



The State of Viral Load Testing in Cambodia

An Assessment of Key Challenges and Opportunities

HP+ POLICY Brief

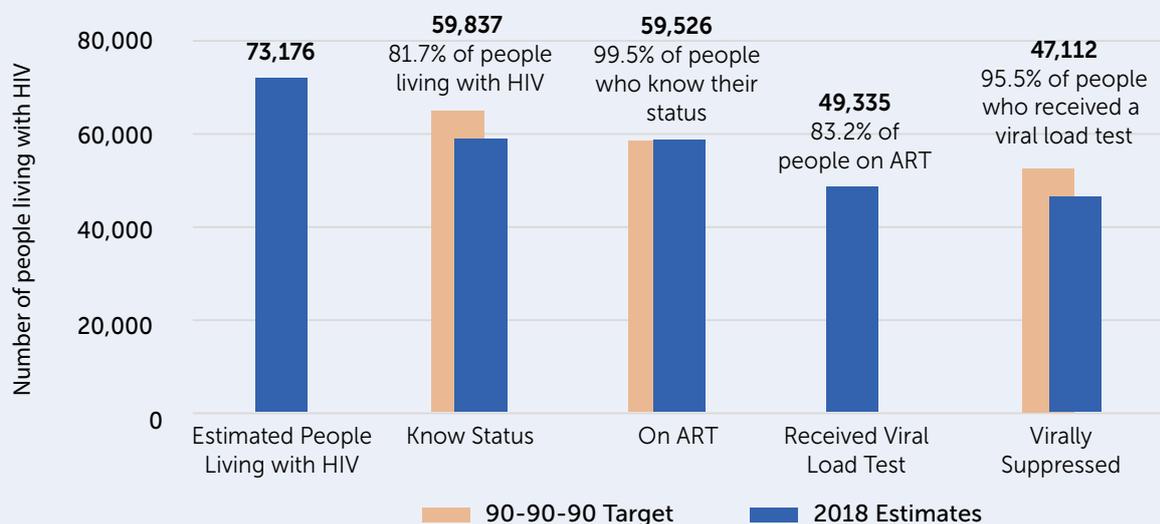
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Cambodia is successfully controlling its HIV epidemic through active case-finding strategies, increasing coverage of antiretroviral therapy (ART), and achieving a high rate of viral load suppression. It is globally recognized as one of the few countries to reach UNAIDS’s “90-90-90” targets and is aiming to achieve “95-95-95” by 2025.¹ To achieve these targets, one critical challenge is to scale up coverage of viral load testing. Implementation of routine viral load testing started in 2013, initially prioritizing patients who had been on ART the longest. There has been rapid scale-up of viral load testing, from 9,290 tests in 2013 to 54,785 tests in 2018. Nevertheless, there is a need to further scale up viral load testing services (as shown in Figure 1) to facilitate viral suppression among 95 percent of all people receiving ART.

The success of Cambodia’s HIV response has been achieved with significant donor support, with some elements of the response, such as laboratory systems strengthening, lab reagents, and viral load commodities exclusively financed by the Global Fund and the U.S. President’s Emergency Plan for AIDS Relief (PEPFAR, 2019). As Cambodia’s economy continues to grow, external support is expected to plateau or decline. Therefore, there is a need to explore options to fund and deliver critical elements of the HIV response with domestic resources, both public and private.

Figure 1. Cambodia HIV Clinical Cascade: Gap to 95-95-95



Source: National Center for HIV/AIDS, Dermatology and Sexually Transmitted Diseases ART reports and December 2018 lab viral load data; people living with HIV 2018 estimates based on unofficial 2019 Asian Epidemic Model results.

¹ UNAIDS’s targets refer to 90 percent of all people living with HIV knowing their HIV status, 90 percent of all people with diagnosed HIV infection receiving sustained ART, and 90 percent of all people receiving ART having viral suppression by 2020.

The Health Policy Plus (HP+) project—funded by the U.S. Agency for International Development and PEPFAR’s Sustainable Financing Initiative for HIV/AIDS—undertook an assessment of private sector engagement in the HIV response in Cambodia. The assessment prioritized four areas: (1) mobilizing resources from the private sector, (2) increasing private insurance coverage for people living with HIV, (3) leveraging the private sector to roll out pre-exposure prophylaxis, and (4) expanding the role of the private sector in delivering viral load testing services. Findings revealed that there appeared to be limited potential for impact in regard to the first two areas—the private sector had limited interest in providing resources for HIV and private insurance did not see a sufficient market to provide coverage for people living with HIV, given over 80 percent of all people living with HIV are being served through the public sector. The third area, roll out of pre-exposure prophylaxis, was already underway in the private sector. Therefore, this brief focuses on the fourth area, an examination of the current viral load testing landscape to explore whether the private sector could be leveraged to fill any gaps that currently exist. This included identifying whether private providers, pharmacies, laboratories, and other related services, including telecommunications, could complement the public sector to support the expansion of viral load services or improve the quality of viral load services. The assessment was conducted through key informant interviews and review of secondary information available in reports produced by the National Center for HIV/AIDS, Dermatology and Sexually Transmitted Diseases (NCHADS) and other partners.

Viral Load Testing Situational Assessment

Viral Load Testing Coverage: There are currently 69 ART sites throughout the country providing ART services to approximately 60,219 people living with HIV.² These 69 sites are supported by two public laboratories that provide viral load testing services. One in Phnom Penh with two machines (covering 58 ART sites) and the other in Siem Reap with one machine (covering 11 ART sites). Of the 54,785 tests reported in the NCHADS database in 2018, 83 percent were performed by the lab in Phnom Penh with the remainder completed by the lab in Siem Reap. Current guidelines require a viral load test to be performed six months after initiation on ART, then 12 months after initiation on ART, followed by annual viral load tests thereafter. For people living with HIV found to have elevated viral loads, a repeat test is required in six months. The total number of viral load tests (54,785 in 2018) exceeds the number of people living with HIV who had a viral load test (49,335 in 2018), indicating that some people living with HIV received more than one viral load test in 2018.

In addition to the two public laboratories, private laboratories also provide viral load testing for ART patients referred from private ART clinics. One such private lab is Institut Pasteur, based in Phnom Penh. Currently, these labs do not report the viral load services they provide to NCHADS, therefore, the NCHADS database currently underreports the number of viral load tests performed in the country.

The number of viral load tests performed, proportion of people living with HIV on ART receiving at least one viral load test per year, and viral load suppression rates have all increased over time (see Table 1).³ However, some evidence from 2017 shows that only 28 percent of patients with a detectable viral load had a repeated (second) viral load test within six months, suggesting many providers are not following viral load testing guidelines

² Data from NCHADS’s Data Management Unit as of the first quarter of 2019, slightly greater than the number of people living with HIV on ART by the end of 2018, given in Figure 1.

³ The increase in viral suppression rates from 2017 to 2018 may be partially attributable to the increase in viral load testing rates among ART patients, therefore capturing a greater proportion of adherent, virally suppressed ART patients.

appropriately (CHAI, 2018). Of those patients who did receive a second viral load test, only 40 percent were undetectable, suggesting a need to improve adherence counseling and investigation of the reasons for the first detectable viral load test.

The 2019 NCHADS Joint Program Review highlighted several issues related to the completeness and accuracy of reporting as well as providers' adherence to viral load testing guidelines. Specifically, there are inconsistencies between the number of tests reported by public labs and the number of tests reported in the NCHADS database, and between the viral load and ART databases, which make it difficult to accurately ascertain the number of people living with HIV on ART who had a viral load test in the past 12 months. At the same time, among people living with HIV who had an undetectable viral load, who then had a follow-up undetectable viral load, the median interval to the follow-up viral load test was 10.8 months, suggesting some providers are requesting follow-up tests earlier than required by the guidelines. A quarter of people living with HIV had their follow-up test in less than 4.7 months.

Table 1. Viral Load Testing Coverage

| | 2015 | 2016 | 2017 | 2018 |
|--|-----------------|-----------------|-----------------|-------------------|
| Number and percentage of people living with HIV on ART who received at least one viral load test | 37,568 (69%) | 44,694 (79%) | 47,658 (81%) | 49,335 (83.2%) |
| Viral load suppression (viral load < 1,000 copies/mL among those who had viral load tests) | N/A | N/A | 83% | 95.5% |

Source: NCHADS database, 2019; does not include viral load testing performed at private labs; viral load suppression data for 2015 and 2016 was not found.

Viral Load Testing Capacity: The three testing machines operating in the two public labs are on 10-year leases from a private company—DKSH (Cambodia) Ltd—at no cost. NCHADS purchases reagents and other consumables from DKSH for the contracting period, which runs until 2025 for the machines in Phnom Penh, and until 2026 for the one in Siem Reap.

Currently, the combined capacity of the three machines is approximately 150,000 viral load tests per annum.⁴ Given current estimates of the total number of people living with HIV on ART per year, the annual number of viral load tests required is expected to remain around 60,000 per year, depending on the number of new initiations, which require two viral load tests in the first year (see Table 2). Therefore, currently there is enough viral load testing capacity in the public sector. NCHADS has indicated that the private company from which they lease the machines is performing upgrades, which will further improve efficiency and thus increase capacity.

Viral Load Test Results Reporting and Turn-Around Time: Overall, the turn-around time from sample collection until the result was ready for dispatch was less than two weeks for a majority of the samples (57 percent) (see Table 3). Ninety-two percent of blood samples reached the lab within a week and the lab processed most of the blood samples (72 percent) within two weeks. According to the 2019 Joint Program Review, there have been further improvements in turn-around time since 2017, when the data was collected.

⁴ Each viral load machine can run two batches per day and each batch consists of 96 blood samples. (If there is a need, a machine can run three batches per day.) It is assumed that each lab runs batches five days per week. Therefore: 96 blood samples per batch x 2 batches per day x 260 working days a year x 3 machines = 149,760 total throughput capacity per year at full utilization.

Table 2. Viral Load Testing Needs for the Next Five Years

| | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---------|---------|---------|---------|---------|
| Estimate number of people living with HIV on ART (a) | 58,957 | 58,637 | 58,200 | 57,727 | 57,214 |
| Estimate number of people living with HIV newly initiated on ART (b) | 834 | 805 | 788 | 766 | 747 |
| Total number of viral load tests required per year per national viral load guidelines [(a) + (b) x 2] | 60,625 | 60,247 | 59,776 | 59,259 | 58,708 |
| Current capacity of three viral load testing machines | 149,760 | 149,760 | 149,760 | 149,760 | 149,760 |

Source: Number of people living with HIV and new infections are based on preliminary 2019 estimates from the Asian Epidemic Model; number of tests are based on standard NCHADS guidelines for testing.

Table 3. Turn-Around Time for Viral Load in 2018**TURN-AROUND TIME FOR TRANSPORTING SAMPLE TO THE LAB**

| | < 1 weeks | 1–8 weeks | > 8 weeks | Missing data |
|------------------------------------|-----------|-----------|-----------|--------------|
| Number of samples | 43,381 | 505 | 26 | 3,426 |
| Percent of total samples processed | 92% | 1% | 0.1% | 7% |

TURN-AROUND TIME FOR PROCESSING SAMPLES IN THE LAB

| | < 1 weeks | 1–8 weeks | > 8 weeks | Missing data |
|------------------------------------|-----------|-----------|-----------|--------------|
| Number of samples | 34,109 | 11,253 | 1,436 | 541 |
| Percent of total samples processed | 72% | 24% | 3% | 1% |

TOTAL TURN-AROUND TIME FROM SAMPLE COLLECTION TO RESULT READY FOR DISPATCH

| | < 1 weeks | 1–8 weeks | > 8 weeks | Missing data |
|------------------------------------|-----------|-----------|-----------|--------------|
| Number of samples | 28,891 | 12,515 | 5,557 | 3,534 |
| Percent of total samples processed | 57% | 25% | 11% | 7% |

Source: CHAI, 2018

While it appears that sample transport and lab processing times are generally quite expedient, there are issues in dispatching results back to providers to then follow up with patients. Currently, 23 of 69 ART sites have remote printing systems installed. Remote printing of results allows providers to obtain viral load test results online. This helps reduce the time between when the viral load test results are available from the lab and received by providers, who can then communicate with patients any actions required. The Joint Program Review recommended scaling up remote printing capacity at the remaining 46 ART sites that do not currently have it.

Financing Viral Load Testing: Currently viral load testing is completely financed by the Global Fund and PEPFAR, including for test reagents and consumables. Staff received per diem and transport allowances for collection and transportation of blood samples to the labs,

including via bus, taxi, or private courier. The Global Fund provided approximately US\$4.1 million for HIV viral load monitoring for the current funding cycle (2018–2020). In 2018, PEPFAR provided US\$31,000 in viral load commodities (3 percent of the total; the remainder funded by the Global Fund) and US\$245,000 toward laboratory systems strengthening (19 percent of the total; the remainder funded by the Global Fund) (PEPFAR, 2019).

Challenges in Viral Load Testing

Based on the above analysis, the following is a summary of some of the critical issues that remain to strengthen viral load testing in Cambodia.

There is an urgent need to ensure various databases are linked and harmonized, and that data entered within the databases are complete. The Joint Program Review highlighted several issues related to the completeness and accuracy of reporting as well as providers' adherence to viral load testing guidelines. Specifically, there are inconsistencies between the number of tests reported by public labs and the number of tests reported in the NCHADS database, and between the viral load and ART databases. This makes it difficult to accurately ascertain the number of people living with HIV on ART who had a viral load test in the past 12 months.

Providers need to be re-trained and incentivized to follow national protocols regarding viral load testing for new patients and those patients with elevated viral loads. The inconsistent application of the viral load testing guidelines at present, and the current median time between tests of 10.8 months, suggest an inefficient use of testing resources for those with undetectable viral loads. At the same time, there is some evidence that patients with elevated viral loads are not getting re-tested six months after the elevated test result. The Clinton Health Access Initiative's 2018 analysis revealed that viral load testing guidelines are not well implemented at ART sites, and approximately 72 percent of patients with a detectable viral load did not receive a repeat viral load test within six months, as required by the guidelines.

Revisions to viral load testing guidelines, training of ART providers, and better engagement of civil society organizations are required to improve the provision of viral load counseling services. This is needed so that patients better understand their viral load test results and undertake appropriate corrective action where necessary. Currently, national viral load testing guidelines do not sufficiently specify the counseling and associated information providers should provide people living with HIV regarding their viral load test. As a result, there is a lack of proper counseling by providers to patients on the importance of their viral load test and actions to undertake depending on the result. There is also a need to better engage civil society organizations to coordinate with providers and patients to support greater understanding of viral load testing results and next steps.

There is a need to improve how providers reach and manage patients whose viral loads are elevated. These patients should be contacted urgently. Efforts should be made to understand the cause of the elevated viral load and appropriate actions to reduce it. Transport of blood samples to labs and processing time at labs appear to be reasonable for most viral load tests. However, there are opportunities to strengthen the process of returning results to providers and to patients. The Joint Program Review recommends scaling up remote printing capacity at the remaining 46 ART sites that do not currently have it. The 23 ART sites with remote printing will require ongoing maintenance support. In addition,

NCHADS indicated a lack of human resource capacity to enter viral load test results into the system, which should be addressed.

Further investment in backup power supplies at viral load testing laboratories and improved internet connectivity at ART sites is required. The Joint Program Review highlights frequent power disconnections without a backup source as a cause for delay in sample processing and results transmission at both laboratories. In addition, at some ART facilities viral load test results were not received in a timely manner via the remote printing system due to lapses in internet connectivity.

There is a need to develop a clear path toward greater domestic ownership and financing of viral load testing for all people living with HIV on ART, aligned with the National AIDS Authority's Fifth National Strategic Plan. The Global Fund remains the major donor supporting viral load testing services, but its budget for viral load testing activities in the next funding cycle (2021–2023) has yet to be determined. Further, NCHADS has raised that some ART sites have encountered challenges with using Global Fund reimbursements because of the complexity of requirements and compliances. Therefore, some facilities are exploring use of their own facility funds to support viral load testing. NCHADS is also exploring if health facilities containing ART sites can use their existing funds to support the maintenance of the remote printing system. The National AIDS Authority's Fifth National Strategic Plan commits to financing 50 percent of the HIV response by 2023. This should include efforts to mobilize domestic resources to expand viral load testing services in accordance with national viral load testing guidelines.

Summary and Discussion

The viral load testing program in Cambodia has achieved considerable success with 83 percent of people living with HIV on ART receiving a viral load test, and 95 percent of those tested being virally suppressed. These results have been achieved through the public sector alone, with the private sector contribution thus far being unknown due to lack of reporting. The primary challenge that remains is to scale up viral load testing to all people living with HIV on ART and maintain high suppression rates. There is sufficient viral load testing throughput capacity with the three machines at the two public labs for Cambodia to achieve viral suppression among 95 percent of people on ART, however several issues remain in implementation. These issues include increasing data quality and reporting completeness, improving provider adherence to viral load clinical guidelines, strengthening counseling associated with viral load testing, more timely communication of test results, investing in infrastructure and connectivity, and increasing reliance on domestic resources to fund the viral load program.

None of the issues identified readily lend themselves to private sector intervention within the current system. Private sector involvement in viral load testing has evolved based on demand for services—some people living with HIV choose to access ART services through private clinicians; those clinicians then refer patients to private laboratories for viral load testing. In this regard, more can be done to strengthen reporting from the private sector to NCHADS on the private sector's participation in the HIV response, and to clarify the regulatory environment that governs private sector provision of viral load testing services. NCHADS acknowledges the role of the private sector and is taking forward both of these initiatives.

Clinton Health Access Initiative (CHAI). 2018. “Viral Load and Early Infant Diagnosis Scale-Up in Cambodia.” (Unpublished)

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