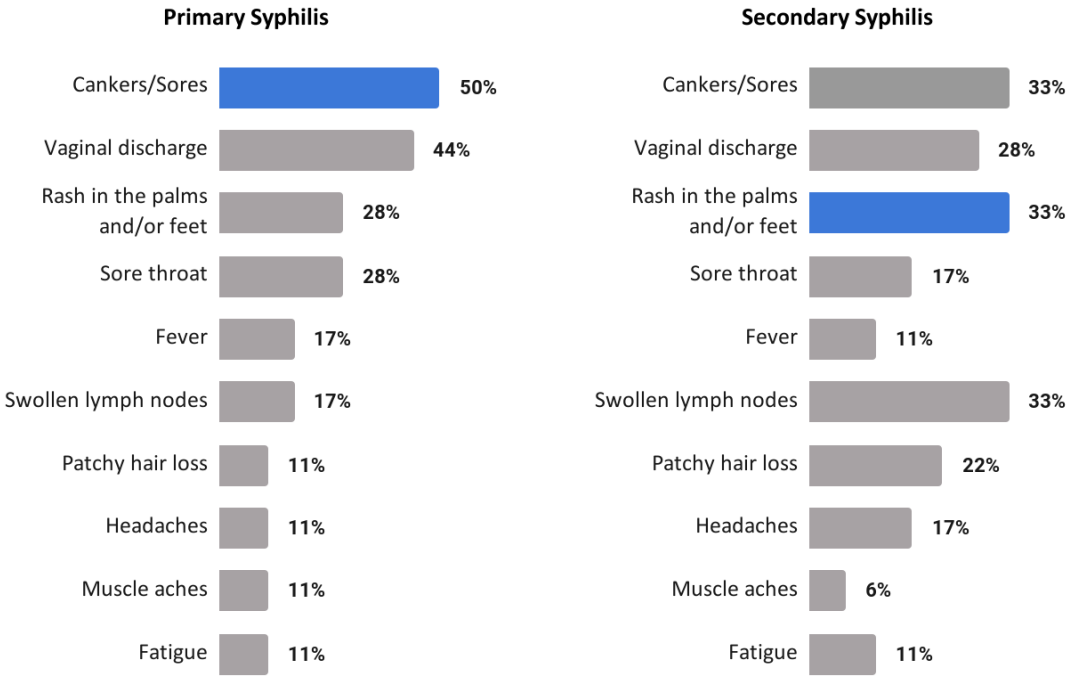
One component of the initial training received by healthcare providers focused on an overview of the stages of syphilis infection, the symptoms of syphilis, and other information related to the disease itself. While providers may screen or treat pregnant women for syphilis irrespective of knowing this information, the survey sought to assess their knowledge retention in this area as an added measure to evaluate program quality.

As with the assessment of counseling knowledge and practices, this component of the survey was also only administered at the subset of health facilities which received the supplemental quality assessment questions. Thus, the findings are based on eighteen healthcare provider respondents from these nine facilities and should be treated as indicative, rather than generalizable.

Generally, healthcare providers were aware of the most common symptom related to syphilis, but demonstrated confusion around how the symptoms corresponded to stages of disease and often cited symptoms which were not specific to syphilis at all. For example, providers accurately identified a sore (53%) as a symptom of primary syphilis. However, only 35% of providers accurately identified a rash as a key symptom of secondary syphilis, and 35% incorrectly said a sore was a symptom of secondary syphilis. Some incorrect symptoms were also mentioned with some frequency for both primary and secondary syphilis: vaginal discharge, swollen lymph nodes, and fever, as examples. Further detailed findings are shown in **FIGURE 2**. Although syphilis is rarely detected through its symptoms, which are minor and often not noticed by the pregnant woman herself, it is worth considering whether refreshers on syphilis symptoms would be beneficial to overall patient care.

[21] This may be due to a misunderstanding from the healthcare providers. Although the enumerators said the positive results for HIV and syphilis were from the dual test (which is just used for screening in the case of HIV), in the way it was phrased, providers may have misunderstood and taken the case to suggest the patient had a positive HIV diagnosis from the full algorithm.

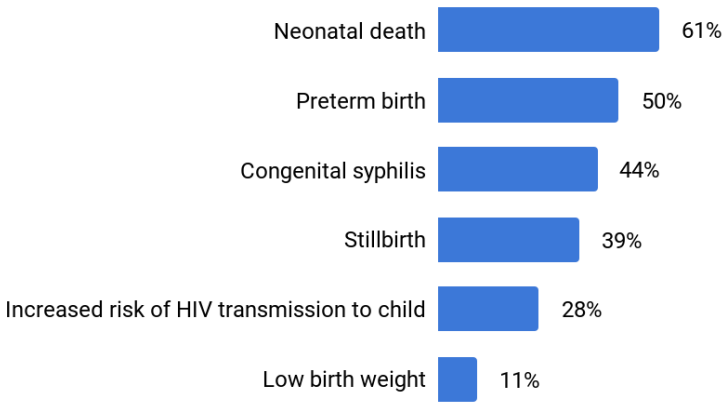
FIGURE 2: SYPHILIS SYMPTOMS LISTED BY PROVIDERS, FOR PRIMARY AND SECONDARY SYPHILIS (N=18)



Note: A correctly identified symptom is in blue whereas the incorrectly identified symptoms are in gray.

The healthcare providers tended to have better recollection for the risks that syphilis poses in pregnancy (see **FIGURE 3**). When asked about those risks, providers correctly reported neonatal death (61%) and preterm birth (50%) as some of the risks of syphilis to pregnant women. Less than half of respondents indicated other key risks such as congenital syphilis, stillbirth, and increased risk of HIV transmission to children, messages which should be reinforced during program enrollment.

FIGURE 3. RISK OF EXPOSURE TO SYPHILIS IN PREGNANCY



Based on findings presented elsewhere in this report, the incomplete knowledge related to the risks of syphilis in pregnancy hasn't translated to a lack of providing those services. That said, this set of findings points to there being additional room for improvement in knowledge underpinning why it is essential to test for syphilis in pregnancy.

Syphilis Screening

One of the most important areas of evaluation in the survey was the extent to which providers knew to use the HIV/syphilis dual test when screening a pregnant woman for syphilis.

First, assessing standard operating procedures and norms within the facility as a whole, all 48 facilities reported using the HIV/syphilis dual test when testing ANC-going pregnant women for syphilis. Of these, nine facilities (19%) reported using the HIV/syphilis dual test for non-pregnant populations; six out of nine cited using the test for male partners of pregnant females (which adheres to the national guidelines), but four out of nine cited using dual tests for other males and/or non-pregnant females (which is contrary to the national guidelines).

Second, turning to whether pregnant women consent to syphilis testing, only one facility reported a syphilis test refusal in the three months preceding the survey. When asked what reasons the pregnant woman gave for her refusal, the respondent indicated that she said she could not afford to pay for the test.[22]

Finally, and most importantly, 94 healthcare providers across the 48 sampled facilities were asked a direct knowledge question regarding which test they would administer when screening a pregnant woman for HIV and syphilis. Among these, 93% accurately stated that the first test should be an HIV/syphilis dual test.

Findings from the Case Studies[23]

Two patient cases related to understanding routine tests and examinations during ANC were presented to respondents from the facilities that were asked the supplemental quality assessment questions (18 respondents in total).[24] Generally, results from these patient cases showed that providers know that HIV

[22] This response was recorded at Triple T Medical Clinic, a private, for profit facility. Per national policy, private health facilities are not supposed to charge for HIV and syphilis testing if the facility is using the dual tests provided (for free) by the Ministry of Health. Further investigation is required to assess whether this facility is improperly charging pregnant women for syphilis testing.

[23] The results in this section were from the nine facilities which received the supplemental quality assessment questions and primarily relied on qualitative analysis.

[24] While designing the CFS, it was decided that patient cases on general ANC provision would be administered only at a select group of facilities because this qualitative data was not strictly relevant to key program indicators (e.g. questions such as what tests would you prescribe could yield a wide variety of responses, many of which would be unrelated to HIV and syphilis screening). However, upon further reflection, this was not optimal. These patient case questions were an opportunity for providers to explicitly state that they use the dual test during the 1st ANC visit in response to an open-ended patient case question rather than a direct knowledge question. Future CFS rounds will consider asking this or a similarly worded question to all providers sampled, considering that responses may be

and syphilis testing is required for pregnant women at their first visit to a facility. In addition, providers showed adequate knowledge with respect to routine tests required for pregnant women and physical examinations to assess for STIs, as shown in their responses to the patient cases described below.

The **first case** was a 23-year-old who is three months pregnant and attending her first ANC visit. Providers were asked what tests they would request for the patient, and 94% (all but one provider) stated that the patient should take an HIV and syphilis test.[25] In responding to this question, over half (63%) mentioned the dual test by name. Providers were then asked whether their response would differ if it was the patient's 2nd, 3rd, or 4th+ visit. Most providers (94%) said they would again recommend either an HIV test and a syphilis test, or a dual test, especially if the visit was in the third or fourth trimester where typically a second HIV test is required by protocol.

When providers were asked how they would assess the pregnant woman's risk for STIs, responses centered around:

1. Asking about pregnancy history, including questions related to past miscarriages, stillbirths, or neonatal deaths, the location of and complications during previous deliveries, and any previous infections during a pregnancy;
2. Asking questions related to the patient and/or their family's medical history, such as previous STIs, hypertension, and blood sugar illnesses. Surprisingly, only five providers asked specifically about STI-related symptoms like vaginal discharges or rashes/itchiness;
3. Asking the patient about their current sexual practices, including their marital status, regular condom use, and whether their partner has been tested for STIs;
4. When prompted about physical examinations to assess a patient's risk for STI, responses included checking vitals and temperature, checking for any vaginal discharge or foul smell, palpitating the belly to check for pains around the lower abdomen, and checking the physical appearance of the mouth and feet.

When asked how they would determine if the patient in this case specifically needs an HIV/syphilis dual test, providers noted that it was routine to do HIV and syphilis tests at every first ANC visit. Therefore, they would check the pregnancy booklet to ascertain the patient's visit number and request an HIV/syphilis dual test if it's her first visit. Additionally, further tests for HIV and syphilis could be requested if the patient presents with possible symptoms of STIs such as sores in the mouth, blisters, rashes, and/or weight loss.

In the **second patient case,** an 18-year-old pregnant woman has attended ANC at another facility but is coming to this provider's facility for the first time. The objective of this case was to understand the regularity of syphilis re-testing at facilities. When prompted for questions they would ask the patient about their previous ANC visits, eleven of the providers (61%) said they would ask the patient about previous HIV and syphilis testing, with six providers (33%) referring specifically to the dual test. A common

upwardly biased since providers will be primed to indicate they follow this guideline by the nature of the monitoring visit.

[25] The research team expressed concerns about a biased response here given that the respondent has been sensitized to being assessed on HIV and syphilis testing for pregnant women. The 1 provider who did not mention HIV and syphilis only mentioned HIV testing.

reference for providers is the patient's pregnancy medical history book, which they use for confirmation of tests and treatments done in previous facilities. If the patient had already taken the necessary tests, approximately half of providers would carry on with ANC from where the patient stopped at the previous facility. Two providers said they would redo the HIV/syphilis dual test in their facility for confirmation irrespective of previous tests, which isn't required by the program. However, when asked specifically how they would assess if this patient needs an HIV or a syphilis test, 44% of providers mentioned that they would definitely carry out an HIV test and 22% said they would definitely carry out a syphilis test since the patient was new to their facility.[26] These findings suggest retesting may be a common practice for pregnant women visiting several facilities throughout their pregnancy.

At the end of the clinical cases, additional knowledge questions were posed to the same eighteen providers. When asked when a pregnant woman should be tested for syphilis during her pregnancy, 94% of the providers correctly stated that a syphilis test is required at the first ANC visit. In addition, the providers responded with a general predisposition to extensive retesting as it pertains to syphilis: 94% of providers said they would recommend retesting a pregnant woman who told them she had already been tested for syphilis at *another facility* and 83% of providers said they would recommend retesting a pregnant woman if she told them she had already been tested for syphilis at the *same facility* but by a different provider. This extent of retesting is not part of the national guidelines and so further reinforcement may be needed as it relates to when patients need to be tested for syphilis to prevent wastage of commodities.

Syphilis Treatment

Alongside knowledge of syphilis screening guidelines, the extent to which providers knew the appropriate guidelines for treating syphilis-positive pregnant women and their partners is a critical area for evaluating the quality of the program.

Syphilis treatment standard practices were assessed at 47 out of the 48 surveyed health facilities.[27] At these 47 facilities, focal points who would be most knowledgeable of the facility norms as it pertains to syphilis treatment were interviewed related to two key areas: patient consent to treatment and partner testing.

Two facilities (4%) reported they had each experienced a single case of a syphilis-positive pregnant woman who refused treatment in the past three months.[28] In one instance, the patient refused treatment because she

[26] Again, this may have been caused by the bias introduced by the respondent's knowledge of the purpose of the survey and being specifically asked about HIV and syphilis.

[27] One of the facilities, Liberia Coast Guard, reported that it does not provide syphilis treatment and was not interviewed on the topic. As noted earlier, Gbaye-Ta Clinic also indicated they did not provide syphilis treatment, but because they indicated this was only due to lack of supply, they were administered the knowledge questions related to syphilis treatment.

[28] The facilities that reported syphilis treatment refusals were Barnersville Health Center (public) and Dagmow Clinic (private, for-profit). Enumerator teams were not able to verify this information during source documents review, as neither facility had an HTC register available.

did not have the transport fare to access treatment.[29] In the other instance, the patient refused treatment because she did not believe the test results themselves. Though this finding would indicate that consent to treatment is high, the program's ultimate objective is to ensure *every* syphilis-positive pregnant woman receives treatment and so even a few treatment refusals need to be addressed.[30]

Shifting to partner testing, all facilities (100%) reported that it is standard operating procedure to encourage syphilis-positive pregnant women to bring in their partners for testing.[31] Despite this, it is widely known that partner testing rates remain low for both HIV and syphilis, suggesting that efforts to improve partner testing need to extend beyond reinforcing clinical guidelines.

Findings from the Case Studies

The most valuable findings related to syphilis treatment come from the case studies. Three patient cases were presented to 92 randomly selected providers across 47 health facilities to assess adherence to syphilis treatment recommendations under different circumstances:

1. The **first patient case** was a 23-year-old woman who is three months pregnant, attending her first ANC visit, and has tested positive for syphilis only.
2. The **second patient case** was for an 18-year-old pregnant woman who has attended previous ANC visits at a different health facility but has been re-tested at this facility and found to be positive for both HIV and syphilis.
3. The **third patient case** was for a male partner of a syphilis-positive pregnant woman who has come in for testing and has been found positive for syphilis only.

To assess whether the healthcare providers would administer the appropriate treatment in each case, the providers were asked an open-ended question of "what prescriptions they would make" after hearing the results of the HIV and syphilis testing. As it pertains to syphilis treatment in pregnant women, the recommended and preferred treatment is benzathine penicillin (BZP) as that is the only drug which effectively treats the unborn child. All of the drugs mentioned by healthcare providers in response to the open-ended question are shown below in **FIGURE 4** and **FIGURE 5** for the two cases involving a pregnant woman.

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[29] Syphilis treatment should be provided on the same day as testing, so it's not clear why the patient would need an additional transport fare to access treatment. Further investigation is required at this facility.

[30] To attain further qualitative insight, facilities were asked what steps providers normally took in the instance that a patient refused syphilis treatment. This was only asked at the nine facilities where the supplemental quality assessment questions were administered. Next steps focused on reinforcing counseling on the safety of the treatment for both mother and child, and the importance of early treatment. One provider spoke about speaking to pregnant women privately and explaining the treatment and the consequences of untreated syphilis for a pregnant woman and her child to help them make the decision.

[31] Among the nine facilities where the supplemental quality assessment questions were administered, key focal points were asked to describe some of the strategies used at the facility to encourage partner testing. Two main themes emerged from the provider responses: reminding the syphilis-positive pregnant woman of the risks of re-infection if their partner isn't tested (44%) and continuous counseling on the importance of getting her partner tested (33%).

FIGURE 4. PRESCRIPTIONS LISTED FOR A PREGNANT WOMAN WHO TESTED POSITIVE FOR SYPHILIS

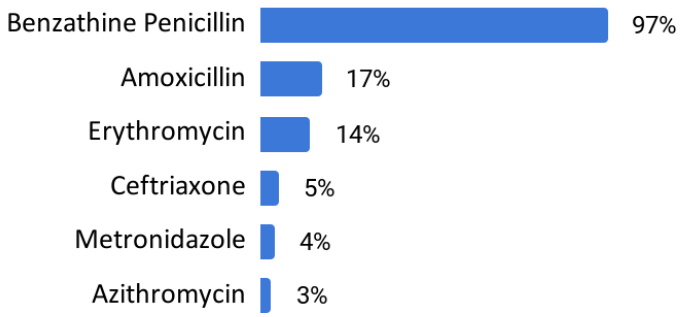
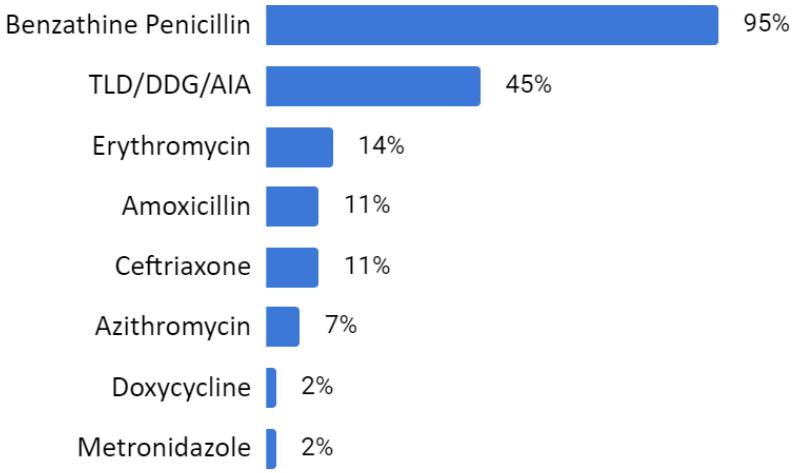


FIGURE 5: PRESCRIPTIONS LISTED FOR A PREGNANT WOMAN WHO TESTED POSITIVE FOR HIV & SYPHILIS



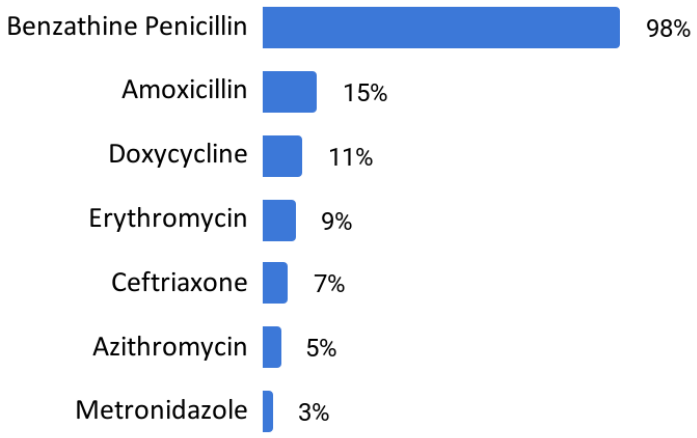
Most importantly, in the instance where the pregnant woman is only positive for syphilis, 97% of healthcare providers listed BZP among the prescriptions they would write. In the instance where the pregnant woman is positive for syphilis and HIV (a co-infection), 95% listed BZP among the prescriptions they would write.[32] Of note, 42% listed BZP and an antiretroviral among the prescriptions they would write, correctly treating both HIV and syphilis.

The healthcare providers often listed other drugs alongside BZP, some of which are recommended for pregnant women like folic acid and some of which would have no benefit such as amoxicillin. For the case of a pregnant woman with syphilis only, 31% of the providers who listed BZP *also* listed another antibiotic. Similarly, for the case of a pregnant woman with syphilis and HIV, 29% of the providers who listed BZP *also* would have prescribed another antibiotic, suggesting overtreatment is not uncommon.

[32] A further analysis of the prescriptions as it pertains to the HIV diagnosis can be found **HIV** Screening.

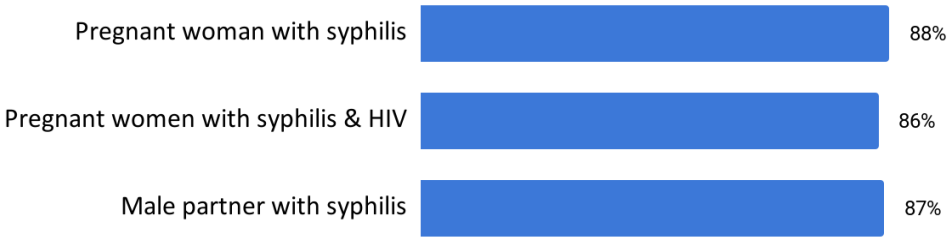
As it pertains to syphilis treatment in a male partner, multiple types of antibiotics are effective (not only benzathine penicillin). Other effective antibiotics include azithromycin, ceftriaxone, erythromycin, and doxycycline. The drugs mentioned by healthcare providers in response to the open-ended question are shown in **FIGURE 6** for the case of the male partner. Importantly, 99% of providers accurately listed at least one of the antibiotics recommended in this instance. Out of those who listed at least one of the recommended antibiotics, 23% would have prescribed more than one and 16% would have prescribed an additional antibiotic that is ineffective, suggesting again that providers may tend toward overtreatment.

FIGURE 6: PRESCRIPTIONS LISTED FOR A MALE PARTNER WHO TESTED POSITIVE FOR SYPHILIS



Across the three cases, if the providers mentioned BZP among the prescriptions they would write, then they were further asked what dosage of BZP they would prescribe and at what frequency. The correct dosage is 2.4IU regardless of whether the patient is a pregnant woman or a male partner. The proportion of providers who knew the correct dosage was relatively consistent regardless of the patient case (86% to 88% accurately recalled 2.4IU). See **FIGURE 7**.

FIGURE 7: CORRECT DOSAGE OF BZP PRESCRIBED



The correct frequency of BZP depends on the stage of syphilis disease. Per the country's clinical guidelines, all syphilis-positive pregnant women are to receive an immediate dose of BZP upon testing positive and then, if the infection is considered latent, two additional doses are required each one week apart (total of

once per week for three weeks). Although multiple doses may be required to treat the infection in the pregnant woman, one injection of BZP is sufficient to prevent or treat infection in the unborn child. In evaluating providers' knowledge of BZP dosing, 99% of the providers stated they would give at least one dose of BZP in the case of the pregnant woman with syphilis only and in the case of the pregnant woman with both syphilis and HIV. Further analysis of responses related to dosing frequency is found in **ANNEX 3**.

Overall, the results from the three patient cases presented for this assessment suggest that providers are aware that BZP should be prescribed to syphilis-positive pregnant women and their partners and are clear that at least one dose of BZP is required, but confusions remain around whether additional drugs should be prescribed in addition to BZP.

Following the patient cases, providers were asked further questions related to their norms in using BZP and their experience administering the drug, which yielded further findings which are critical to assessing program quality in the area of syphilis treatment. These are:

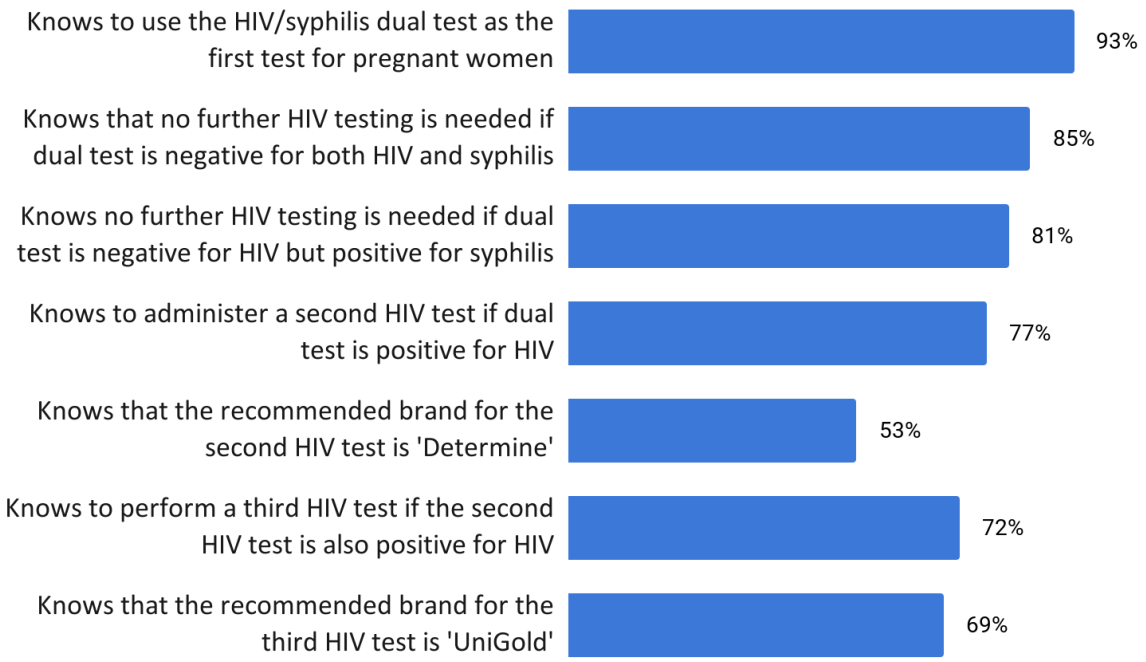
- Although BZP is only recommended to treat syphilis and rheumatic heart disease, unfortunately, 55% of providers reported using BZP to treat Gonorrhea (22%), STIs more generally (28%), UTIs (16%), and PID (7%), suggesting continued education on the appropriate use of BZP is required.
- While 95% of providers reported ultimate confidence in their ability to administer BZP, 13% reported some challenges when doing so. Commonly reported challenges included patients being treated on an empty stomach and shortages of needles, syringes, and BZP.
- No providers recalled having a pregnant woman who had an allergic reaction to BZP.

HIV Screening

Although the primary purpose of this survey was to assess the quality and coverage of syphilis services in ANC, provider knowledge related to HIV testing and treatment were evaluated simultaneously. HIV screening in pregnancy has long been the standard-of-care in Liberia, and so the survey did not explicitly assess whether providers knew they should be testing pregnant women for HIV. Rather, the survey focused on assessing providers' knowledge as to the HIV testing algorithm for pregnant women and partners, which was revised in 2020 to recommend the dual test and to recommend a three test algorithm for establishing an HIV-positive diagnosis.

In total, 94 providers across 48 facilities answered questions related to their knowledge of the algorithm. The extent to which the providers accurately recalled each step independently is shown in **FIGURE 8**; see **ANNEX 2** for the algorithm diagram published in the "National Guidelines for HIV Testing Services (HTS) & Psycho-Social Support (PSS) 2020".

FIGURE 8. PROVIDER KNOWLEDGE OF THE HIV TESTING ALGORITHM FOR PREGNANT WOMEN AND PARTNERS[33]



Starting with screening, 93% of providers accurately recalled that the first test administered should be the HIV/syphilis dual test. Further HIV testing is then dependent on the results from the dual test. If the HIV result on the dual test is negative, further HIV testing is not recommended per the guidelines but if the HIV result is positive, then confirmatory testing is needed. Among those surveyed, 85% accurately recalled that no further HIV testing was needed in the instance that the patient was negative for both HIV and syphilis on the dual test. Slightly fewer providers (81%) accurately recalled that no further HIV testing was needed in the instance that the patient was negative for HIV but positive for syphilis, suggesting some confusion when the HIV and syphilis test results are discordant.

Furthermore, 77% of providers accurately recalled that a second HIV test was needed if the HIV result on the dual test is positive but only 53% of those providers recalled the correct second HIV test brand in the algorithm (Determine). The final step in the algorithm is a third HIV test, which is to be given in the event that the first two tests (dual test and Determine) are positive for HIV. Of the providers who had gotten to

[33] The sample size for these results varies as such: 94 providers were asked which test they would administer first, whether a second HIV test is needed: (a) if the dual test is negative for HIV and syphilis, (b) if the dual test is negative for HIV but positive for syphilis, and (c) if the dual test is positive for HIV but negative for syphilis. Depending on a respondent's correct answer to that last question, the respondent would then be asked which brand of test should be administered (n=72), and consequently, whether a third HIV test is needed if the second HIV test is also positive (n=72). If the provider knew the third HIV test was needed, he or she was then asked which brand should be used for that third test (n=52).

this level of questioning (n=72), 72% accurately recalled the need for the third HIV test, and 69% of those providers knew that the correct third HIV test brand in the algorithm was UniGold.

Looking at the algorithm as a whole, importantly, only 49% of providers correctly recalled the full HIV testing algorithm. Performance was poorer if recollection of the correct brands was considered; only 23% of providers knew both the correct expectations for test sequencing and the specific brands recommended in the national guidelines. This suggests that while providers understand the importance of HIV testing and can recall some steps, they are less able to recall the full algorithm and further mentorship on this area is likely needed.

HIV Treatment

The survey did not assess knowledge of treatment guidelines for an HIV-positive pregnant woman independently but rather in the context that the pregnant woman is co-infected with HIV and syphilis. As previously described, 92 providers from 47 health facilities were presented with the case of a pregnant woman who was positive for both HIV and syphilis. After sharing the test results, the providers were immediately asked an open-ended question of "what prescriptions they would make" (see **FIGURE 5** for the full results).

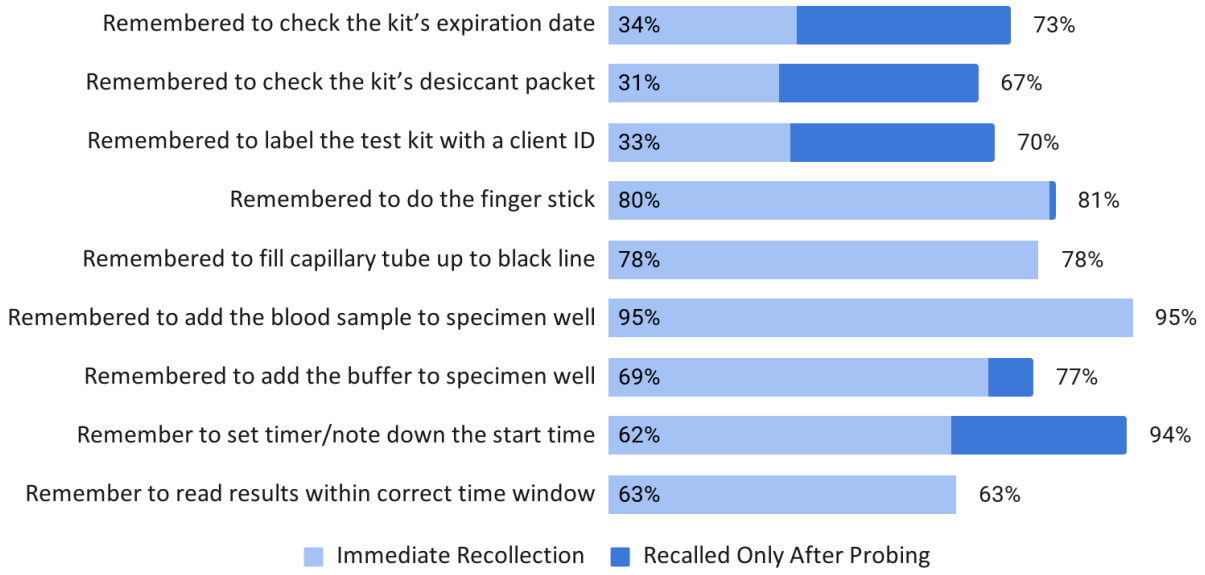
Unfortunately, only 45% of healthcare providers listed at least one of the recommended ARVs in their response: TLD, DDG, or AIA. This finding suggests that further training and sensitization is required around next steps in the instance that a pregnant woman is found HIV-positive.[34]

Skills in Using the HIV/Syphilis Dual Test

In the knowledge assessment portion of the survey, the healthcare providers were questioned on their recall of the key steps involved in administering the HIV/syphilis dual test itself. Firstly, the providers were asked to "give a detailed description of the HIV/syphilis dual testing process step by step, listing all the steps they could remember." Once the provider was done, the enumerators asked probing follow-up questions if one of the key steps was not mentioned in the provider's initial response. For example, if a provider failed to mention "check the kit's expiration date," the enumerator then asked "when do you check the kit's expiration date, if ever?" The extent to which providers initially mentioned each step or mentioned it after probing is shown in **FIGURE 9**.

[34] Not all of the health facilities surveyed are designated centers for HIV treatment, so it's possible that the providers were not specifically trained in HIV treatment. Since the survey specifically asked "what prescriptions would be made" it's possible that providers did not consider a referral to a different health facility for enrollment into PMTCT and ARVs as a prescription and so did not say this during the patient case.

FIGURE 9: HEALTHCARE PROVIDER KNOWLEDGE OF HIV/SYPHILIS DUAL TEST PROCEDURE



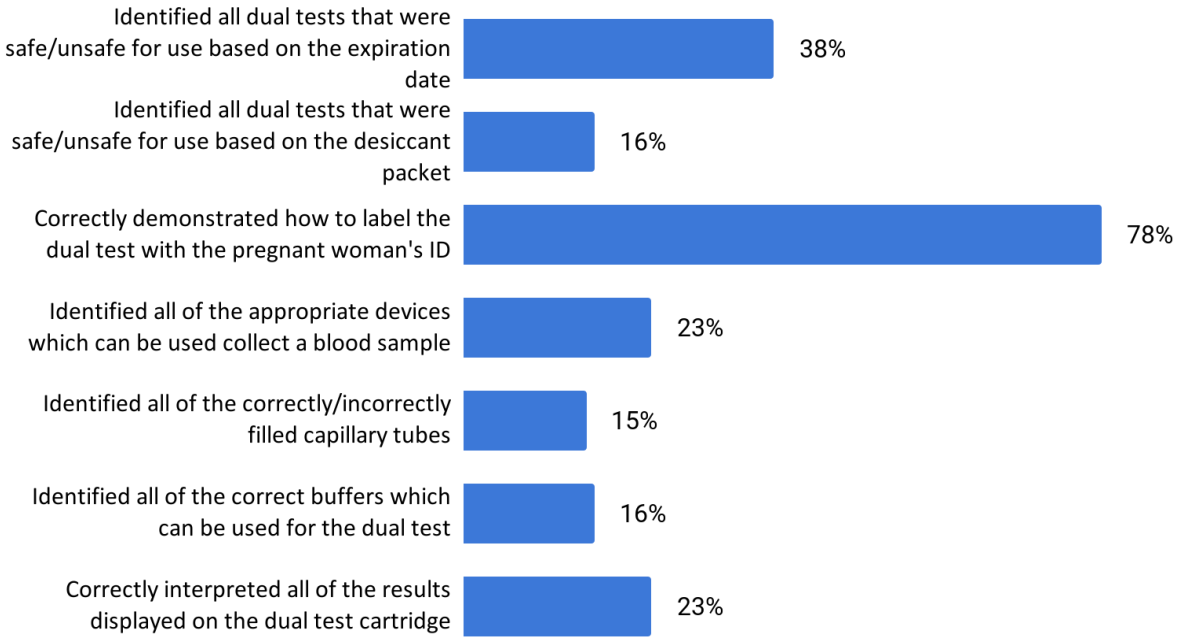
Taking the dual test administration as a whole, only 10% of providers correctly described *all* steps in the HIV/syphilis dual testing process on first recall. Including probed responses, 17% of providers correctly described *all* steps required. A majority of providers described the steps following the fingerstick, but the majority did not immediately list the preparatory steps for correctly using the dual test, as shown in **FIGURE 9**. The least mentioned steps were checking the kit expiration dates, checking the kit's desiccant packet to know if the test is safe for use, and labeling the test kit with the patient ID. These key steps are easy to overlook but are essential to delivering accurate dual test results.

Secondly, via photo-based quizzes, the healthcare providers were tested on their ability to:

- Identify dual test kits that were safe/unsafe for use based on the state of the desiccant packet and labeled expiration date;
- Label a test kit provided a patient name and medical registration number;
- Identify the devices used to collect the fingerstick blood;
- Identify which capillary tubes were filled with the correct volume of blood;
- Identify the correct buffer for the dual test; and
- Correctly interpret results displayed on the test cartridge.

For each test topic listed, providers were shown a set of pictures (6-8) with varying scenarios. Overall, the providers struggled to identify *every* correct response in the set of pictures shown for each topic (**FIGURE 10**). However, they were generally knowledgeable as most got 60% or above of the questions correct in each of the topic assessments (**ANNEX 4**).

FIGURE 10: HEALTHCARE PROVIDER PERFORMANCE ON PRACTICAL SKILLS TEST ON HIV-SYPHILIS DUAL TEST PROCEDURE



Note: The percentages presented indicate the proportion of providers who answered all the questions in a set of visuals correctly.

While it is important to know how many providers got every question correct, this obscures lessons to be learned based on which specific scenarios providers were most likely to answer incorrectly. Turning first to providers' ability to accurately assess expiry of test kits, providers were shown pictures of eight test kits with expiry dates ranging from Oct. 2018 to Jan. 2023. On average, providers correctly labeled expired test kits as unsafe and non-expired test kits as safe 84% of the time. Providers struggled the most with a test kit that had an expiration date of Sept. 2022, the month following the time of surveying (Aug. 2022), with only 57% correctly identifying it as usable.

Similarly, providers were shown six pictures of capillary tubes filled to different levels (some with too much blood, some with too little blood, and some with the correct amount) and asked to identify which were filled correctly/incorrectly. On average, providers answered these correctly 67% of the time. In this case, providers found it challenging to identify both properly and improperly filled tubes. For example, there were two tubes with too much blood and only 43% accurately identified it as such in one instance and 52% accurately identified it as such in the other instance. At the same time, for two tubes with the correct amount of blood, 56% accurately identified it as correct in one instance and 66% accurately identified it in the other instance.

Finally, respondents were also shown pictures of eight dual test cartridges displaying either negative, positive, or inconclusive HIV and syphilis test results and were asked to interpret these results to the best of their ability. Looking at the interpretation of the HIV and syphilis results separately, on average, providers correctly interpreted the HIV results 73% of the time and correctly interpreted the syphilis results

72% of the time. Providers were most likely to correctly interpret results if the cartridge showed clear control and test lines, but they found cartridges with missing control lines confusing and often cited these as positive for syphilis or HIV rather than inconclusive. For more details on this and other skills test results, please reference **ANNEX 4**.

Overall Provider Experience in Using the Dual Test

After the skills assessment, providers were asked a final set of questions related to their experience using the dual test. Of the 94 providers surveyed, 86% of them have been administering the dual test for at least six months and 90% of the providers were confident in their ability to correctly administer the dual test. Only 23% admitted having experienced challenges with administering the tests. Common challenges listed included collecting the right amount of blood required for an accurate test result, identifying tests that can be used by the state of the desiccant packets, test kits taking longer than expected to show results, inadequate training on documentation, and stock out of test kits. Further, 34% of providers mentioned having made mistakes in administering the dual test in the past. Common mistakes listed included using insufficient or too much buffer, using insufficient or too much blood, waiting too long to read results, and not setting a timer to read results.

Supply Chain Management

Supply chain management is a key area for the program, as whether or not a pregnant woman is ultimately screened and treated for syphilis is dependent on whether the commodities are available in the first place. The survey examined the availability of key commodities, assessed stock management norms with the facility, evaluated commodity requisition practices, and took note of the challenges that facilities have had in regard to stock management.

Product Availability

In the survey, the availability of HIV/syphilis dual tests and benzathine penicillin were evaluated. The availability of these commodities was primarily assessed by asking the focal persons within each facility whether there had been a stock out of the commodity in the preceding three months (**TABLE 11**). The enumerators also conducted a physical inventory in the stock room; these results are presented in **ANNEX 6**.[35]

[35] The results of the physical inventory are included in the annex because the enumerators did not look in all of the places where the stock could be present in the facility. In some health facilities, the stock of these commodities is kept at the point of care, and so a review of the stock room only would not be definitive evidence that the facility was stocked out at the time of the survey.

TABLE 11: REPORTED STOCK OUT IN THE PREVIOUS THREE MONTHS OF THE SURVEY

Facility Name	District	County	Commodity was stocked out in past three months?	
			Dual tests	BZP
Samuel David (SD) Medical Clinic	Buchanan	Grand Bassa	✓	
Steven Tolbert Memorial Hospital	Buchanan	Grand Bassa		
Camphor Mission Clinic	Buchanan	Grand Bassa		
Liberia Agriculture Company Hospital	District #3	Grand Bassa		
Bokay Town Clinic	Owensgrove	Grand Bassa		
Dolo's Town Health Center*	Firestone	Margibi	✓	✓
Cotton Tree Health Center	Firestone	Margibi	✓	
Cinta Clinic*	Kakata	Margibi	✓	✓
CH Rennie Hospital	Kakata	Margibi		
Gbaye-Ta Clinic	Kakata	Margibi		
JJ Korhene	Kakata	Margibi	✓	
Ma Cynthia Health Care Center	Kakata	Margibi		
Vellay-Ta Clinic	Kakata	Margibi	✓	✓
Weala United Methodist Clinic	Kakata	Margibi		
Excellent Clinic	Mambah-Kaba	Margibi		
Triple T Medical Clinic	Mambah-Kaba	Margibi	✓	
Summah Medical Clinic	Mambah-Kaba	Margibi	✓	
Unification Town Health Center	Bushrod	Margibi		
Bishop John Collins Clinic	Bushrod	Montserrado		
Cynthia Nelson Clinic	Bushrod	Montserrado		
Jamaica Road Clinic	Bushrod	Montserrado		
Liberia Coast Guard	Bushrod	Montserrado		
Slipway Clinic	Bushrod	Montserrado		
Careysburg Clinic	Careysburg	Montserrado	✓	
Crozierville Clinic	Careysburg	Montserrado		
White Plains Clinic	Careysburg	Montserrado		
Dagmow Clinic	Central Monrovia	Montserrado		
Joanna Maternity Clinic	Central Monrovia	Montserrado		
SDA Cooper Medical Memorial Hospital	Central Monrovia	Montserrado		
Soniwen Health Center	Central Monrovia	Montserrado		
Benson Hospital	Commonwealth	Montserrado		✓
Children Heaven Care Clinic	Commonwealth	Montserrado	✓	
Omega Market Clinic	Commonwealth	Montserrado	✓	
Gardnersville Community Clinic**	Somalia Drive	Montserrado		✓
Barnersville Health Center**	Somalia Drive	Montserrado		✓

Facility Name	District	County	Commodity was stocked out in past three months?	
			Dual tests	BZP
Kelthy Clinic	Somalia Drive	Montserrado		
Lofa Medical Services Clinic	Somalia Drive	Montserrado		
New Georgia Community Health Center	Somalia Drive	Montserrado		
RH Ferguson Health Center	Somalia Drive	Montserrado	✓	
THT Clinic	Somalia Drive	Montserrado		
AF Russell Clinic	St. Paul River	Montserrado		
Arthington Clinic**	St. Paul River	Montserrado		✓
Banjor Community Clinic	St. Paul River	Montserrado		✓
Glory of Christ Medical Clinic	St. Paul River	Montserrado		✓
Kpalla Clinic**	St. Paul River	Montserrado		✓
Goba Clinic	Todee	Montserrado		✓
Koon Town Clinic	Todee	Montserrado		✓
Zingbor Town	Todee	Montserrado		✓

** This facility reported not keeping regular stock of dual test kits or BZP.*

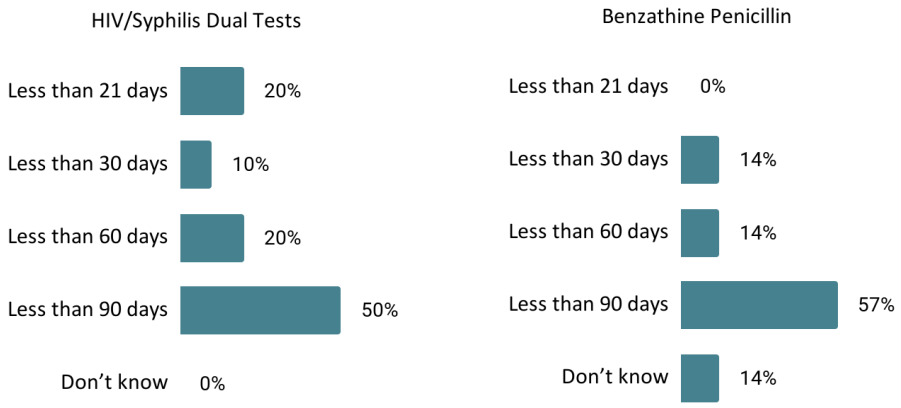
*** This facility reported not keeping regular stock of BZP only.*

As can be seen in **TABLE 11**, 25% of facilities reported having experienced a stock out of HIV/syphilis dual tests and 27% reported experiencing a stock out of benzathine penicillin in the three months prior to the survey.[36] In the case of the dual test stock outs, half of reported stock outs lasted less than 60 days. However, in the case of the BZP stock outs 57% of the reported stock outs lasted between 60 and 90 days. See **FIGURE 11**. Unfortunately, given the way in which stock/bin cards are used in facilities in Liberia, it was not possible to validate whether the recalled stock outs had taken place and for how long.[37]

[36] Before asking whether the facility had experienced a stock out in the prior three months, the facility was asked if they "regularly keep stock" of dual tests and BZP. If a facility said they don't keep regular stock of either of the two commodities, then the question of whether there was a stock out and for how long was not asked. Conservatively, for purposes of this analysis, facilities who stated they don't regularly keep stock of either dual tests and/or BZP were assumed to have experienced a stock out. In the case of the dual test, this included two facilities, resulting in twelve out of 48 facilities with a stock out in the prior three months. In the case of BZP, this included six facilities, resulting in thirteen out of 48 facilities with a stock out in the prior three months.

[37] Stock/bin cards are used to trace the amount and flow of stock from the facility's store room. If the stock/bin card indicates zero stock, it does not mean the facility as a whole is stocked out but rather that there is no buffer stock remaining in the store room (as the commodity may have been moved to the point of service and is still available there).

FIGURE 11: ESTIMATED LENGTH OF TIME THAT THE STOCK OUTS LASTED



The focal persons who reported having had a stock out of either dual tests or BZP in the previous three months were asked if they knew the reason for the stock out. The responses received included:

- The focal person did not know why the stock out had occurred.
- The focal person believed the initial supply was not enough to match patient volume and so the stock was consumed quickly.
- The focal person believed the supply was stocked out in the county or nationally and so the facility could not be resupplied.
- The facility was private and so the county was refusing to supply the commodities.[38]

Commodity Stock Management Within the Facility

The survey sought to better understand how facilities managed their stock of commodities -- how they knew how much they had and how much was being consumed, how they requisitioned further stock, etc.

First, facility focal persons were asked whether they used stock/bin cards to manage the key commodities. According to the focal persons, the use of stock/bin cards was common across facilities – 79% reported using them to track the inventory of dual tests and 76% reported using them to track the inventory of BZP. However, the enumerators sought to validate the usage of stock/bin cards by inspecting the cards themselves and found that only 69% of facilities had a stock/bin card available for dual test kits and 54% for BZP (**FIGURE 12**).[39] The few facilities not using stock/bin cards had devised other means of tracking inventory as reported by the focal person, such as copy books, ANC and HTC registers, pharmacy consumption sheets, and tally sheets, as shown in **FIGURE 13**.

[38] This response was given by the focal person at JJ Korhene, a private facility in Margibi, as it pertains to their stock out of dual tests. Per NACP, private facilities are to receive dual tests and BZP as long as those commodities are supplied for free to patients. Further investigation is needed to assess whether dual tests are being withheld from this facility and, if so, why.

[39] While enumerators recorded some HIV/syphilis dual test stock/bin card data at 33 facilities (69%), only 27 facilities (56%) had any balance information recorded for the months under review.

FIGURE 12: STOCK/BIN CARD AVAILABILITY AMONG SURVEYED HEALTH FACILITIES

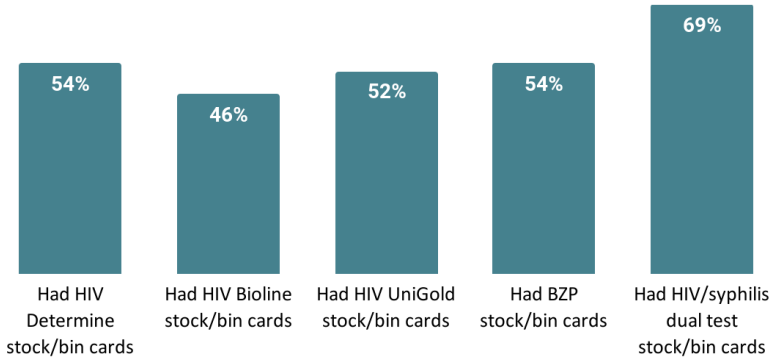
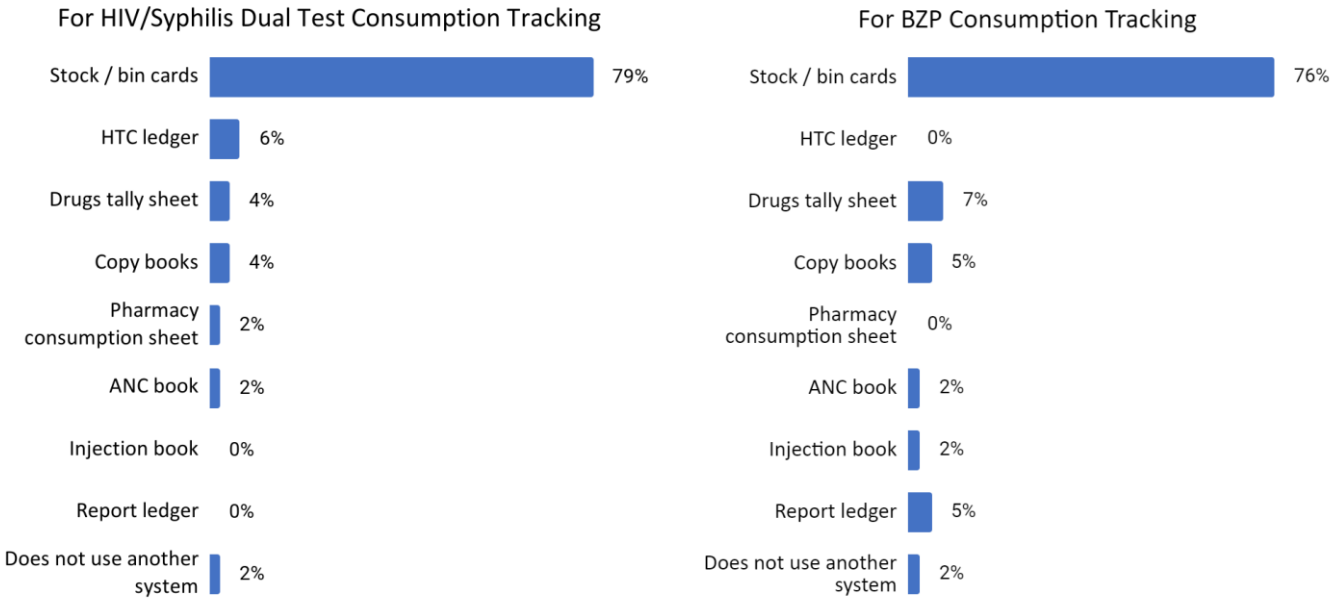


FIGURE 13: DOCUMENTS USED FOR INVENTORY TRACKING ACCORDING TO FACILITY SUPPLY CHAIN FOCAL PERSONS



Second, the facility focal persons were asked whether the Stock Status Report and Requisition (SSRR) is routinely used. The expectation is that all facilities are using these SSRR forms as they are the only means for facilities to requisition commodities from the County Health Team and Central Medical Store. Of the facilities surveyed, 94% said it was standard operating procedure to request HIV/syphilis dual tests and BZP using the SSRR forms. Two facilities reported not using the SSRR to requisition dual tests, while three facilities reported not using the SSRR to requisition BZP.

Staff were asked to describe the process they follow when deciding the amount of stock to request. Requesting adequate stock is essential because the amount resupplied is based on the amount requested; an under-sized order would risk a stock out at the facility and an over-order may lead to strains in national

availability. Different facilities used different approaches for estimating the amount to requisition, and the approach varied for dual tests vs. benzathine penicillin. The range of responses included:

1. Estimate the amount requisitioned based on patient intake or load;
    a. For BZP specifically, estimate requisition based on the number of positive patients from previous months;
2. Estimate the amount requisitioned using facility consumption data from the past quarter or month;
3. Estimate the amount requisitioned based on the amount of stock in hand.

Not all focal persons could clearly specify how they determined what was requisitioned and how that corresponded to what the facility was supplied, with one reporting, "*What is in stock, that's what they will give, what they can afford, that's what they can give the facility. We are not the ones that can make requests for the facility.*"

Finally, facility focal persons were asked whether they had any challenges in the supply of key program commodities. For the supply of HIV/syphilis dual tests, 25% reported having challenges; the challenges included shortages, delays in getting re-supplied, inconsistent supply times, and stock outs. Providers shared that the lack of supply causes a backlog of patients to be tested. Pregnant women that are unable to take the test during their first ANC visit may get tested later in their pregnancies (i.e. 3rd or 4th visits) or not tested at all, and any backlogs may cause further shortages down the line. Seven facilities reported having challenges with the supply of BZP. Often, the challenges noted focused on shortages of BZP. At SDA Cooper Memorial Hospital, the focal person stated the facility sometimes buys its own provisions of BZP due to issues with securing government donations as a private hospital. Another facility explained that they were also having challenges with supply of the syringes and distilled water needed to dissolve and administer the BZP injections.

Based on the findings related to supply chain management, there is additional work to be done to strengthen the availability of the key commodities and address the challenges noted by the health facilities.

Data Recording & Reporting

Strengthening the complete and accurate recording and reporting of HIV and syphilis screening and treatment indicators is a core function of the program's mentorship and supportive supervision and underpins the NACP's ability to effectively monitor the program. The survey sought to better understand how effectively stakeholders recorded and reported key indicators in facility source documents in order to identify areas for improvement and to be able to assess the extent to which the data could be used to reliably estimate syphilis screening and treatment coverage. This included interviewing facility focal persons and providers to assess routine recording practices, understanding how facility records are used to report on key indicators in the HMIS, and reviewing facility records themselves.

Routine Practices Among Healthcare Providers in Data Recording

The CFS sought to understand providers' knowledge of data recording and reporting guidelines, as this knowledge is critical to the interpretation of the data that is reported. This was done at two levels: first,

enumerators spoke with the focal persons responsible for key areas of care at the facility and collected information on standard recording procedures (n=48). Secondly, sampled providers at each facility were asked questions about their individual recording practices (n=94; in some cases, these are the same individuals who were asked about standard procedures). Overall, results suggest improvements in data recording are needed and this area should be emphasized during facility mentorship and supportive supervision.

Turning first to the recording of HIV and syphilis screening among pregnant women, self-reported recording practices diverged slightly from facility standard operating procedures, particularly when it came to the use of the HIV Testing and Counseling (HTC) register. In terms of normal practice, most providers stated they do record when an HIV (97%) and syphilis (95%) test takes place. Specifically, the respondents noted they would record whether a syphilis test was done in the HTC register (45%), the ANC register (43%), and the patient's chart (16%).[40] This is compared to reported standard recording procedures for documenting a syphilis test in **TABLE 12**. Additional assessment of where HIV testing is recorded in practice and per the SOPs is available in **ANNEX 3**.

TABLE 12. SYPHILIS TEST RECORDING: COMPARING STANDARD PROCEDURES TO PRACTICE

	Facility SoP (n=48)	**Practice** (n=94)
Record if a pregnant woman is tested for syphilis	100%	95%
If the syphilis test is recorded, it's recorded in the HTC register	71%	45%
If the syphilis test is recorded, it's recorded in the ANC register	50%	43%
If the syphilis test is recorded, it's recorded in the patient chart	23%	16%
Recorded the results of a pregnant woman's syphilis test	100%	61%
If results are recorded, they're recorded in the HTC register	75%	-
If results are recorded, they're recorded in the ANC register	42%	-
If results are recorded, they're recorded in the patient chart	25%	-

Moving to syphilis treatment, the standard operating procedure at 98% of facilities is for providers to record if a syphilis-positive pregnant woman receives syphilis treatment. Where the treatment should be recorded, according to standard operating procedure, varied across facilities; the most commonly mentioned places for documentation included the ANC register (54%), the patient's chart (48%), and the HTC register (41%).[41] In comparison, in practice, again, 97% of providers said they would record syphilis treatment somewhere; the two most common places for documentation were the patient's chart (67%) and the ANC register (64%).[42] However, based on the qualitative feedback shared by the survey supervisors and

[40] These responses are not mutually exclusive, as providers are encouraged to record testing in multiple documents.

[41] These responses are not mutually exclusive, as providers are encouraged to record treatment in multiple documents.

[42] The ANC register does not include an indicator specifically for syphilis treatment, rather a column to record treatments more generally.

enumerators, there was minimal recording of syphilis treatment in the ANC register. **TABLE 13** describes how standard operating procedures compared to self-reported practices for recording syphilis treatment.

TABLE 13. SYPHILIS TREATMENT RECORDING: COMPARING STANDARD PROCEDURES TO PRACTICE

	Facility SoP (n=47)[43]	**Practice** (n=93)[44]
Record whether a syphilis-positive pregnant woman receives treatment	98%	97%
If treatment is recorded, it's recorded in the HTC register	41%	29%
If treatment is recorded, it's recorded in the ANC register	54%	64%
If treatment is recorded, it's recorded in the patient chart	48%	67%
If treatment is recorded, it's recorded in the injection room ledger	2%	8%
Recorded if a syphilis-positive pregnant woman refuses treatment	94%	-
If treatment is refused, it's recorded in the HTC register	41%	-
If treatment is refused, it's recorded in the ANC register	48%	-
If treatment is refused, it's recorded in the patient chart	59%	-
If treatment is refused, it's recorded in the HIV Care and Treatment register	16%	-

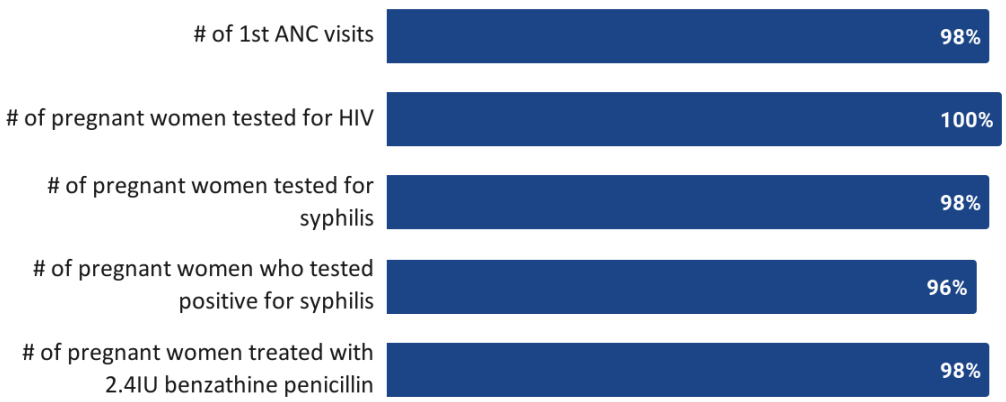
HMIS Knowledge & Reporting Practices

All 48 facilities surveyed reported filling the Health Management Information System (HMIS) forms and submitting them to the District or County Health team's office, as is required in Libera. To assess whether facilities are reporting the intended information in the HMIS, the focal person responsible for filling in the HMIS forms at each facility was shown select sections of the form and asked to explain what information was being requested in that section. For example, a visual of the 'Antenatal' section of the form was shown and the respondents were asked what information the '1st ANC visit' row is requesting. This process was repeated with the various program-relevant indicators included in the HMIS forms. Providers showed good understanding of the HMIS indicators, with at least 96% of respondents correctly identifying what each of the indicators represented as shown in **FIGURE 14**.

[43] Liberia Coast Guard reported they do not treat for syphilis among pregnant women and were therefore not asked questions related to recorded practices for syphilis treatment.

[44] The results presented here were taken from the patient case where a pregnant woman had tested positive for syphilis but negative for HIV. The same set of questions were asked for the patient case where the pregnant woman was positive for both HIV and syphilis (a co-infection) and a similar response pattern was found.

FIGURE 14: FRACTION OF FACILITY FOCAL PERSONS WHO CORRECTLY INTERPRETED EACH OF THE KEY PROGRAM INDICATORS



To further assess the accuracy of the reported data and trace what it is based on, the respondents were also asked what source documents they used to fill out the relevant sections of the HMIS forms, and their responses varied as shown in **TABLE 14**. Most facilities reported that the source document for '1st ANC visit' was the ANC register (83%). The ANC and HTC registers were most commonly noted as the source documents for reporting the number of pregnant women tested for syphilis and the number that tested positive. The ANC register and the patient charts were most commonly mentioned as the source document for reporting the number of pregnant women treated with at least 2.4 IU BZP.

TABLE 14: SOURCE DOCUMENTS USED FOR HMIS REPORTING OF PROGRAM INDICATORS

	# 1st ANC visits	# of pregnant women tested for syphilis	# of syphilis-positive pregnant women	# of syphilis-positive pregnant women treated with 2.4IU BZP
ANC register	83%	44%	44%	48%
HIV Testing and Counseling (HTC) register	8%	42%	40%	21%
HIV Care and Treatment (HCT) register	2%	19%	21%	17%
Patient charts	19%	27%	23%	35%
Injection room ledger	-	2%	2%	10%
Pregnancy booklet	-	4%	2%	6%

Facility Data Review & Consistency Across Tools

Enumerators reviewed health facility records from the 48 sampled facilities to validate the counts of each of the key indicators reported in the HMIS and to compare the consistency across different data sources. The facility records review included the ANC register, the HTC register, the injection room ledger, and the

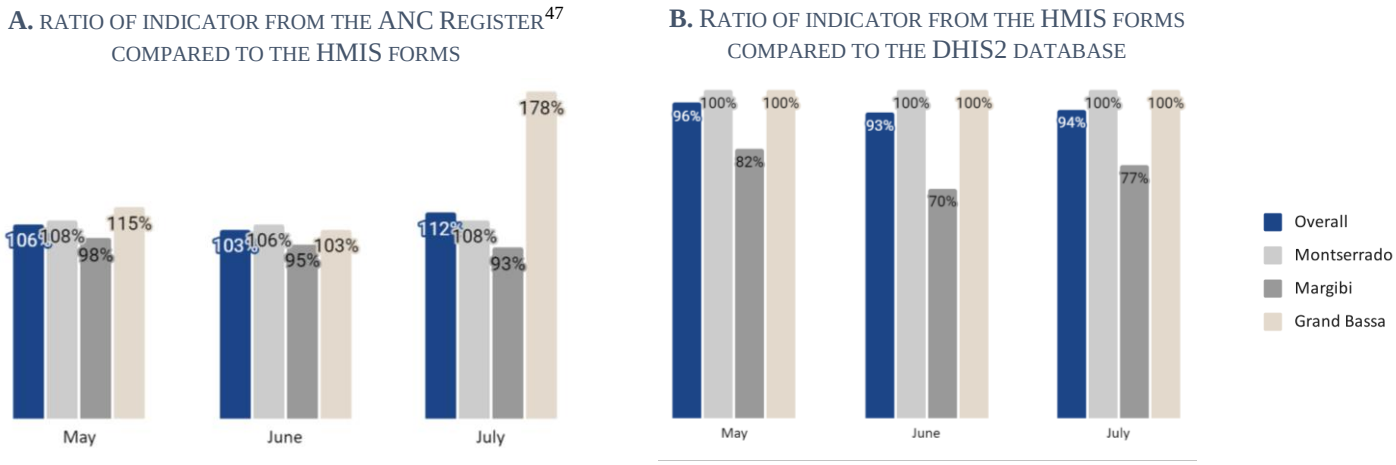
HMIS forms for May, June, and July of 2022. Enumerators checked for availability of these records at the facilities visited and found the following:

- 90% had HMIS forms for at least one month;
- 94% had ANC register data for at least one month;
- 79% had HTC register data for at least one month;
- 79% had injection room ledger data for at least one month.

To assess consistency of reporting, key performance indicators were compared from the facility registers to the paper HMIS reporting forms. In addition, the same indicators were compared from the paper HMIS reporting forms to data from the online DHIS2 database (as downloaded on November 16, 2022). Both stages of comparison are required – the first step validates the facility's counting of the indicators and the second step validates the values entered into the database by the district and/or county data clerks.

For the number of 1st ANC visits, in aggregate, the numbers of visits counted from the ANC registers were generally consistent with the numbers reported on the paper HMIS forms (**FIGURE 15-A**) with one exception. In Grand Bassa in July 2022, there was one facility where enumerators counted 119 1st ANC visits but the reporting forms for the month only indicated 30 visits.[45] Then, comparing between the paper forms and the DHIS2 database (**FIGURE 15-B**), the aggregated total across Montserrado, Margibi, and Grand Bassa for the number of 1st ANC visits generally aligned in all three months. The greatest deviation between the two datasets occurred in Margibi where the values inputted on the dashboard consistently exceeded what the facility had reported on the forms.

FIGURE 15. NUMBER OF 1ST ANC VISITS[46]



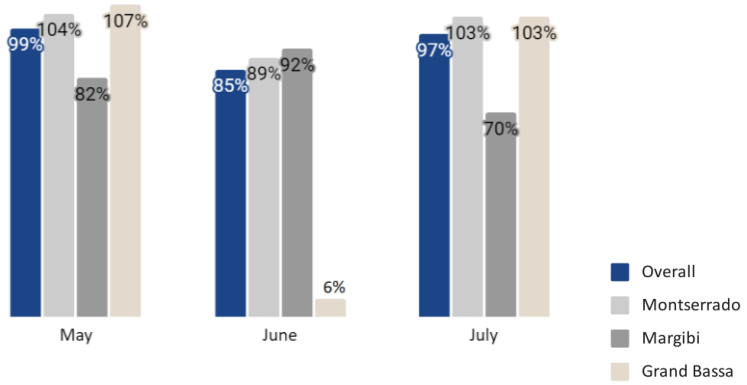
[45] The facility referenced here is Bokay Town Clinic.
[46] These analyses exclude instances where there a data point was missing from either of the datasets being compared.
[47] The ANC register is the main record book at the facility where the visit number is recorded and is the source which facilities are expected to use when reporting the number of 1st ANC visits in the HMIS report. Thus, these two sources and not others were compared in the context of the 1st ANC visit indicator.

For the number of pregnant women tested for syphilis, there was some inconsistency between the HTC register and the HMIS forms (**FIGURE 16-A**). This inconsistency is to be expected as the HTC registers are new and are not being uniformly used across all facilities nor by all providers within a single facility. As a result, some facilities have devised other means of counting the number of pregnant women tested for syphilis when it comes time to submit the HMIS report, which may then be introducing deviations in the reported data which are difficult to trace.

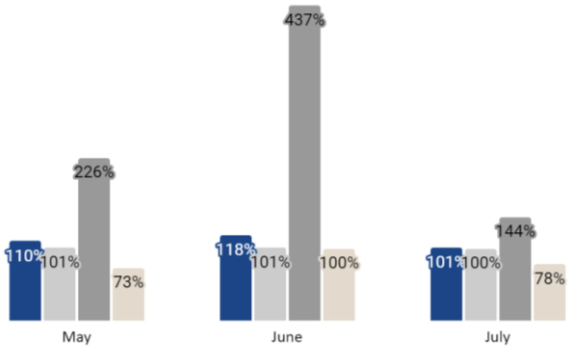
Turning to the paper forms versus the DHIS2 database (**FIGURE 16-B**), the aggregated number of pregnant women tested for syphilis was largely consistent with the exception of Margibi. In Margibi, at C.H. Rennie Hospital, the values entered for syphilis testing among pregnant women are zero despite the forms containing large, non-zero counts of syphilis testing (which enumerators also validated).

FIGURE 16. NUMBER OF PREGNANT WOMEN TESTED FOR SYPHILIS[48]

A. RATIO OF INDICATOR FROM THE HTC REGISTER[49] COMPARED TO THE HMIS FORMS



B. RATIO OF INDICATOR FROM THE HMIS FORMS COMPARED TO THE DHIS2 DATABASE

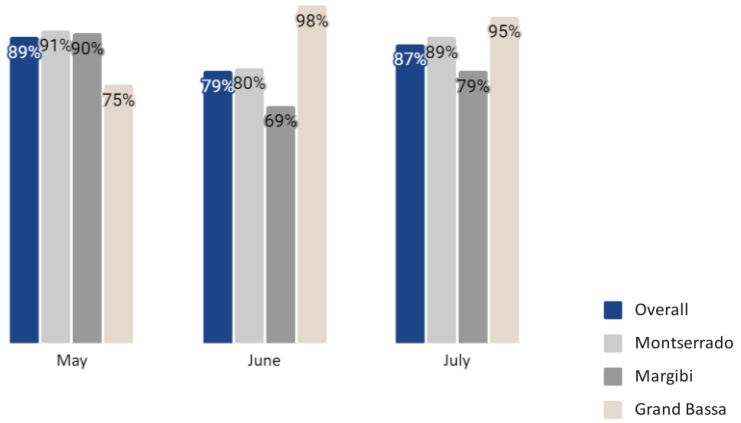


[48] These analyses exclude instances where there a data point was missing from either of the datasets being compared.
[49] The HTC register contains dedicated columns for noting HIV and syphilis test results (and a column where the provider is asked to specify if the patient tested is a pregnant female). Thus, the HTC register is the source facilities are expected to use when reporting the number of pregnant women tested for syphilis, the number tested for HIV, and the number that were syphilis-positive in the HMIS report.

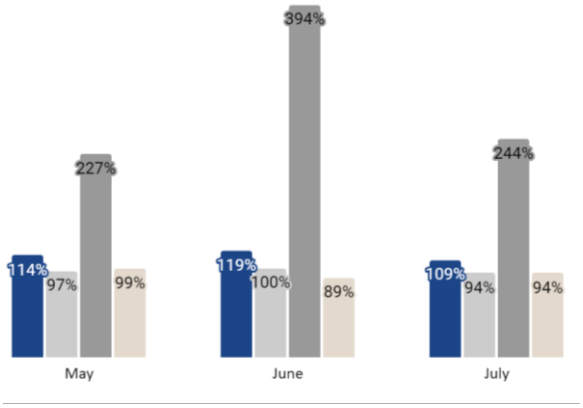
With the adoption of dual testing, it is expected that HIV and syphilis testing rates would mirror one another where facilities are indeed using the dual test. Given the design of the HTC register, it is also expected that data discrepancy patterns for HIV testing would be similar to those for syphilis testing. This is largely evidenced in **FIGURE 17-A** and **FIGURE 17-B**. The largest data discrepancies in regard to the number of pregnant women tested for HIV occurs in the stage between the paper HMIS forms and the DHIS2 database; this is the same instance as noted above where the data clerk entered zeros for C.H. Rennie despite the reporting forms containing non-zero values (which were validated by the enumerators).

FIGURE 17. NUMBER OF PREGNANT WOMEN TESTED FOR HIV[50]

A. RATIO OF INDICATOR FROM THE HTC REGISTER[51] COMPARED TO THE HMIS FORMS



B. RATIO OF INDICATOR FROM THE HMIS FORMS COMPARED TO THE DHIS2 DATABASE



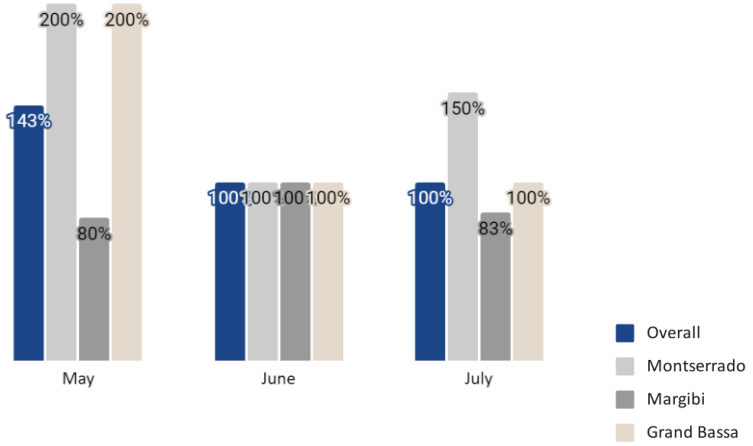
Turning to the number of pregnant women who were positive for syphilis (**FIGURE 18-A** and **FIGURE 18-B**), the overall number of reported positives is small (with an average syphilis prevalence of 2.7% and only three months of data review in three counties, this is to be expected). Because the aggregated values are small, deviations of one or two pregnant women would appear as a large inconsistency. For instance, in

[50] These analyses exclude instances where there a data point was missing from either of the datasets being compared.
[51] See FOOTNOTE 49.

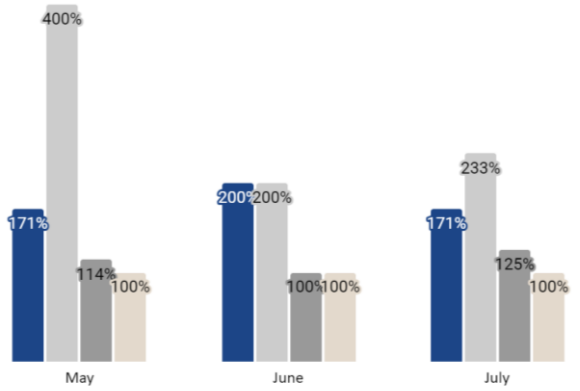
Montserrado in May, there were four syphilis-positive pregnant women counted by enumerators in the HTC registers but only two cases were reported on the HMIS forms (a deviation of 200% in **FIGURE 18-A**).

FIGURE 18. NUMBER OF SYPHILIS-POSITIVE PREGNANT WOMEN[52,53]

A. RATIO OF INDICATOR FROM THE HTC REGISTER[54] COMPARED TO THE HMIS FORMS



B. RATIO OF INDICATOR FROM THE HMIS FORMS COMPARED TO THE DHIS2 DATABASE



For the last indicator, syphilis treatment records were also compared across the ANC register and the HMIS forms, and between the HMIS forms and the DHIS2 database (n.

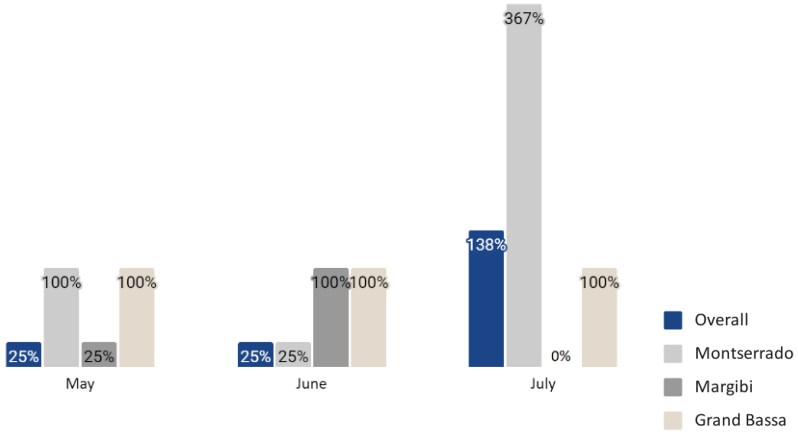
[52] These analyses exclude instances where there a data point was missing from either of the datasets being compared.
[53] The reported values here represent ratios and so "division by zero" errors occurred where the dataset used as the denominator had a value of zero. This only occurred for the number of pregnant women who tested positive for syphilis and the number of syphilis-positive pregnant women who were treated for syphilis. In the case where both datasets being compared had zero cases, then the ratio of one dataset to the other was treated as 1, or 100%. In the case where the dataset in the denominator was zero but the dataset in the numerator was non-zero, the ratio was treated as the value of the numerator. For example, if enumerators counter four cases of syphilis positivity in the HTC register but none were one the HMIS forms, then the ratio of HTC register to HMIS forms was 4, or 400%.
[54] See FOOTNOTE 49.

FIGURE 19-A and n.

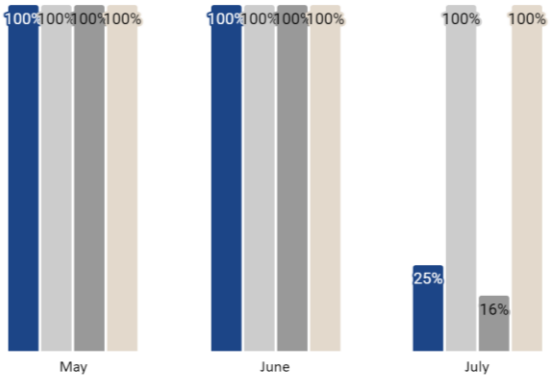
FIGURE 19-B). As was the case with the number of syphilis-positive pregnant women, the total number of cases of treatment were small (as expected in the context of the survey) and so small deviations resulted in large impacts to the ratios reported. Thus, these results should be interpreted with caution.

FIGURE 19. NUMBER OF SYPHILIS-POSITIVE PREGNANT WOMEN TREATED WITH 2.4IU BZP[55,56]

A. RATIO OF INDICATOR FROM THE ANC REGISTER[57] COMPARED TO THE HMIS FORMS



B. RATIO OF INDICATOR FROM THE HMIS FORMS COMPARED TO THE DHIS2 DATABASE



Finally, the verification factors were calculated by dividing the aggregated totals for each performance indicator as counted in the facility source documents (the ANC register and HTC register) by the totals for

[55] These analyses exclude instances where there a data point was missing from either of the datasets being compared.
[56] See FOOTNOTE 53.
[57] Among the facility recording tools, there is no designated / specifically labeled place for recording syphilis treatment. In the training, it is emphasized that providers should record syphilis treatment in the "treatments" section of the ANC register and in the "notes" section of the HTC register. The analysis presented here focuses on the ANC register as that was viewed as the most likely place for this data to be recorded consistently.

each indicator on the online DHIS2 dashboard. Verification factors are a measure of data accuracy: a ratio of the validated data (i.e. the register data observed during the CFS) to the reported value (i.e. data in DHIS2). Values greater than 1 indicate underreporting, as more services were counted in facility source documents than in the national database. The verification factors can be found in **TABLE 15**.

TABLE 15: DQA RESULTS FOR KEY PROGRAM INDICATORS (MAY-JULY 2022)[58]

Indicator	Total counted in facility source documents[59]	Total reported in online DHIS2	Calculated verification factor (excluding missing)	% of missing data
# of 1st ANC visits	4,509	4,367	1.03	6.60%
# of total ANC visits (1st, 2nd, 3rd, 4th, 4+)	8,025	10,714	0.75	8.57%
# of HIV tests among pregnant women	3,220	3,363	0.96	22.92%
# of syphilis tests among pregnant women	2,780	2,751	1.01	24.65%
# of pregnant women who tested positive for syphilis	15	14	1.07	26.04%
# of pregnant women treated for syphilis with 2.4IU benzathine penicillin	14	14	1.00	19.79%

Note: Any cells in orange indicate that the DQA results could not be used, either because the verification factor implies too much data deviation or because there is too much missing data to be able to confidently apply the verification factor.

The verification factors were estimated for the subset of observations where there was an observation in both datasets that could be compared to one another; in other words, for a given facility and month, if either the register was missing or the online DHIS2 had no data reported, then that facility and month were excluded from the values used to calculate the verification factor. Overall, as reported in

TABLE 15, where there was data in both the facility source document and the DHIS2 dashboard, there was good consistency between the two sources in all instances except the total # of ANC visits. However, for the indicators related to HIV testing, syphilis testing, syphilis positivity, and syphilis treatment, there were not enough non-missing observations to be able to use the verification factors as intended (see **ANNEX 1**).

[58] Comparisons between CFS data and data reported in DHIS2 (HMIS database) for **TABLE 15** excluded instances from facilities for which data was missing in either data source. For example, if data for '# of 1st ANC visits' was populated for a facility in the ANC register, but missing in DHIS2, these instances were excluded from the aggregated '# of 1st ANC visits' for the ANC Register.

[59] The facility source document is the HTC register for # of HIV tests among pregnant women, # of syphilis tests among pregnant women, and # of pregnant women positive for syphilis and is the ANC register for # of 1st ANC visits, # of total ANC visits, and # of pregnant women treated for syphilis, as discussed previously.

Recommendations for Program Strengthening

RECOMMENDATIONS TO INCREASE SYPHILIS SCREENING AND TREATMENT COVERAGE AMONG PREGNANT WOMEN

- Achieving high syphilis screening and treatment coverage is dependent on three factors: availability of relevant commodities, provider knowledge, and patient behavior. Results from the survey suggest that significant gains in coverage will require focused improvements in supply management, as improvements in provider knowledge and counseling would only marginally increase screening and treatment rates. For example, providers know they should use the dual test when first screening for HIV and syphilis (93%) and are largely aware the correct treatment for syphilis infections in pregnant women is benzathine penicillin (95-97%). Results also suggest that pregnant women rarely refuse testing (2%) or treatment (4%). However, approximately one in four facilities reported having experienced a stock out of dual test kits (25%) and BZP (27%). Providers cannot screen or treat without these supplies, directly impacting program coverage. To increase commodity availability, it is recommended to:
    - Revisit the assumptions used when determining the quantities of commodities that are "pushed" or distributed to health facilities to include additional buffer stock.
    - Routinely review the amounts requisitioned by health facilities and compare this to what was forecasted to identify and adjust requisitions for facilities which are under-ordering.
    - Provide targeted supportive supervision to facilities which are reporting stock outs and continue reinforcing the guidelines for appropriate use of HIV/syphilis dual tests and BZP to prevent overuse.
    - Engage with supply chain partners to identify mechanisms which can be deployed for more rapid resupply of stocked-out facilities, including leveraging the master trainers to deliver commodities as part of supportive supervision.
- Although patient consent to syphilis testing and treatment is high (only 2% of facilities reported a patient refusing testing and only 4% reported a patient refusing treatment), any patient refusal must be addressed. This is especially true in regard to syphilis treatment where the patient chart review also surfaced the case of a pregnant woman who was found HIV and syphilis positive and was noted by the OIC as having refused syphilis treatment. To address the issue of patient's refusing syphilis treatment, a few routes can be taken:
    - The program should contact every facility where there are more syphilis-positive cases among pregnant women than reports of treatment in the DHIS2 and identify if it is a case of a patient refusing treatment. If so, a master trainer should go to the facility and work with the provider to encourage the pregnant woman (by phone) to return for treatment.
    - The program should consider a system by which facilities are asked to contact their assigned master trainer when a patient refuses treatment so that this issue can be systematically tracked and addressed.
    - The training curriculum should be amended to provide specific counseling messages in the case of a co-infected pregnant woman (where she is positive for both HIV and syphilis) as

these cases are found to be the ones where women are most often refusing syphilis treatment.

- An important factor influencing the lower-bound estimate of treatment coverage was the inability to validate syphilis positivity and treatment patient-by-patient through the chart review. Evidence Action staff were unable to trace the charts of eight out of nineteen patients identified as syphilis positive in the HTC register. These eight patients were assumed to have gone untreated, a highly conservative assumption. Improving the precision of the treatment coverage estimate will require that patient charts are more readily available at facilities, particularly for patients who test positive for syphilis. It is therefore recommended that proper storage and organization of patient charts be emphasized during mentorship and supportive supervision, including a clear policy for where and how long to keep the patient charts of syphilis-positive pregnant women. It is further recommended that the program consider conducting quarterly chart reviews at a representative sample of health facilities and consider including a chart review for syphilis-positive pregnant women as part of the routine on-site data verification (OSDV) activities conducted by NACP.

RECOMMENDATIONS TO STRENGTHEN PROVIDER KNOWLEDGE, SKILLS IN USING THE DUAL TEST, AND ADHERENCE TO GUIDELINES

- Qualitative results from the patient cases indicate the providers may be recommending unnecessary retesting of HIV and syphilis among pregnant women, which could lead to wastage of dual tests. Further reinforcement of the appropriate frequency of testing may be needed during the initial training and/or during the mentorship and supportive supervision visits. The program should also revisit the content of the job aids provided to health facilities to ensure that these are noting the recommended frequency for HIV and syphilis retesting among pregnant women.
- Though providers knew to treat syphilis in pregnant women with BZP, almost one in three providers listed other drugs alongside BZP; often, the additional drugs were other antibiotics which also treat syphilis or some that do not, such as amoxicillin. At the very least, over-prescription could be leading to wastage of commodities, and it's recommended that the content delivered during mentorship and supportive supervision reinforce what drugs are needed for a syphilis infection and an HIV and syphilis co-infection.
- Providers frequently stated that they would use BZP to treat conditions for which it is ineffective; 55% of providers reported using BZP to treat Gonorrhea (22%), STIs more generally (28%), UTIs (16%), and PID (7%). Continued education and reinforcement that BZP does not effectively treat other STIs is critical to reducing over-consumption which may be leading to unnecessary stock outs. The program should also review which facilities are consuming BZP at accelerated rates and target supportive supervision to these facilities as the most likely ones for misusing BZP for conditions which it does not treat.
- Just under half of providers correctly recalled the full HIV testing algorithm, and only 23% of providers knew both the correct expectations for test sequencing and the specific brands recommended for the second and third HIV tests as per the national guidelines. The program should consider whether refreshers on HIV testing in pregnancy are required. Further, where possible, the OSDV should include a review of the HTC registers and identification of instances where the HIV testing may not be following the algorithm to assess the extent to which this issue is impacting care.

- Only 45% of healthcare providers listed at least one of the recommended ARVs when asked what they would prescribe to a pregnant woman with an HIV and syphilis co-infection. This finding suggests that further training and sensitization is required around next steps in the instance that a pregnant woman is found HIV-positive. The program should also consider producing job aids specific to management of HIV cases among pregnant women and posting these in health facilities.
- There were a few gaps noted in providers ability to use the dual tests. Providers did not immediately list the preparatory steps for correctly using the dual test, such as checking the kit's expiration date and desiccant packet, they struggled to identify correctly filled capillary tubes, and struggled to interpret results where the control line was missing. The program should consider adding these visuals and tests to the training itself, as an opportunity to surface gaps in knowledge and address them immediately. Further, the program should consider introducing a specific component into the supportive supervision which assesses providers' ability to use the dual test.

RECOMMENDATIONS TO STRENGTHEN SUPPLY CHAIN MANAGEMENT

- The use of stock/bin cards at facilities to track the inventory of relevant commodities ranged between 46% and 69% as evidenced during the stock/bin card review. The program should consider investing in printing and distributing stock/bin cards during the initial facility training so that these can be in use from the outset.
- The program should revisit the way in which facilities are tracking usage of HIV rapid tests, including the dual test. As of now, these commodities are tracked via the stock/bin cards which only capture the flow of stock for the facility stock room, as compared to drugs which are tracked in the daily dispensing register at the pharmacy. It is recommended that the program consider adopting a daily activity/dispensing register for HIV tests, including the dual test, as is in use in other countries, to be able to more accurately trace stock consumption, assess the length of stock outs, and identify where commodities are being misused.

RECOMMENDATIONS TO STRENGTHEN DATA RECORDING AND REPORTING

- During the facility records review of ANC registers, inconsistencies where found in whether facilities were ticking the ANC visit numbers (15% of entries in the ANC registers were missing a visit number). Although the amount of missing data did not rise to the level to negate the DQA, it must still be addressed. The number of 1st ANC visits as per the ANC register is an important aspect of conducting the data quality assessment, and in turn, a critical aspect of estimating syphilis screening coverage as the screening is to take place during the 1st ANC visit. To address this, it is recommended that the master trainers review the ANC register during supportive supervision and reinforce appropriate documentation.
- There were general challenges in data availability, both within the health facility and on the DHIS2 dashboard. Thus, a significant proportion of the data that was required to utilize the DQA findings was missing. For example, 19.8% of the expected data was missing for the number of syphilis-positive pregnant women treated for syphilis and 24.6% of the expected data was missing from the number of pregnant women tested for syphilis. The main source of missing data was the absence of the new HTC registers within the health facilities, as these are the only data source where there

is an explicit location for recording syphilis testing. Additional printing and distribution of the new HTC registers is required moving forward to address this gap, as without these registers, health facilities have no place to record syphilis testing, and it will be impossible to validate the data reported in the HMIS / DHIS2. Additionally, some facilities had HTC registers available but the registers themselves missing data for one or two of the months under review, suggesting more diligent guidance on filling in the registers is required and master trainers should directly review these registers when visiting facilities to identify which ones are using it and which are not.

- A challenge resulting from the designs of the ANC and HTC registers is there is no clear, uniform location for tracking all syphilis screening and treatment. As a consequence, the facility focal persons responsible for reporting in the HMIS must look across a number of references to try to compile the data required for monthly reporting, especially in the case of syphilis treatment. This then creates the risk of inconsistent reporting from one provider to the next or one facility to the other. As a result, it is nearly impossible to consistently trace and validate syphilis treatment, hence the lower bound estimate of syphilis treatment coverage of 36%. To address this, it is recommended that the ANC register be revised to include syphilis testing, the test result, and treatment, as is done in many countries which emphasize an integrated, comprehensive antenatal care experience.
- The chart review surfaced instances where pregnant women were noted as syphilis-positive in the HTC register but then syphilis-negative on their patient chart. It was noted that providers may fill in the HTC registers one to two days after the testing itself but are noting the correct information on the charts. It is recommended that the program reconsider the SOPs in this area and encourage facilities to fill in basic information in the HTC register as they go along (patient name, ID, date of testing, test results), and then return to backfill other information at a future date so that the HTC register may be more accurate to what is in the patient charts and vice versa.

Annexes

Annex 1. Data Completeness vs. Coverage Estimation Pre-Conditions

As described in the coverage section of the report, the preferred approach for estimating syphilis screening and treatment coverage was to use data collected from the facility source records review to adjust figures reported in the national HMIS database, or the DHIS2. However, anticipating that there could be issues with data completeness and availability at both facilities and the DHIS2, alternative estimation approaches were delineated with pre-specified decision rules to guide the decision of which approach would ultimately be used to calculate the four performance indicators. These decision rules included primary and secondary conditions. The primary condition for using the DQA approach for all four indicators was a uniform threshold of HMIS data completeness, while secondary conditions varied by indicator as described below.

For the number of 1st ANC visits, the primary and secondary conditions required for the DQA approach were met:

- *Among the facilities enrolled in the program, at least 75% of the indicator data is present in the HMIS for the last six calendar months (i.e. the average submission rate of the past six months for all enrolled facilities must be 75% or higher).*
    - The average submission rate for this indicator over the six months preceding the survey was 94%.[60]
- *On average among the sampled health facilities, 75% or more of ANC visits entered in the ANC register for the period being assessed through a DQA are not missing the ANC visit number.*
    - Approximately 85% of recorded ANC visits in the ANC registers at sampled health facilities had an ANC visit number.

For the number of pregnant women tested for syphilis and the number who were syphilis-positive, the primary condition (HMIS data completeness) was met, but the secondary conditions were not:

- *Among the facilities enrolled in the program, at least 75% of the indicator data is present in the HMIS for the last six calendar months (i.e. the average submission rate of the past six months for all enrolled facilities must be 75% or higher).*
    - The average submission rate for these indicators over the six months preceding the survey was 80% for # of pregnant women tested for syphilis and 77% for # of pregnant women who were positive for syphilis.
- *At least 80% of the sampled health facilities have an HTC register.*
    - Only 79% of facilities sampled had an HTC register available during the CFS.[61]

[60] As the threshold focused on the six months preceding the survey, the calculation of the average submission rate includes data from February to July 2022. This differs slightly from the time period referenced for the coverage estimate (January to August 2022).

[61] The ten facilities without an HTC register were: Valley-Ta Clinic, Liberia Coast Guard, Cynthia Nelson Clinic, Dagmow Clinic, SDA Cooper Memorial Hospital, Lofa Medical Services Clinic, Barnersville Health Center, Koon Town Clinic, Zingbor Town, and Soniwen Health Center.

- *At least 75% of the sampled health facilities that have HTC registers, the test done and test result columns are filled in for syphilis.*
    - 95% of sampled health facilities that had HTC registers had at least some data in the syphilis test done and syphilis test results columns.

For the number of syphilis-positive pregnant women who were treated with 2.4IU BZP, the primary condition (HMIS data completeness) was not met.

- *Among the facilities enrolled in the program, at least 75% of the indicator data is present in the HMIS for the last six calendar months (i.e. the average submission rate of the past six months for all enrolled facilities must be 75% or higher).*
    - The average submission rate for this indicator over the six months preceding the survey was 74%.

As such, indicators related to syphilis testing, positivity, and treatment were calculated using the outlined alternative approaches. In some instances, there were multiple alternative approaches, which are described below.

For the number of pregnant women tested for syphilis, two alternative approaches had been delineated. Option A centered on using consumption data reported in the electronic Logistics Management Information System (eLMIS), combined with a DQA among a sample of facilities, to approximate the number of women tested using the number of test kits consumed. Option B was to use the estimates of supply availability and provider knowledge combined with qualitative interviews collected during the CFS to provide insight into the role of provider and patient behavior. It was pre-specified that alternative Option A would be used if all of the following were true:

- At least 60% of the sampled health facilities have and clearly utilize a stock/bin card for HIV/syphilis dual tests during the survey reference period;
- The data sources at the health facility could be utilized to estimate the percentage of dual tests that are utilized for testing partners and testing the general population;
- Among the facilities enrolled in the program, at least 75% of the data is present in the eLMIS for the last two calendar quarters (with each quarter for each facility counting as a unique data entry).

The first pre-condition for selecting Option A was not met: 60% of sampled health facilities did not have or did not clearly utilize a stock/bin card for HIV/syphilis dual tests during the survey reference period (approx. 54% did). Hence, alternative approach Option B was employed.

For the number of syphilis-positive pregnant women, two alternative approaches were also delineated. Option A would have reviewed the HTC registers at the sampled health facilities to count how many pregnant women tested positive for syphilis during an ANC visit out of the number who had reported test results. The estimated prevalence among the sampled facilities would then be utilized to multiply the total number of women tested across all enrolled facilities to estimate how many syphilis-positive pregnant women would be expected across the program. Option B was to use county-level prevalence estimates measured in the 2017 sentinel survey and similarly multiply the prevalence estimates against the number

of women tested for syphilis. It was pre-specified that alternative Option A would be used if all of the following were true:

- At least 80% of the sampled health facilities have an HTC register;
- At least 75% of the sampled health facilities that have HTC registers, have the "syphilis test done" and "syphilis test result" columns filled in

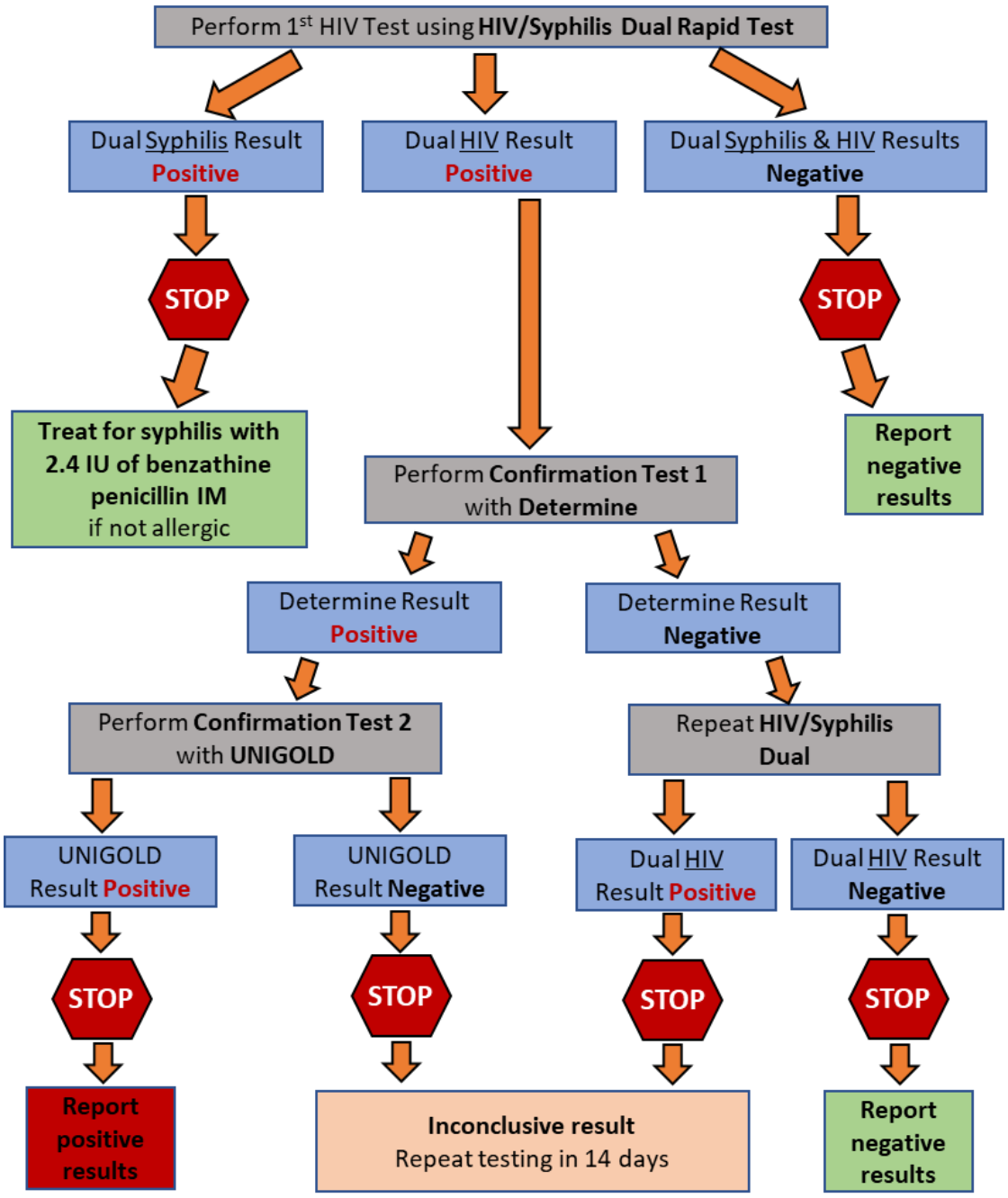
As already described, less than 80% of sampled health facilities had an HTC register available during the CFS. Therefore, the number of syphilis-positive pregnant women was estimated using alternative option B, which multiplied syphilis prevalence from the 2017 sentinel survey against the number of women tested for syphilis.

Lastly, for the number of syphilis-positive pregnant women who were treated with 2.4IU BZP, only one alternative approach was delineated. This approach was used to estimate the lower and upper bounds of syphilis treatment coverage as described in the coverage estimate section.

Annex 2. HIV Diagnostic Algorithm Reference

In the newest "National Guidelines for HIV Testing Services (HTS) & Psycho-Social Support (PSS)" published in June 2020, the NACP put forward a new HIV testing algorithm for pregnant women and partners. The analysis of providers' knowledge of the HIV testing algorithm refers to this algorithm.

FIGURE 20: HIV DIAGNOSTIC ALGORITHM



Annex 3. Miscellaneous Survey Results

There were several findings from the survey which were not included in the main report as they are less critical in the assessment of program quality and impact. Nonetheless, these findings are included here.

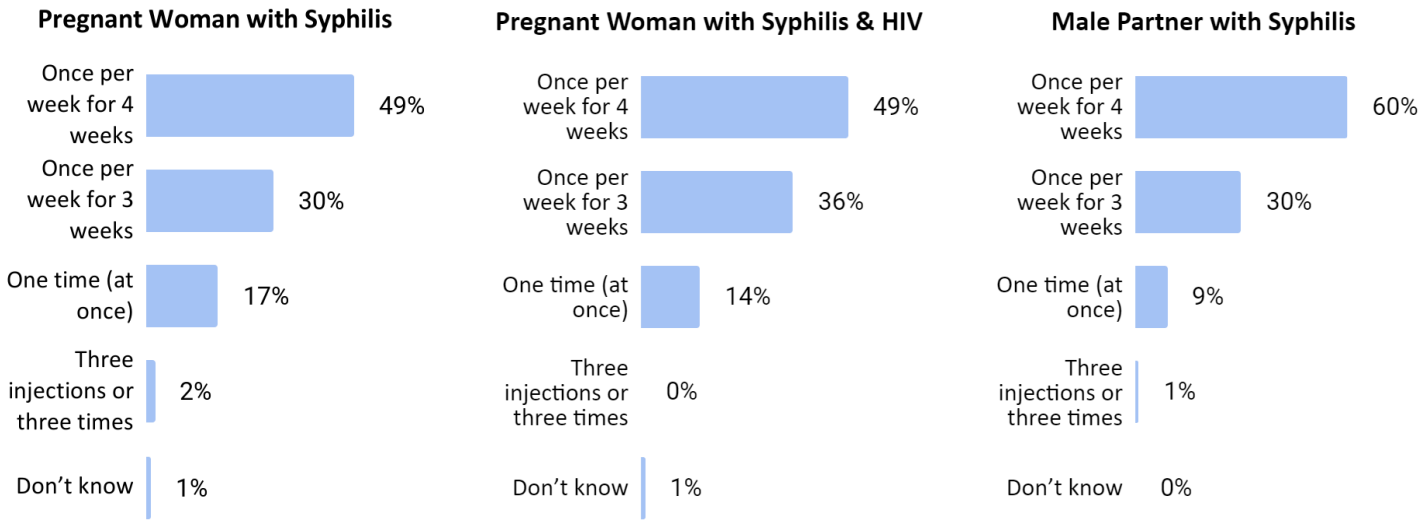
Usage of Job Aids

The NACP distributed various job aids to provide healthcare providers reference material when they are providing counseling, using the dual test, applying the HIV testing algorithm, treating syphilis-positive cases, recording and reporting key data, and requisitioning commodities. When asked about their usage of these job aids in the context of counseling, 90% of respondents (n=18/20) reported using the Key Counseling Messages on Syphilis job aid during their counseling sessions. No direct questions were asked about the other job aids.

Knowledge of Benzathine Penicillin Dosing Frequency

For the three cases where the patient had syphilis (a pregnant woman with syphilis only, a pregnant woman co-infected with HIV and syphilis, and a male partner with syphilis), the providers which listed BZP among the drugs they would prescribe were asked to recall the recommended frequency of BZP dosing. While 99% indicated they would give at least one dose of BZP, the full range of responses for each case are below.

FIGURE 21: RESPONSES GIVEN WHEN ASKED TO RECALL RECOMMENDED BZP DOSING FREQUENCY



Providers' Comfort with Areas of Care / Services

- 80% of the surveyed healthcare providers (n=73/92; more than one provider was surveyed per health facility if available) reported at least some confidence in their ability to administer TLD or DDG or AIA (on a scale of 'not at all confident' to 'extremely confident').

- At facilities where the supplemental quality assessment questions were administered (n=9), focal persons were asked whether they have faced any challenges with the use of stock bin cards or with filling in the SSRR forms. Though one focal person reported their facility does not use stock/bin cards to track the inventory of dual test kits, the remaining eight facilities reported they had no challenges filling in the stock/bin cards for this purpose. All focal persons (n=9/9) also reported no challenges in filling in the SSRR forms in the three months preceding the survey.

Recording of Partner Testing

In the context of the case where a male partner of a syphilis-positive pregnant woman came to the health facility, the providers were asked whether they would record the syphilis treatment of the male partner. In response, 96% of respondents indicated, yes, they would plan to record this patient's treatment, with most stating they would record it in the patient chart (68%) and HTC register (24%).

Recording of HIV Testing

Facility focal persons were asked questions around standard operating procedures for whether and where HIV testing among pregnant women should be recorded. Most of the focal persons (97%) stated they do record that an HIV test was performed on a pregnant woman. The three most often mentioned documents used to record HIV testing of pregnant women are shown in **TABLE 16**. When asked what details of the HIV test they would record, 63% of the focal persons said they would record the results of the test.

TABLE 16. HIV TEST RECORDING STANDARD PRACTICES AMONG PROVIDERS

	Practice (n=94)
Record if a pregnant woman is tested for HIV	97%
If the HIV test is recorded, it's recorded in the HTC register	56%
If the HIV test is recorded, it's recorded in the ANC register	29%
If the HIV test is recorded, it's recorded in the patient chart	19%
Record the results of a pregnant woman's HIV test	63%

Preventing Double Counting in the HMIS

Among the nine facilities where the supplemental quality assessment questions were administered, the focal persons responsible for filling in the HMIS reporting form were asked what measures they took, if any, to prevent double counting. Respondents described using the tallying method of counting in 5s, comparing or tallying across registers (e.g. HTC and ANC), counting the indicators from the patient charts on a daily basis, and recording the indicators in the various ledgers and then moving them from the ledger to the HMIS form at the end of the month.

Annex 4. Additional Dual Test Skills Test Analysis

94 respondents across the 48 surveyed facilities were tested on several aspects related to the correct administration of the HIV/syphilis dual test. Results are shown below. For each skills test, the first figure shows the percentage of providers who achieved a given score. For example, 32% of participants answered 81-90% of the eight expiry date questions correctly (**FIGURE 22**), while 35% of providers identified effective desiccant packets 61-70% of the time (**FIGURE 24**). Then, for each skills test, the second set of figures shows the response pattern for each sub-question.

Accurate Understanding of Expiration Dates

FIGURE 22: DISTRIBUTION OF SCORES ON TEST OF EXPIRY DATE INTERPRETATION

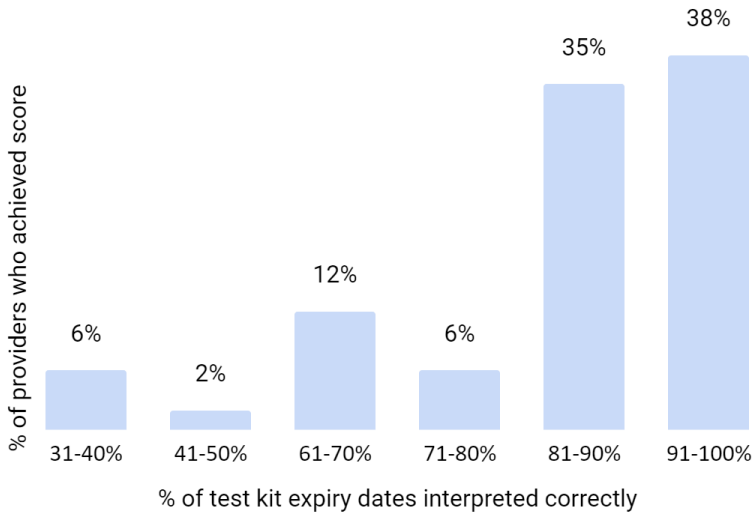
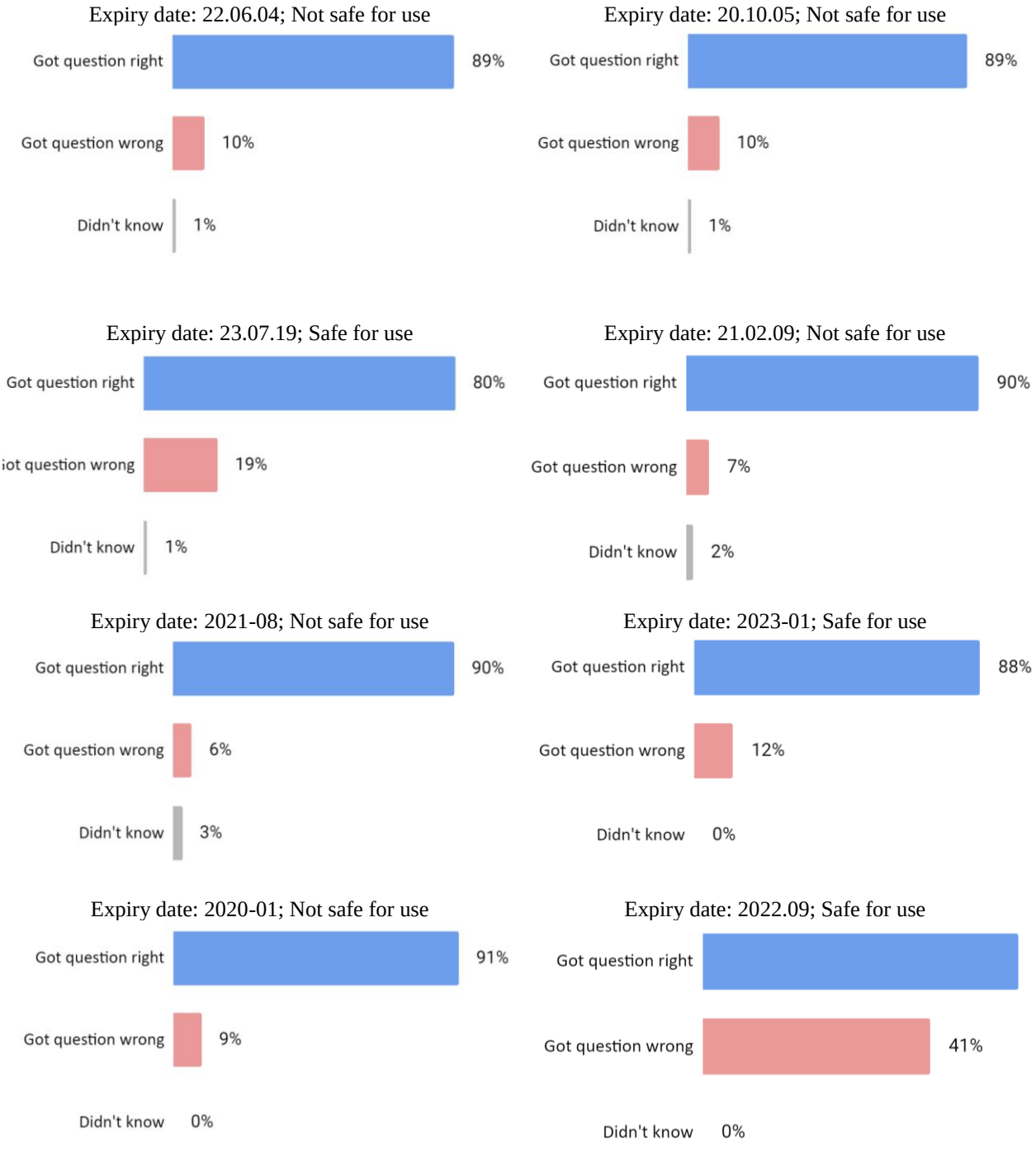


FIGURE 23: SCORES ON INDIVIDUAL QUESTIONS RELATED TO TEST KIT EXPIRY



Accurate Understanding of Desiccant Packet

FIGURE 24: DISTRIBUTION OF SCORES ON TEST OF DESICCANT PACKET INTERPRETATION

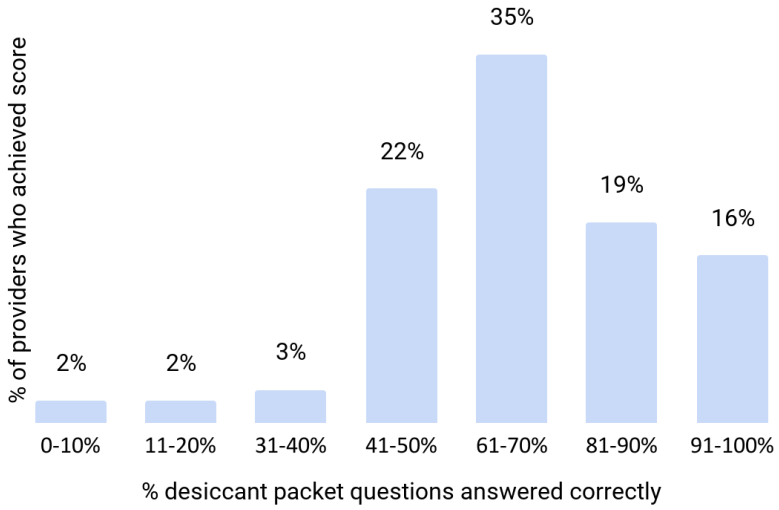
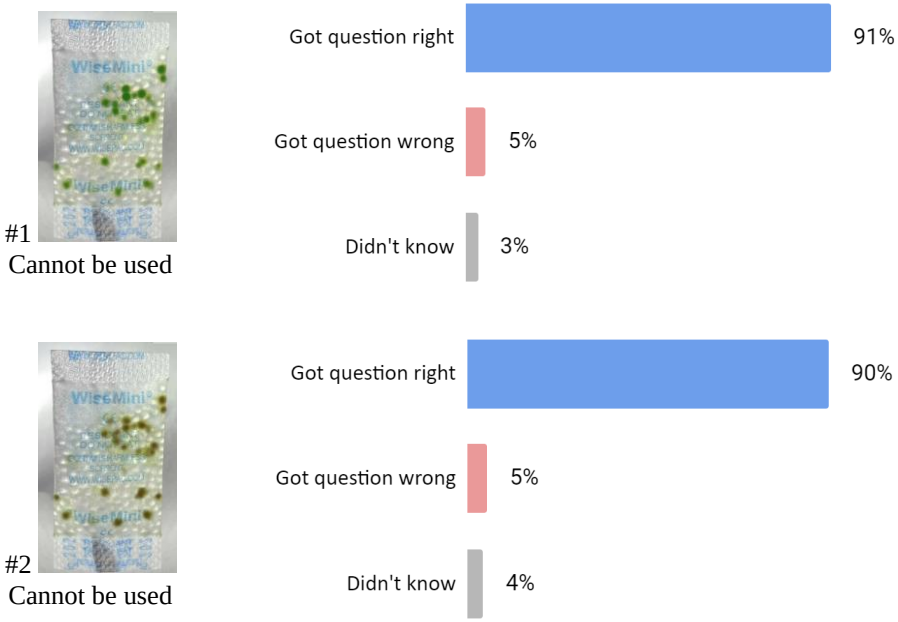


FIGURE 25: SCORES ON INDIVIDUAL QUESTIONS RELATED TO DESICCANT PACKET INTERPRETATION

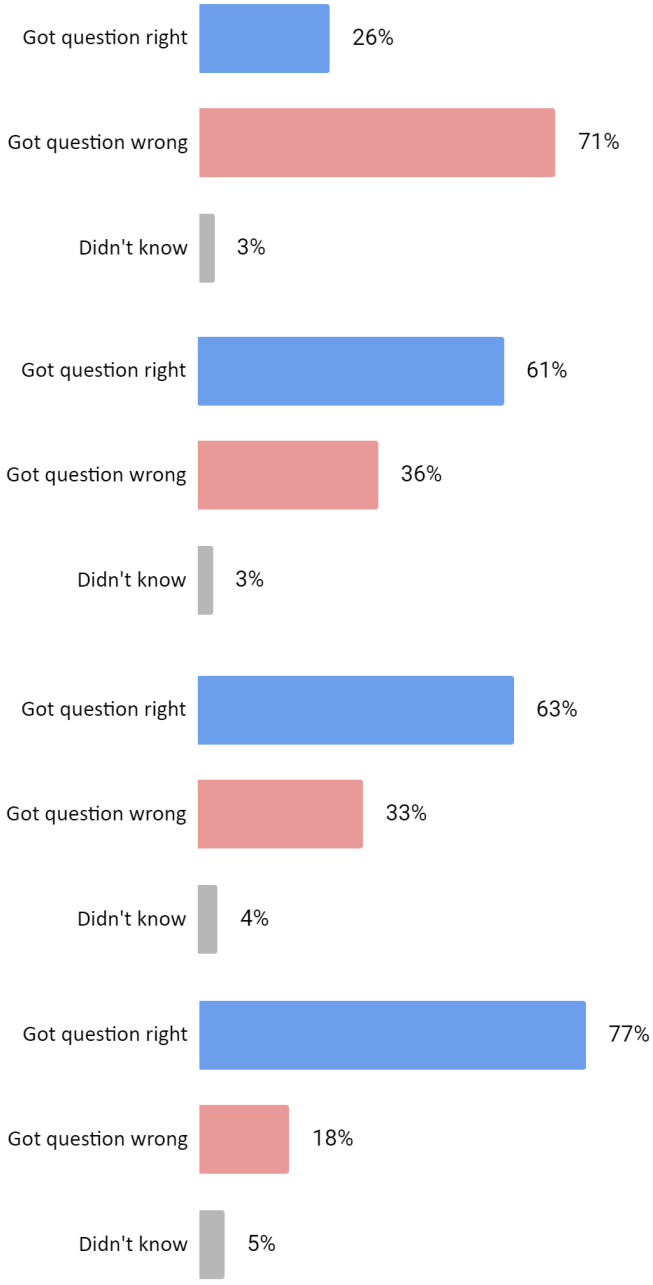


#3
Can be used

#4
Can be used

#5
Cannot be used

#6
Cannot be used



Accurate Identification of Blood Sample Collection Devices

FIGURE 26: DISTRIBUTION OF SCORES ON TEST OF SAMPLE COLLECTION DEVICE IDENTIFICATION

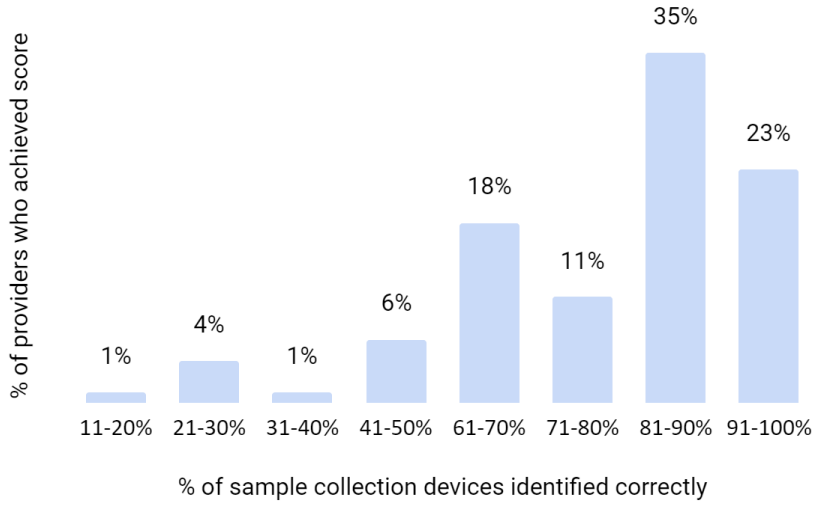
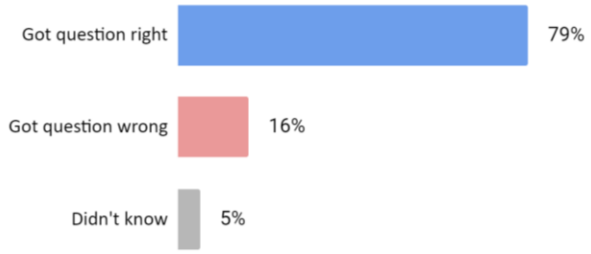
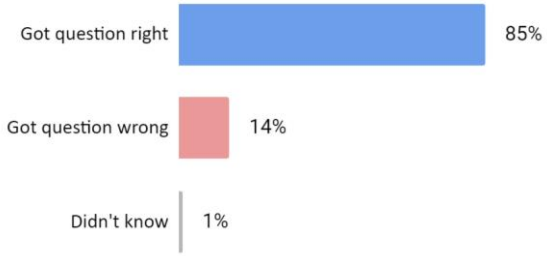


FIGURE 27: SCORES ON INDIVIDUAL QUESTIONS RELATED TO IDENTIFYING BLOOD COLLECTION DEVICES

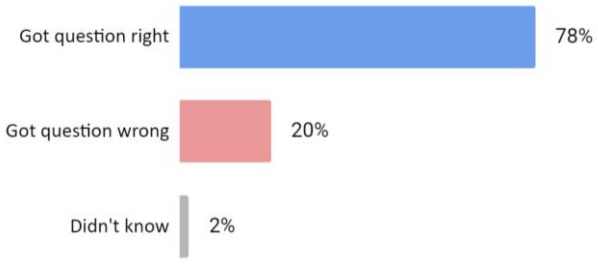
#1. Not an appropriate fingerstick blood collection device



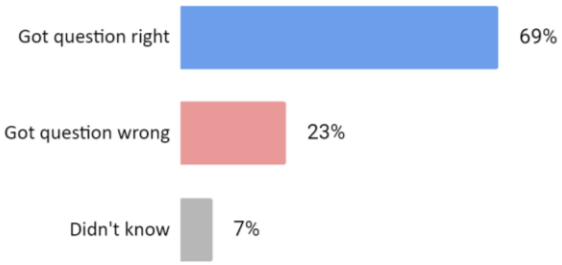
#2. Not an appropriate fingerstick blood collection device



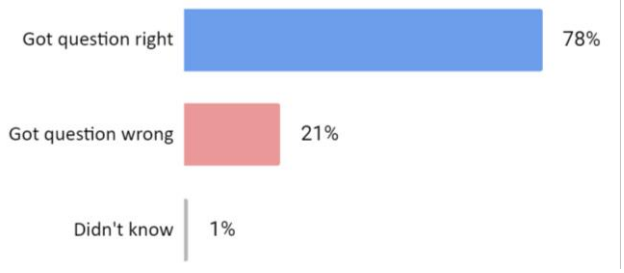
#3. Appropriate fingerstick blood collection device



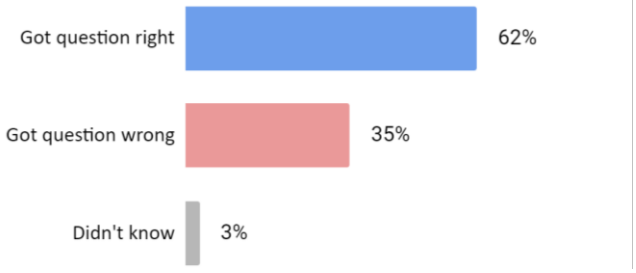
#4. Not an appropriate fingerstick blood collection device



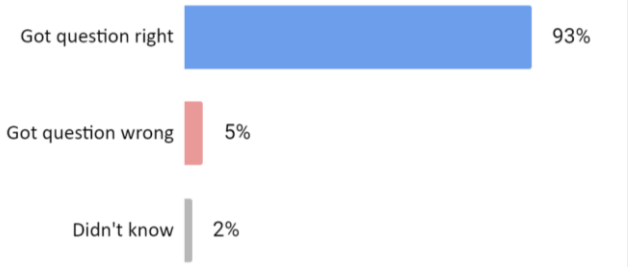
#5. Not an appropriate fingerstick blood collection device



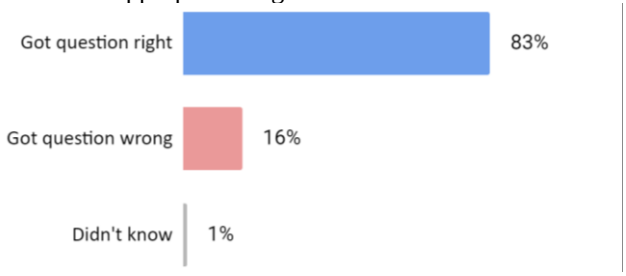
#6. Appropriate fingerstick blood collection device



7. Not an appropriate fingerstick blood collection device



8. Not an appropriate fingerstick blood collection device



Accurate Volume of Sample Blood

FIGURE 28: DISTRIBUTION OF SCORES ON TEST OF IDENTIFYING CORRECT VOLUMES OF SAMPLE BLOOD

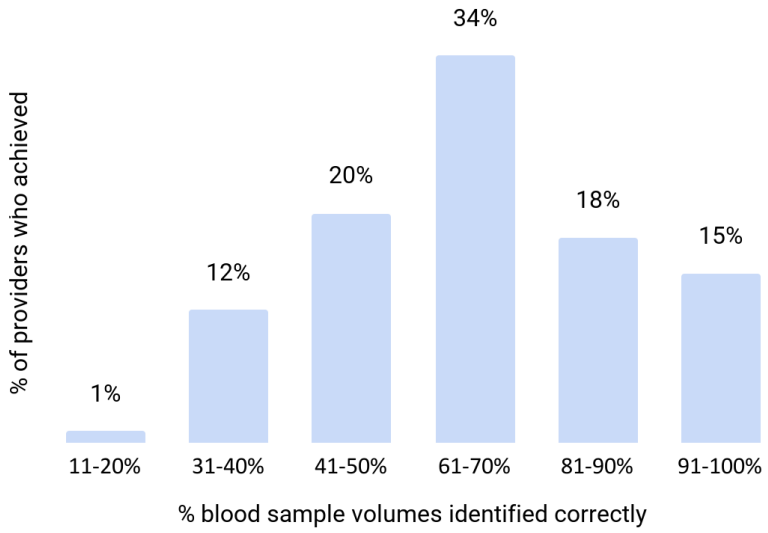
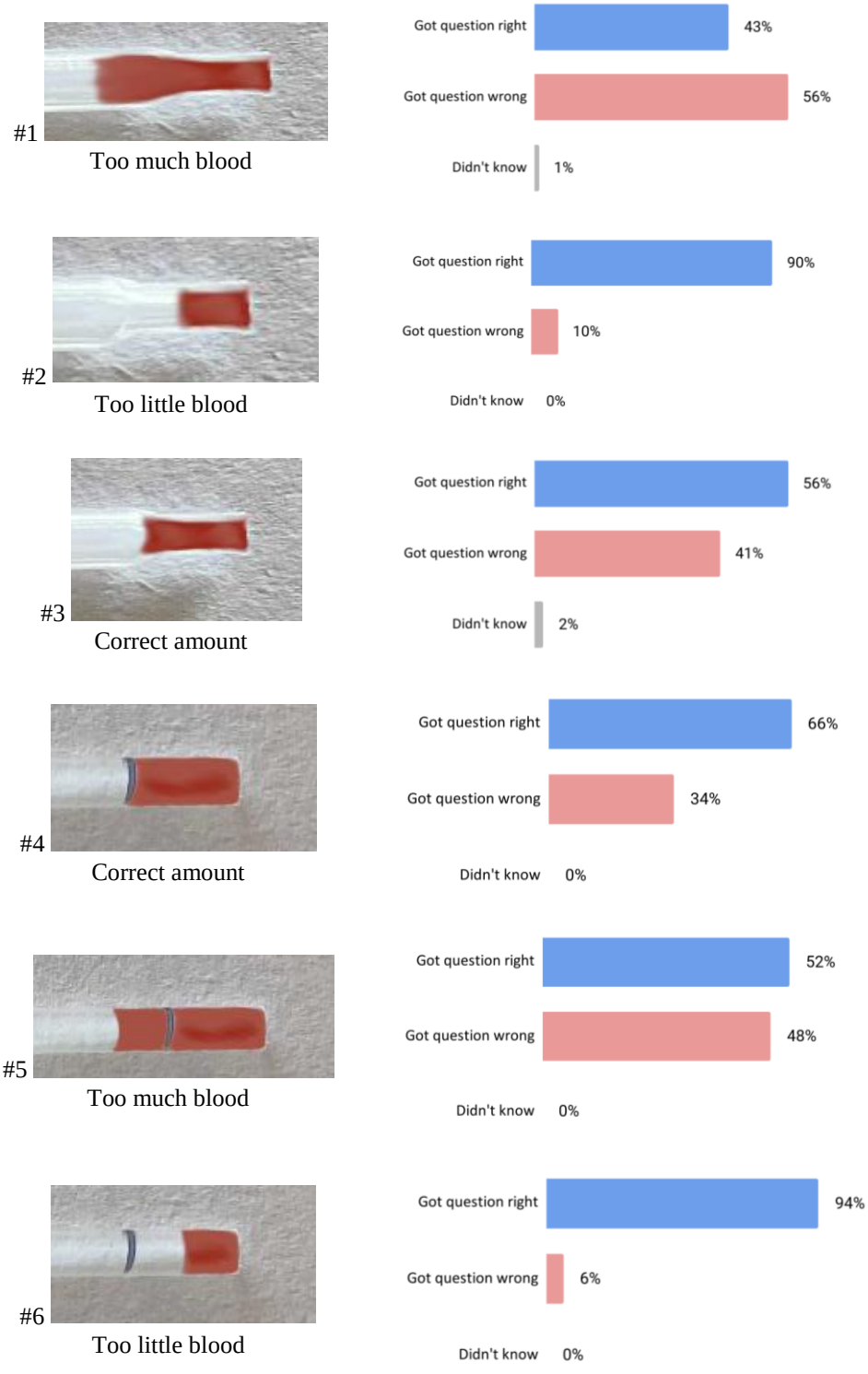


FIGURE 29: SCORES ON INDIVIDUAL QUESTIONS



Accurate Identification of Buffers

FIGURE 30: DISTRIBUTION OF SCORES OF TEST ON IDENTIFYING CORRECT BUFFERS

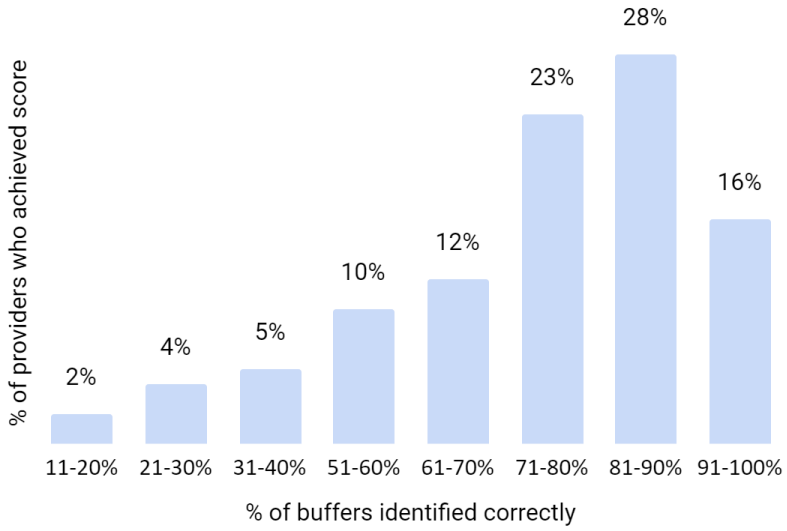
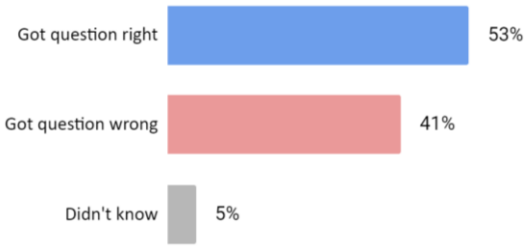
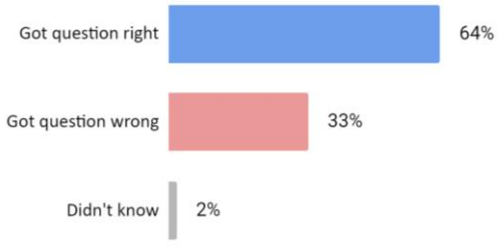


FIGURE 31: SCORES ON INDIVIDUAL QUESTIONS RELATED TO IDENTIFYING CORRECT BUFFERS

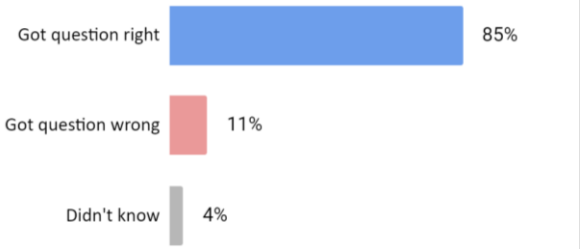
#1
Incorrect buffer



#2
Correct buffer

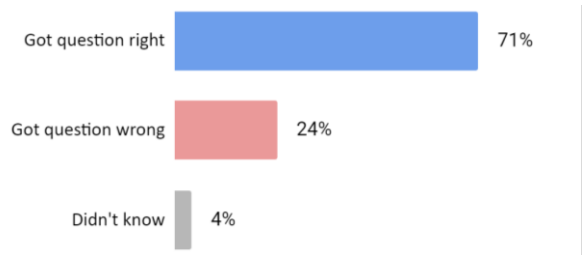


#3
Incorrect buffer



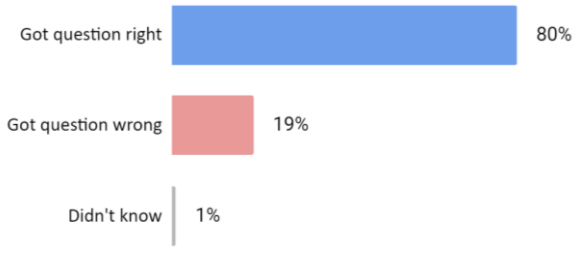
#4 

Incorrect buffer



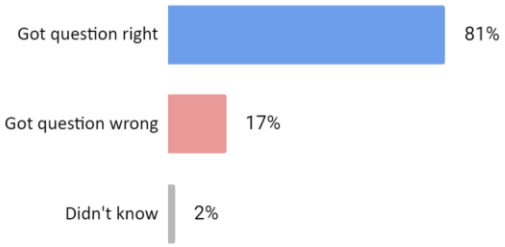
#5 

Incorrect buffer



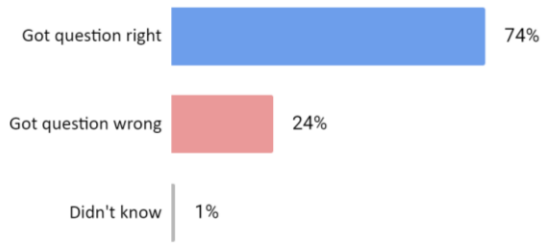
#6 

Incorrect buffer



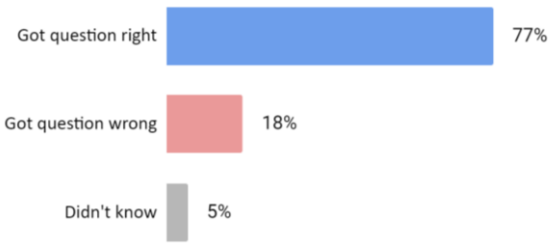
#7 

Correct buffer



#8 

Incorrect buffer



Accurate Interpretation of Test Results

FIGURE 32: DISTRIBUTION OF SCORES ON TEST OF INTERPRETING DUAL TEST RESULTS

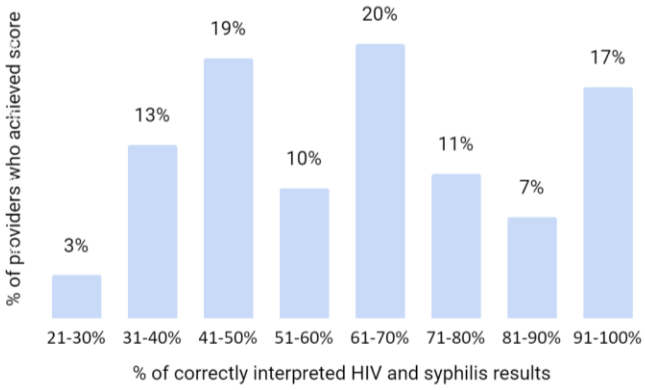
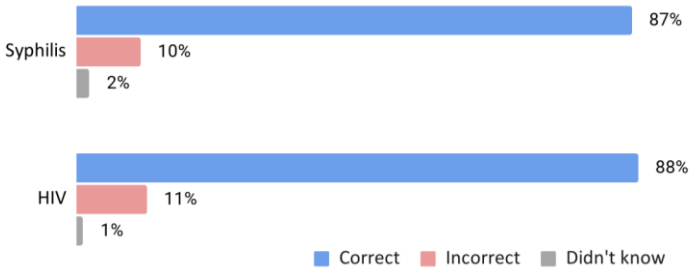


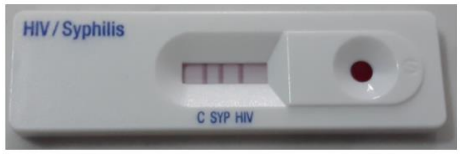
FIGURE 33: SCORES ON INDIVIDUAL QUESTIONS INTERPRETING TEST RESULTS

#1

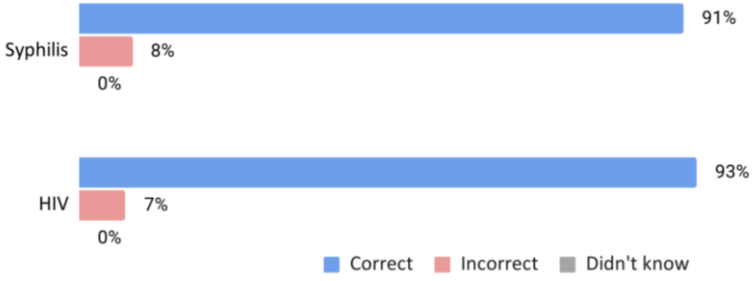
HIV negative
Syphilis negative



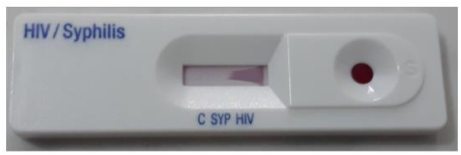
#2



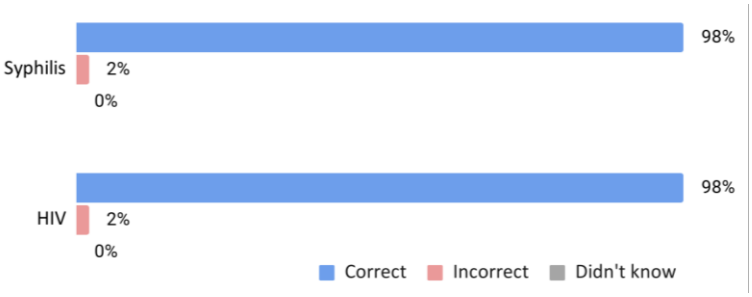
HIV positive
Syphilis positive



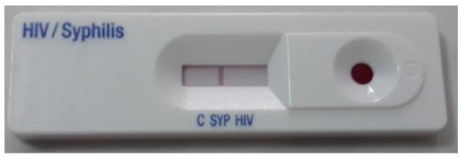
#3



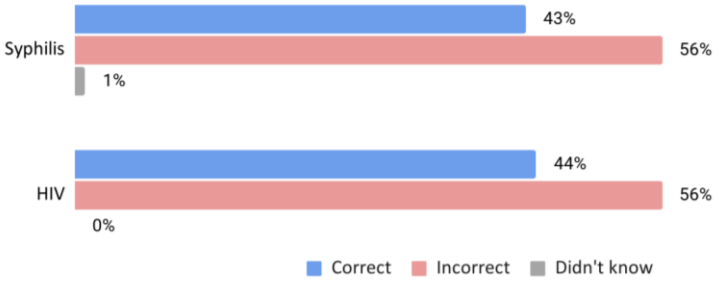
Invalid results



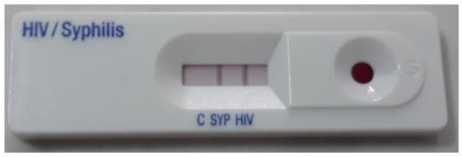
#4



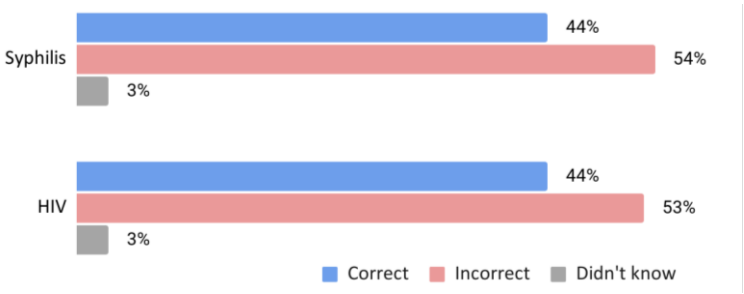
Invalid results



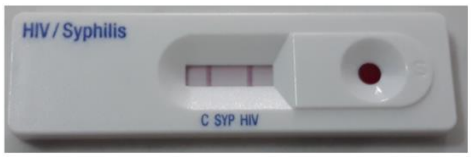
#5



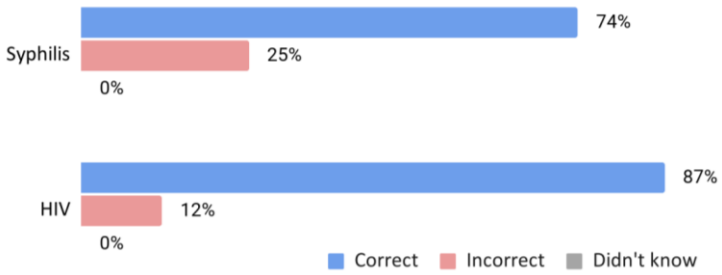
Invalid results



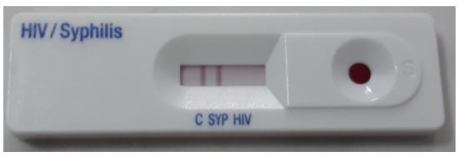
#6



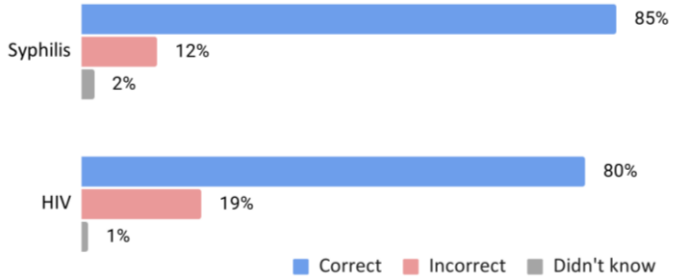
HIV positive
Syphilis negative



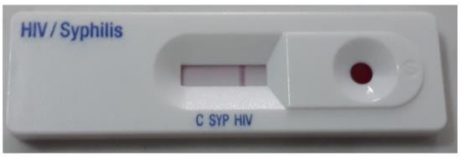
#7



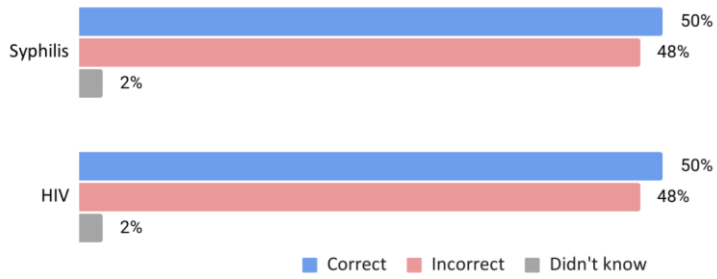
HIV negative
Syphilis positive



#8

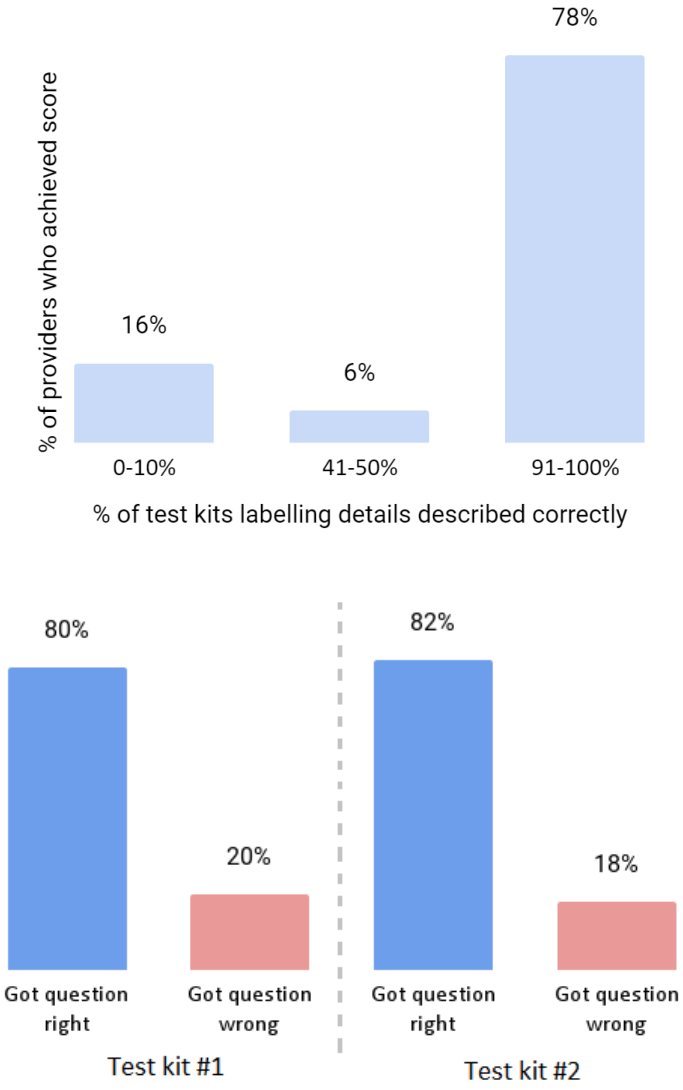


Invalid results



Accurate Test Kit Labeling

FIGURE 34: DISTRIBUTION OF SCORES AND INDIVIDUAL SCORES IN EACH TEST OF KIT LABELING



Annex 5. Additional Support Requested by Providers

At the nine facilities where the supplemental quality assessment questions were administered, the facility focal persons who were responsible for different areas of care were asked whether their facility required additional support from an NACP Master Trainer to strengthen service delivery at the end of each of their interviews. Overall, additional support was requested by most facilities and varied slightly by area of service, as shown in **TABLE 17**.

TABLE 17: ADDITIONAL SUPPORT REQUESTED BY FACILITY FOCAL PERSONS

	% who mentioned specific support needed in listed area
In the area of HIV & syphilis pre- and post-test counseling (out of nine facilities)	
Refresher trainings on new counseling methods	78%
Increase HIV/syphilis testing and awareness	11%
Provide pictures that show patients the risks of syphilis infection	11%
In the area of HIV & syphilis screening (out of eight facilities)	
More training on syphilis screening and treatment	75%
Supply of more testing kits	25%
Training in counseling	13%
Training on standard procedures	13%
Build more screening rooms	13%
Stipend for staff	13%
In the area of HIV & syphilis treatment (out of nine facilities)	
Additional training on BZP administration	67%
Supply of more medications	11%
In the area of data recording and reporting (out of nine facilities)	
Training for HMIS forms	78%
More training for HIV and syphilis counseling and testing	22%

Annex 6. Results of Physical Inventory

Enumerators visited store rooms to conduct a physical inventory, or count, of key program commodities, noting the quantity present and their expiration dates. **TABLE 18** summarizes where stock outs of dual test kits, BZP, and HIV-only rapid tests (namely, Determine, Bioline, and UniGold) were observed during the inventory review. It's important to note these results are only reflective of what enumerators recorded in store rooms, if accessible, and do not account for present stock in consultation rooms or elsewhere throughout the facility.

TABLE 18: STOCK OUTS OF KEY PROGRAM COMMODITIES OBSERVED DURING INVENTORY REVIEW

Facility Name	District	County	Commodity was stocked out during observation?				
			Dual tests	BZP	HIV Determine	HIV Bioline	HIV UniGold
Samuel David (SD) Medical Clinic	Buchanan	Grand Bassa					
Steven Tolbert Memorial Hospital	Buchanan	Grand Bassa					
Camphor Mission Clinic	Buchanan	Grand Bassa					
Liberia Agriculture Company Hospital	District #3	Grand Bassa					
Bokay Town Clinic	Owensgrove	Grand Bassa					
Dolo's Town Health Center	Firestone	Margibi	✓	✓	✓	✓	✓
Cotton Tree Health Center	Firestone	Margibi					
Cinta Clinic	Kakata	Margibi	✓				
CH Rennie Hospital	Kakata	Margibi	✓				
Gbaye-Ta Clinic	Kakata	Margibi	✓				
JJ Korhene	Kakata	Margibi	✓		✓	✓	✓
Ma Cynthia Health Care Center	Kakata	Margibi			✓		
Vellay-Ta Clinic	Kakata	Margibi	✓	✓	✓		
Weala United Methodist Clinic	Kakata	Margibi			✓		
Excellent Clinic	Mambah-Kaba	Margibi					
Triple T Medical Clinic	Mambah-Kaba	Margibi	✓		✓		
Summah Medical Clinic	Mambah-Kaba	Margibi	✓				
Unification Town Health Center	Mambah-Kaba	Margibi	✓	✓			
Bishop John Collins Clinic	Bushrod	Montserrado			✓		
Cynthia Nelson Clinic	Bushrod	Montserrado			✓	✓	✓
Jamaica Road Clinic	Bushrod	Montserrado			✓	✓	✓
Liberia Coast Guard	Bushrod	Montserrado					
Slipway Clinic	Bushrod	Montserrado					
Careysburg Clinic	Careysburg	Montserrado	✓				
Crozierville Clinic	Careysburg	Montserrado			✓		
White Plains Clinic	Careysburg	Montserrado			✓		
Dagmow Clinic	Central Monrovia	Montserrado			✓	✓	✓
Joanna Maternity Clinic	Central Monrovia	Montserrado					
SDA Cooper Medical Memorial Hospital	Central Monrovia	Montserrado		✓	✓	✓	✓
Soniwen Health Center	Central Monrovia	Montserrado					

Facility Name	District	County	Commodity was stocked out during observation?				
			Dual tests	BZP	HIV Determine	HIV Bioline	HIV UniGold
Benson Hospital	Commonwealth	Montserrado		✓			
Children Heaven Care Clinic	Commonwealth	Montserrado	✓				
Omega Market Clinic	Commonwealth	Montserrado					
Gardnersville Community Clinic	Somalia Drive	Montserrado					
Barnersville Health Center	Somalia Drive	Montserrado					
Kelthy Clinic	Somalia Drive	Montserrado					
Lofa Medical Services Clinic	Somalia Drive	Montserrado	✓	✓	✓	✓	✓
New Georgia Community Health Center	Somalia Drive	Montserrado					
RH Ferguson Health Center	Somalia Drive	Montserrado	✓		✓		
THT Clinic	Somalia Drive	Montserrado		✓	✓		
AF Russell Clinic	St. Paul River	Montserrado					
Arthington Clinic	St. Paul River	Montserrado		✓	✓	✓	✓
Banjor Community Clinic	St. Paul River	Montserrado			✓		
Glory of Christ Medical Clinic	St. Paul River	Montserrado		✓			
Kpalla Clinic	St. Paul River	Montserrado					
Goba Clinic	Todee	Montserrado		✓			
Koon Town Clinic	Todee	Montserrado		✓		✓	
Zingbor Town	Todee	Montserrado		✓	✓		

Among the surveyed facilities, 73% had dual test kits in stock in store rooms during the time of surveying, and all stock observed was still unexpired.[62] Similarly, enumerators observed 75% of facilities had BZP in stock in their store rooms during the time of surveying, and 95% of facilities where stock was observed had valid stock.[63] The stocking levels of HIV test kits were lower than the dual test and benzathine penicillin; 60% of the facilities had stock of HIV-Determine (96% of the observed stock was not expired), 56% had stock of HIV Bioline (93% of the observed stock was not expired) and 63% had stock of HIV Unigold (all of the observed stock had yet to expire).

[62] Expiration date data was missing for thirteen facilities and is not included in this result.
[63] Expiration date data was missing for eleven facilities and is not included in this result.