June 2016

Reaching the Third 90:
Routine Viral Load Scale-up Readiness in Swaziland: Laboratory Perspective

Tesfay Abreha[1], Gibson Mtisi[1], Gugu Maphalala[1, 2], Pido Bongomin[1], Altaye Kidane[1], Ruben Sahabo[1], Bereket Alemayehu[3], Sindisiwe Dlamini[2]
[1]ICAP in Swaziland, [2]Swaziland Health Laboratory Services, [3]Columbia University ICAP, New York, USA

Background

As part of the global initiative to end the HIV epidemic by 2030, Swaziland adopted an integrated HIV treatment management approach to ensure that 90% of those who are HIV-positive know their status, 90% of those who are eligible are put on anti-retroviral treatment (ART), and 90% of those on ART achieve viral suppression. By the end of December 2015, data from the Swaziland National AIDS Program (SNAP) showed that just over 150,000 patients are active on ART. Even though retention on ART at 12 months is at 91%, reaching the third 90 will require routine monitoring of viral load suppression among patients on ART. To be able to absorb the anticipated increased demand for viral load (VL) testing, the Swaziland National Molecular Reference Laboratory (NMRL) has embarked on intense preparations to ensure that there is adequate capacity for collection, processing, referral and analysis of VL samples from the Swaziland Health Laboratory Services (SHLS) network. To inform this preparatory phase, context analysis for readiness and capacity to conduct VL testing to reach the third 90 was assessed and programmatic areas identified for intervention.

Context Analysis and Programmatic Strategic Approaches

Equipment and testing capacity

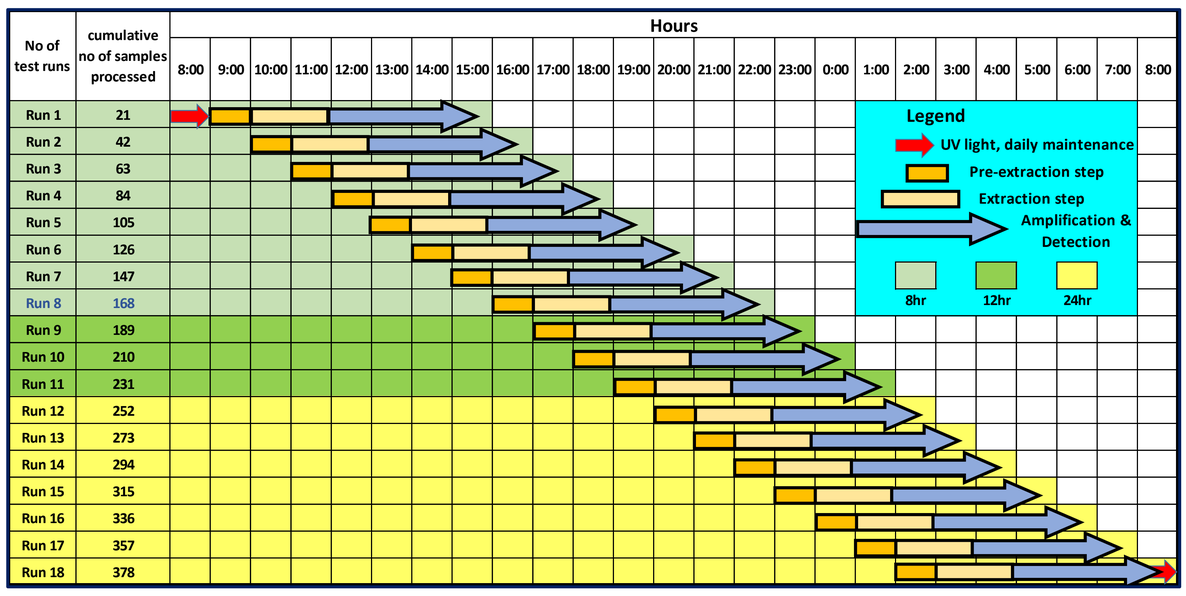
Context

The NMRL is equipped with three COBAS AmpliPrep/COBAS TaqMan 96 (CAP/CTM96) systems for conducting both Early Infant Diagnosis (EID) and VL. Currently, the NMRL has capacity to conduct 4000-5000 targeted VL and 1000 EID tests per month. The current analysers are old with frequent down times taking away an estimated 33% of the time out of work. The NMRL was also affected by shortage of trained laboratory personnel.

Strategic approach

- Procurement of additional VL analysers to increase testing volume and minimize machine down time
- Hiring and training of additional laboratory technologists
- Work flow optimization by improving sample flow from sample reception to testing , maximizing machine output, and result return. Different workflow optimization scenarios have been designed to maximize testing capacity of the CAP/CTM 96 at the NMRL and absorb the VL testing demands (Fig 1)

Fig 1: Work flow Optimization by 8hrs (168 samples), 12hrs (231 samples) and 24hrs (378 samples) per CAP/CTM 96 analyser*



With the assumption that one CAP/CTM 96 works under IDEAL conditions with no down time

- *Scenario 1: 8hr working day: 3696 tests per month and 44,352 tests per annum per machine*
- *Scenario 2: 12hr working day: 5082 tests per month and 60,984 tests per annum per machine*
- *Scenario 3: 24hr working day: 8316 tests per month and 99,792 tests per annum per machine*

VL sample collection and referral system capacity

Context

During 2015, 156 ART sites referred plasma samples for targeted VL. However, only 60 health facilities have laboratory personnel to work on whole blood collection and plasma processing. 16 out of the 60 facilities lack centrifuges for plasma preparation. The SHLS has 10 vehicles dedicated for sample transport. However, 4 of these vehicles require frequent maintenance and are often out of service. As a result, the current national sample transport system is able to collect plasma samples only twice a week from facilities. Therefore, facilities have to queue for VL testing and return of results.

Strategic approach

- Procurement of 4 additional refrigerated vehicles to strengthen sample transportation and transition from twice weekly to daily pick-ups
- Procurement of centrifuges for facilities with laboratory personnel
- Introduction of dried blood spots (DBS) specimen as an alternate sample of choice in order to reach peripheral facilities
- Development of standard operating procedures (SOP) and job aids for plasma and DBS sample collection, processing, storage and transport
- Development of a training plan for sample collection, storage and transport

National leadership and harmonization of efforts

Context

The Ministry of Health is working in close collaboration with different partners to ensure that the set goals are met. There are different forums including the HIV Care and Treatment technical working group, HIV drug resistance technical working group and the VL task force who are working together to improve HIV/AIDS control and prevention in the country. However, there is currently no laboratory technical working group with a mandate to focus on all aspects of the laboratory in general and guide implementation of laboratory quality management system in particular.

Strategic approach

- Outlining terms of reference for the VL task force
- Establishing a National Laboratory Technical Working Group (NLTWG)
- Coordination of technical assistance from stakeholders both in country and abroad to strengthen laboratory systems in preparation for VL scale-up

Lessons Learned

- Countries should give due emphasis for capacity building activities in preparation for implementation of VL scale up for routine monitoring of ART
- Introduction of a stringent service contract with the vendor to ensure timely service and preventive maintenance of the CAP/CTM 96 analyzers can markedly increase testing capacity by reducing machine down-times.
- Swaziland needs decentralization of viral load testing to a second satellite laboratory in one of the four regions
- Work flow optimization and the introduction of a shift system will enable processing of samples as soon as they arrive in the laboratory and increase the efficiency of the CAP/CTM 96 analysers
- VL scale-up should be accompanied by measures to ensure adequate capacity building of laboratory personnel, as well as measure to retain those who are trained in order to maximize VL testing services

This work is supported by PEPFAR through the CDC. The content are the responsibility of ICAP and do not necessarily reflect the views of United States Government

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