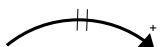


A casual loop diagram(CLD) depicting the factors affecting HIVDR was developed using Stella Architect version 3.7.1. The key in **Table 1** explains the meanings of all signs and symbols used in the diagrams in this document.

KEY:

SYMBOL	MEANING
	Direct relationship where an increase in one variable leads to an increase in another, and vice versa
	Inverse relationship where an increase in one variable leads to a decrease in another, and vice versa.
	Indicates a delay or time lag between cause and effect
	A feedback loop that amplifies change, leading to exponential growth or decline.
	A feedback loop that stabilizes the system by counteracting change, maintaining equilibrium.

The CLD displays eight balancing loops (B1-8) and six reinforcing loops(R1-6) as displayed in **Figure 1**. Each loop is displayed from **Figure 2-15**.

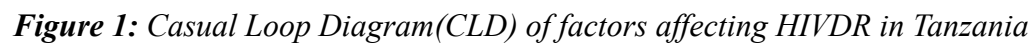


Figure 1: Casual Loop Diagram(CLD) of factors affecting HIVDR in Tanzania

BALANCING LOOPS

Balancing loop B1: In this loop, a high HIV program budget would lead to increased health system strengthening capacity including laboratory capacity. Better laboratory capacity would mean monitoring of viral load and HIVDR drug resistance is improved and appropriate effective antiretroviral therapy(ART) is provided, ultimately leading to more people achieving viral suppression. With more people living with HIV being virally suppressed, there less transmission of HIV and hence reduced new HIV infections. Less reported new infections would mean lower HIV incidence rate which overtime would make HIV less of a priority and lead to lower budget allocations for the HIV program (*Figure 2*).

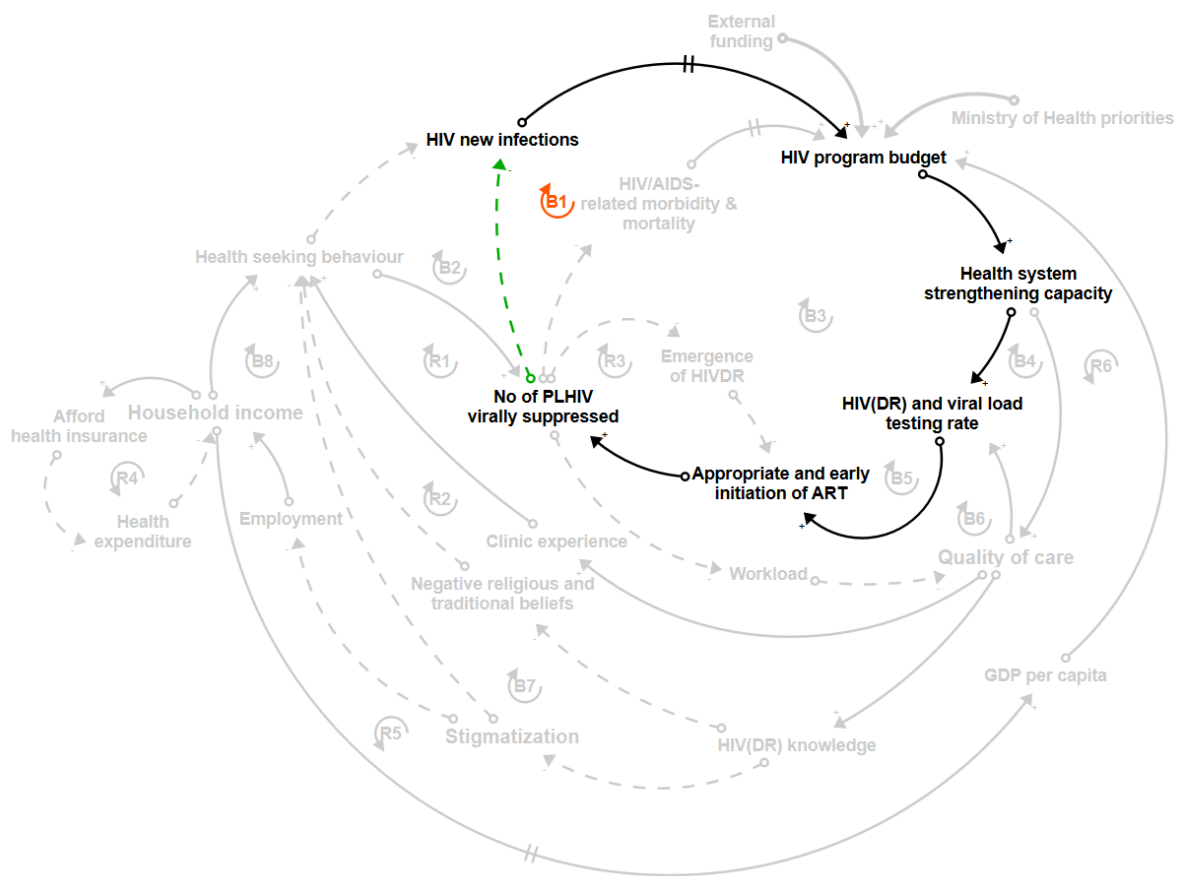


Figure 2: Balancing B1 of the CLD depicting the factors influencing HIVDR in Tanzania

Balancing loop B2: In this loop, a high HIV program budget would lead to increased health system strengthening capacity including laboratory capacity, improved infrastructure, staff incentives and adequate staffing at healthcare facilities. These would improve privacy for patients at clinics, reduce healthcare workload and motivate staff, thus improving the quality of care. Shorter waiting times, better clinician attitudes and longer counselling time would improve the clinic experience of patients therefore promoting health seeking behaviors like adherence to ART and retention in care. Health seeking behaviors ultimately lead to viral suppression and prevent further transmission of HIV infection and as a result less new infections. Less reported new infections would mean lower HIV incidence rate which overtime would make HIV less of a priority and lead to lower budget allocations for the HIV program (*Figure 3*).



Figure 3: Balancing loop B2 of CLD depicting factors influencing HIVDR in Tanzania

Balancing loop B3: In this loop, a high HIV program budget would lead to increased health system strengthening capacity including laboratory capacity. Better laboratory capacity would mean monitoring of viral load and HIVDR drug resistance is improved and appropriate effective antiretroviral therapy(ART) is provided, ultimately leading to more people achieving viral suppression. Virally suppressed individuals are less likely to progress to advanced stages of disease and develop acquired immunodeficiency syndrome (AIDS) and ultimately death. Lower HIV morbidity and mortality reported would make HIV less of a priority and lead to lower budget allocations for the HIV program (*Figure 4*).

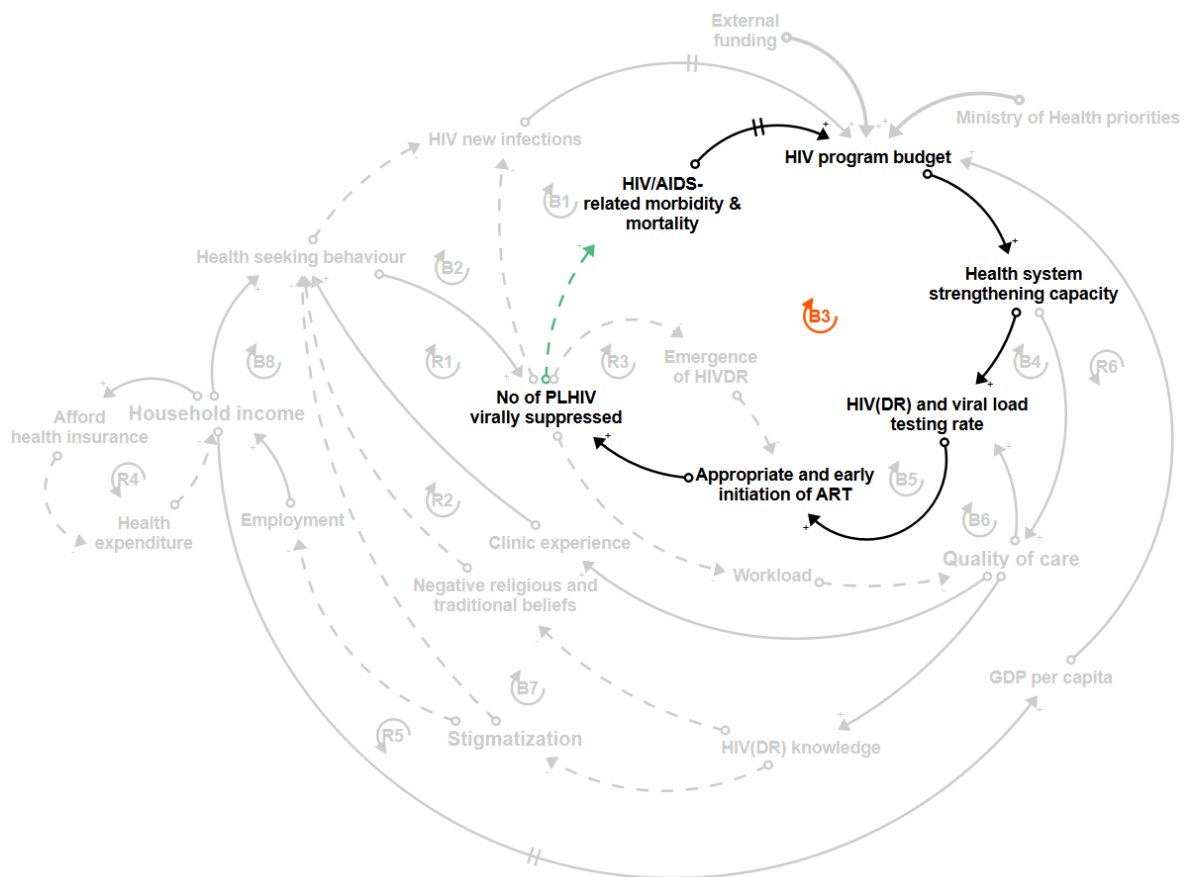


Figure 4: Balancing loop B3 of CLD depicting factors influencing HIVDR in Tanzania

Balancing loop B4: In this loop, a high HIV program budget would lead to increased health system strengthening capacity including laboratory capacity, improved infrastructure, staff incentives and adequate staffing at healthcare facilities. These would improve privacy for patients at clinics, reduce healthcare workload and motivate staff, thus improving the quality of care. Shorter waiting times, better clinician attitudes and longer counselling time would improve the clinic experience of patients therefore promoting health seeking behaviors like adherence to ART and retention in care. Virally suppressed individuals are less likely to progress to advanced stages of disease and develop acquired immunodeficiency syndrome (AIDS) and ultimately death. Lower HIV morbidity and mortality reported would make HIV less of a priority and lead to lower budget allocations for the HIV program (*Figure 5*).

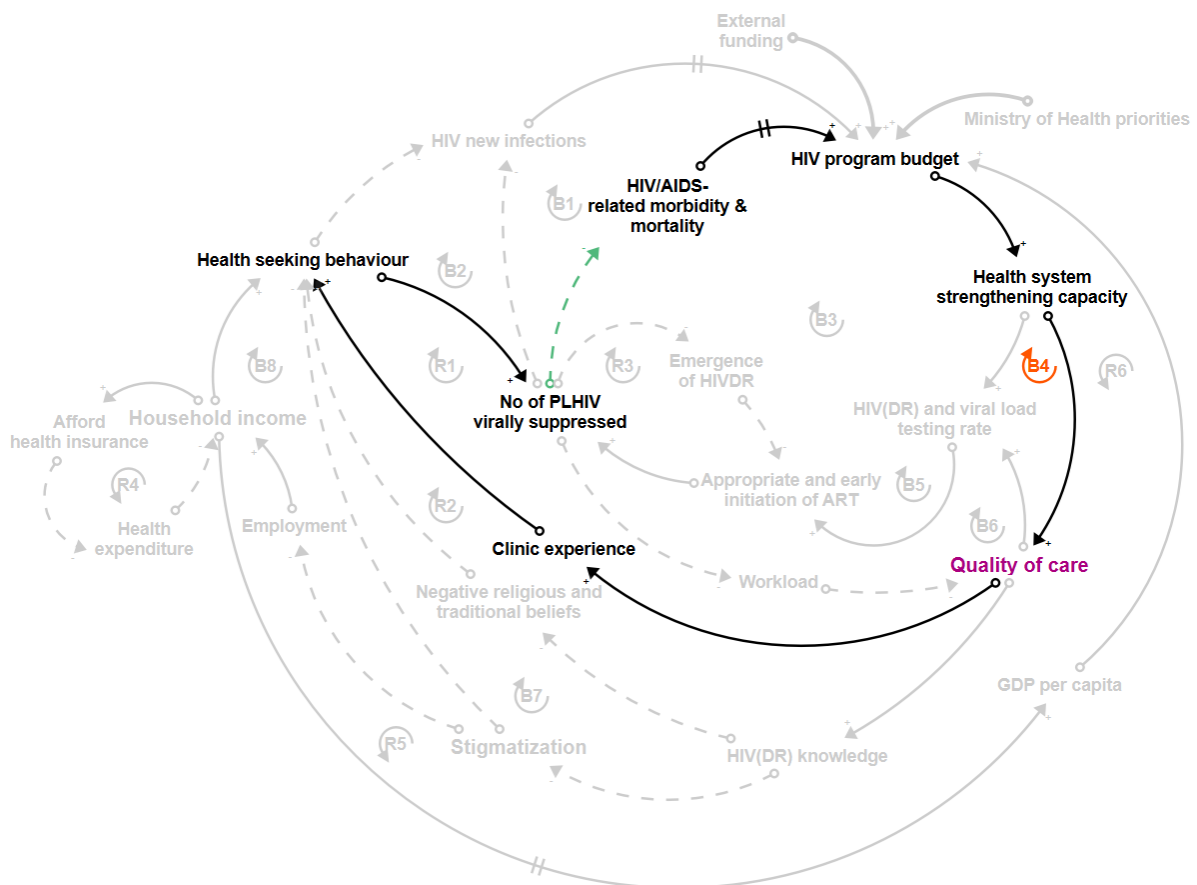


Figure 5: Balancing loop B4 of CLD depicting factors affecting HIVDR in Tanzania

Balancing loop B5: In this loop, a high HIV program budget would lead to increased health system strengthening capacity including laboratory capacity. Better laboratory capacity would mean monitoring of viral load and HIVDR drug resistance is improved and appropriate effective antiretroviral therapy(ART) is provided, ultimately leading to more people achieving viral suppression. Virally suppressed individuals are less likely to progress to advanced stages of disease and develop acquired immunodeficiency syndrome (AIDS) and ultimately death. Lower HIV morbidity and mortality reported would make HIV less of a priority and lead to lower budget allocations for the HIV program (*Figure 6*).

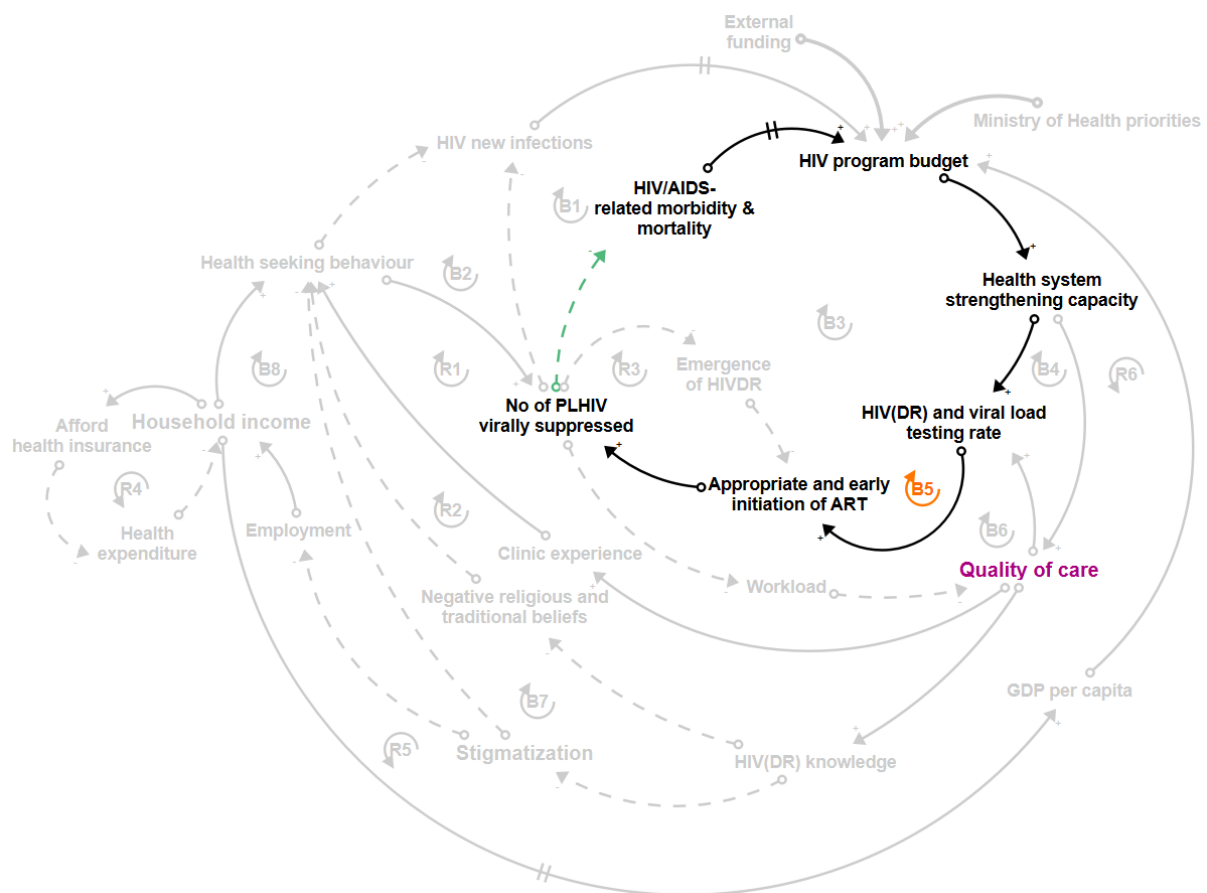


Figure 6: Balancing loop B5 of the CLD depicting factors influencing HIVDR in Tanzania

Balancing loop B6: In this loop, a high HIV program budget would lead to increased health system strengthening capacity including laboratory capacity, improved infrastructure, staff incentives and adequate staffing at healthcare facilities. These would improve privacy for patients at clinics, reduce healthcare workload and motivate staff, thus improving the quality of care. This will also mean that clinicians have more time to counsel patients and furnish them with information about HIV(DR) and debunk negative traditional and religious beliefs for better adherence to ART and retention in care. Improving these health seeking behaviors ultimately leads to viral suppression and prevents further transmission of HIV infection and as a result less new infections. Less reported new infections would mean lower HIV incidence rate which overtime would make HIV less of a priority and lead to lower budget allocations for the HIV program (*Figure 7*).

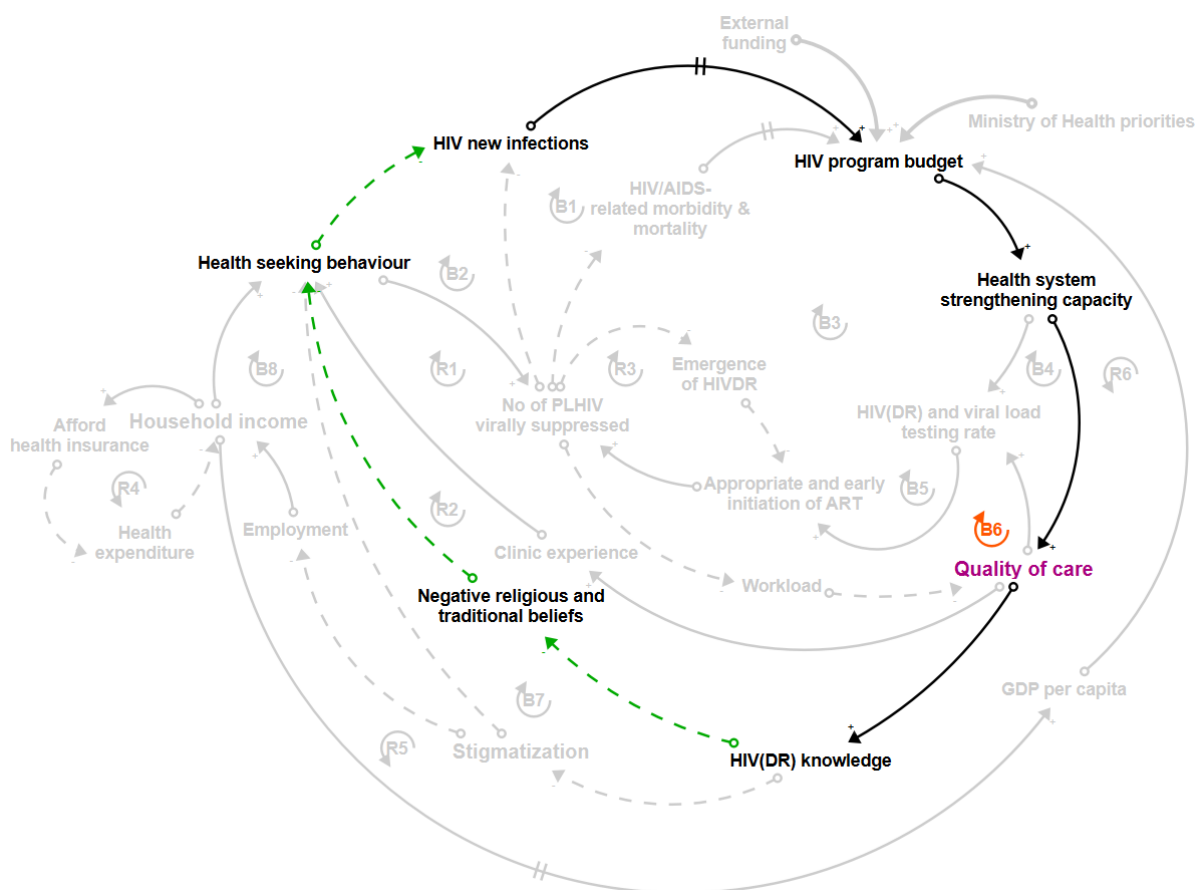


Figure 7: Balancing loop B6 of the CLD depicting factors affecting HIVDR in Tanzania

Balancing loop B7: In this loop, a high HIV program budget would lead to increased health system strengthening capacity including laboratory capacity, improved infrastructure, staff incentives and adequate staffing at healthcare facilities. These would improve privacy for patients at clinics, reduce healthcare workload and motivate staff, thus improving the quality of care. This will also mean that there are resources available for public health education to reduce stigmatization. Reduced stigma means less fear of involuntary HIV status disclosure leading to higher adherence to ART and retention in care. Improving these health seeking behaviors ultimately leads to viral suppression and prevents further transmission of HIV infection and as a result less new infections. Less reported new infections would mean lower HIV incidence rate which overtime would make HIV less of a priority and lead to lower budget allocations for the HIV program (*Figure 8*).

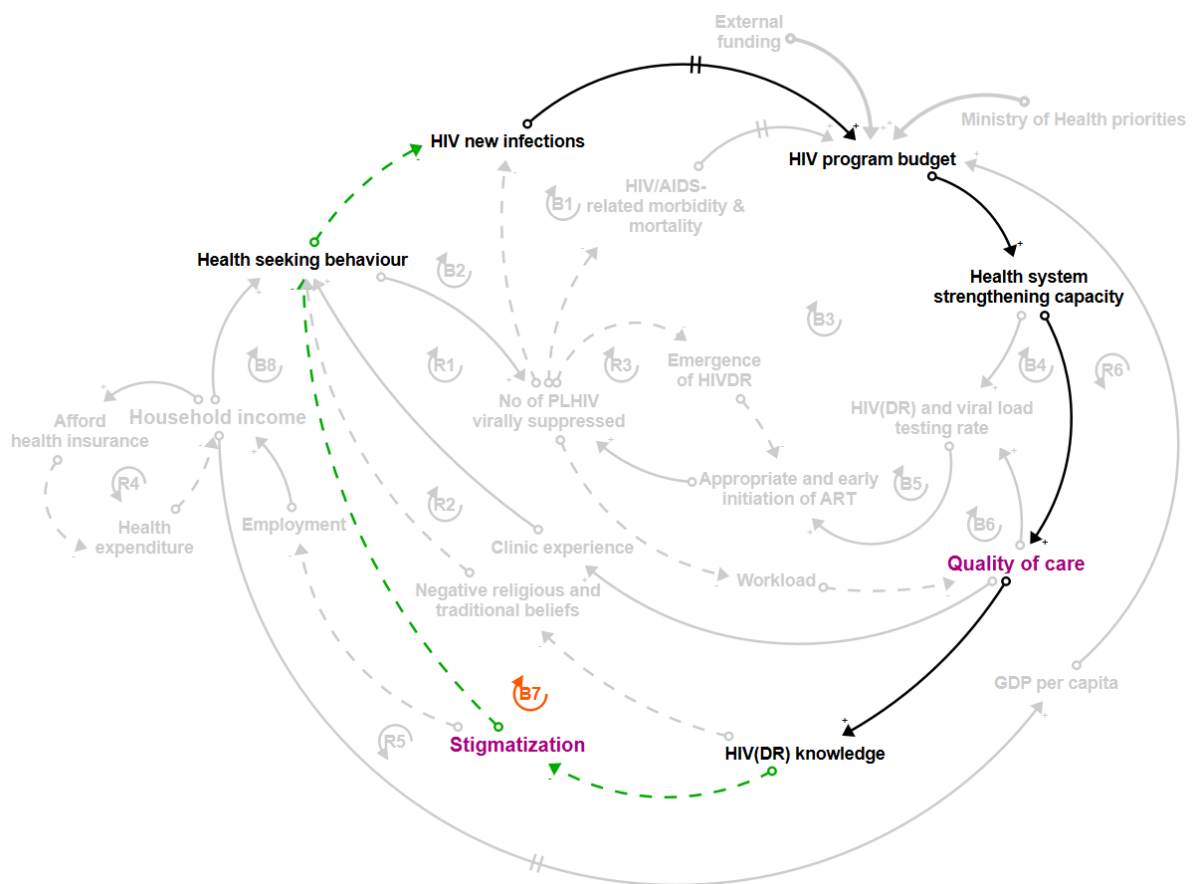


Figure 8: Balancing loop B7 of the CLD depicting factors affecting HIVDR in Tanzania

Balancing loop B8: In this loop, a high HIV program budget would lead to increased health system strengthening capacity including laboratory capacity, improved infrastructure, staff incentives and adequate staffing at healthcare facilities. These would improve privacy for patients at clinics, reduce healthcare workload and motivate staff, thus improving the quality of care. This will also mean that there are resources available for public health education to reduce stigmatization. Reduced stigma means more employment opportunities for PLHIV and more open communication about days off for clinic refill leading to more financial stability. This means that more PLHIV can afford transport to clinic for refill and have food security, thus achieving higher adherence to ART and retention in care. Improving these health seeking behaviors ultimately leads to viral suppression and prevents further transmission of HIV infection and as a result less new infections. Less reported new infections would mean lower HIV incidence rate which overtime would make HIV less of a priority and lead to lower budget allocations for the HIV program (*Figure 9*).

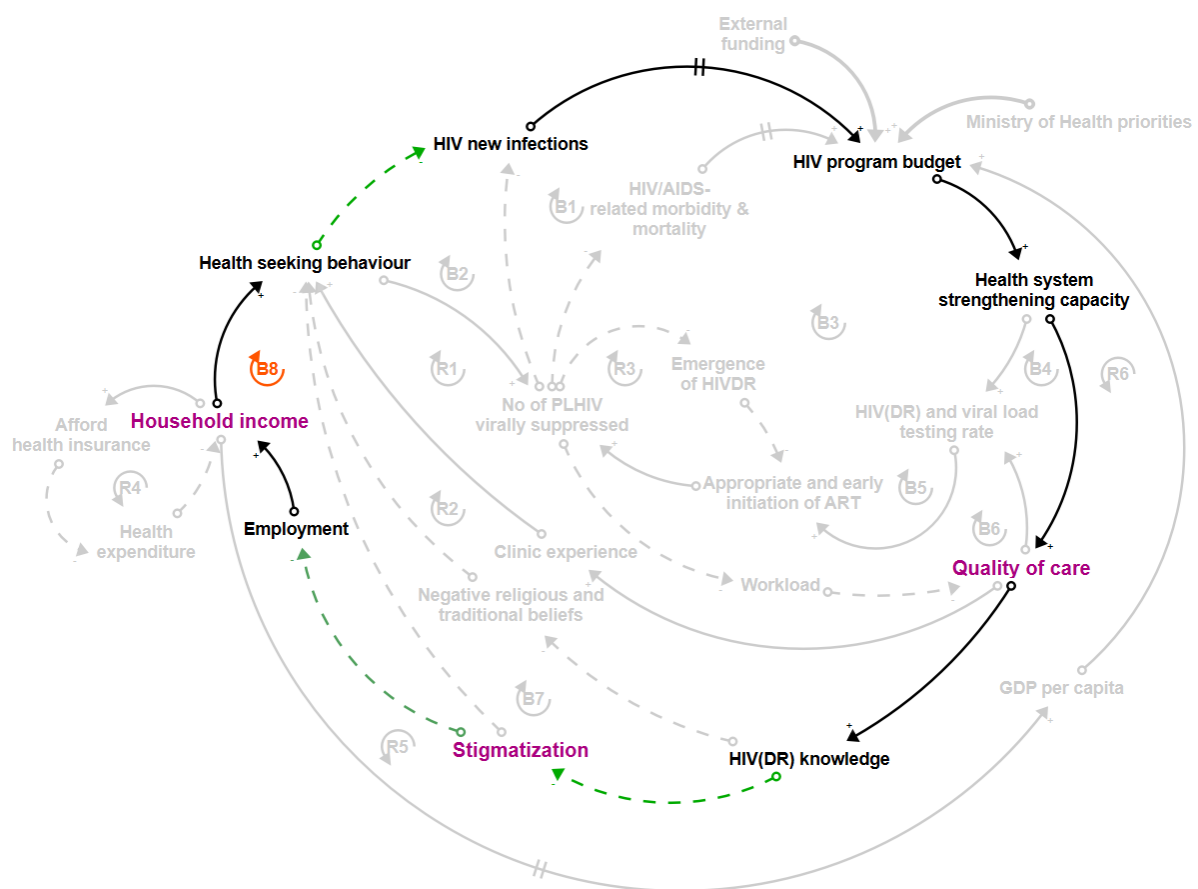


Figure 9: Balancing loop B8 of CLD depicting factors affecting HIVDR in Tanzania

REINFORCING LOOPS

Reinforcing loop R1: In this loop Improving health seeking behaviors like adherence to ART and retention in care ultimately leads to higher rates of viral suppression. Patients who are virally suppressed visit the clinic less often and also are less likely to get opportunistic infections leading less workload at health facilities. This then leads to less waiting times and more time for clinicians to spend per patient hence improved clinic experience and thus leading to even more retention in care and other health seeking behaviors(**Figure 10**).

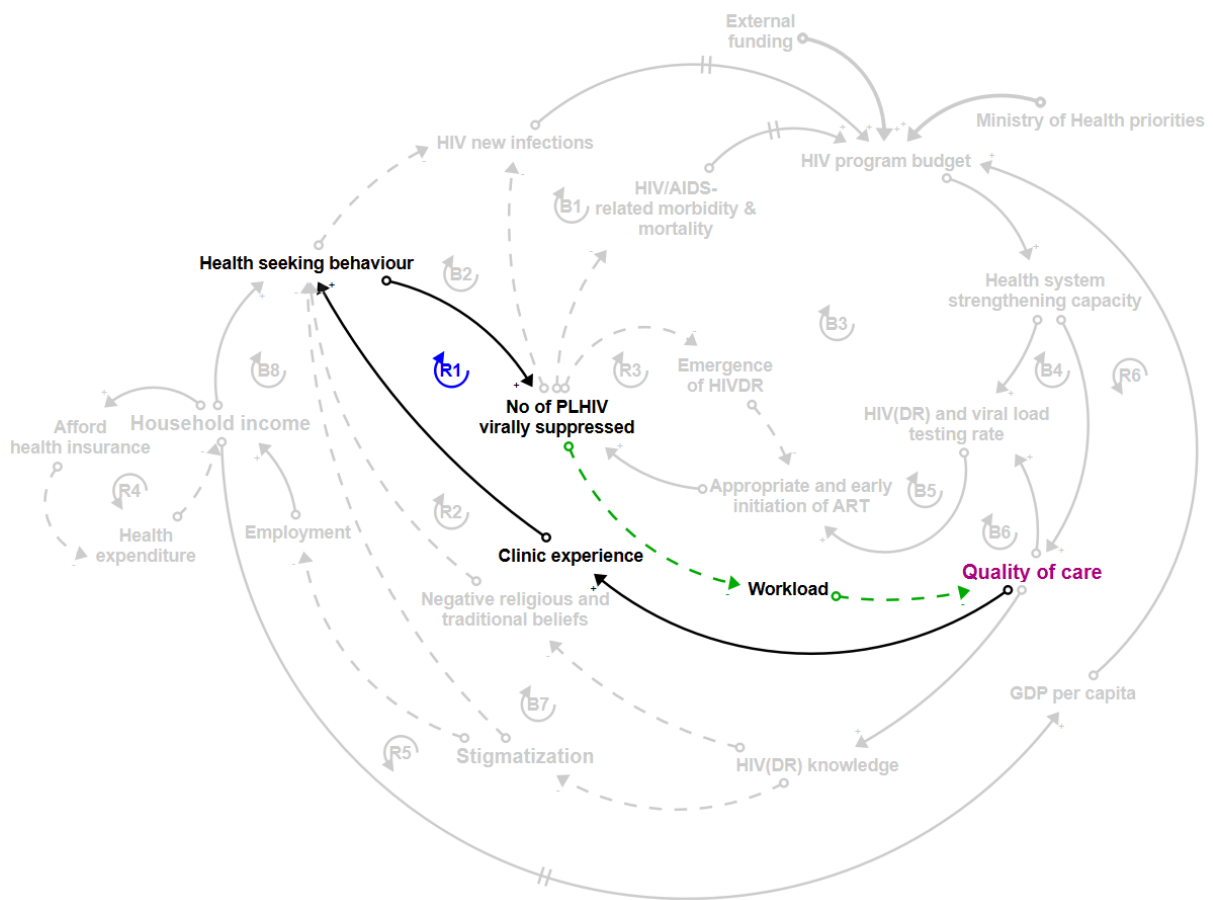


Figure 10: Reinforcing loop R1 of the CLD depicting factors affecting HIVDR in Tanzania

Reinforcing loop R2: In this loop Improving health seeking behaviors like adherence to ART and retention in care ultimately leads to higher rates of viral suppression. Patients who are virally suppressed visit the clinic less often and also are less likely to get opportunistic infections leading less workload at health facilities. This will also mean that clinicians have more time to counsel patients and furnish them with information about HIV(DR) and debunk negative traditional and religious beliefs for better adherence to ART and retention in care. Improving these health seeking behaviors ultimately leads to even higher rates of viral suppression (*Figure 11*).

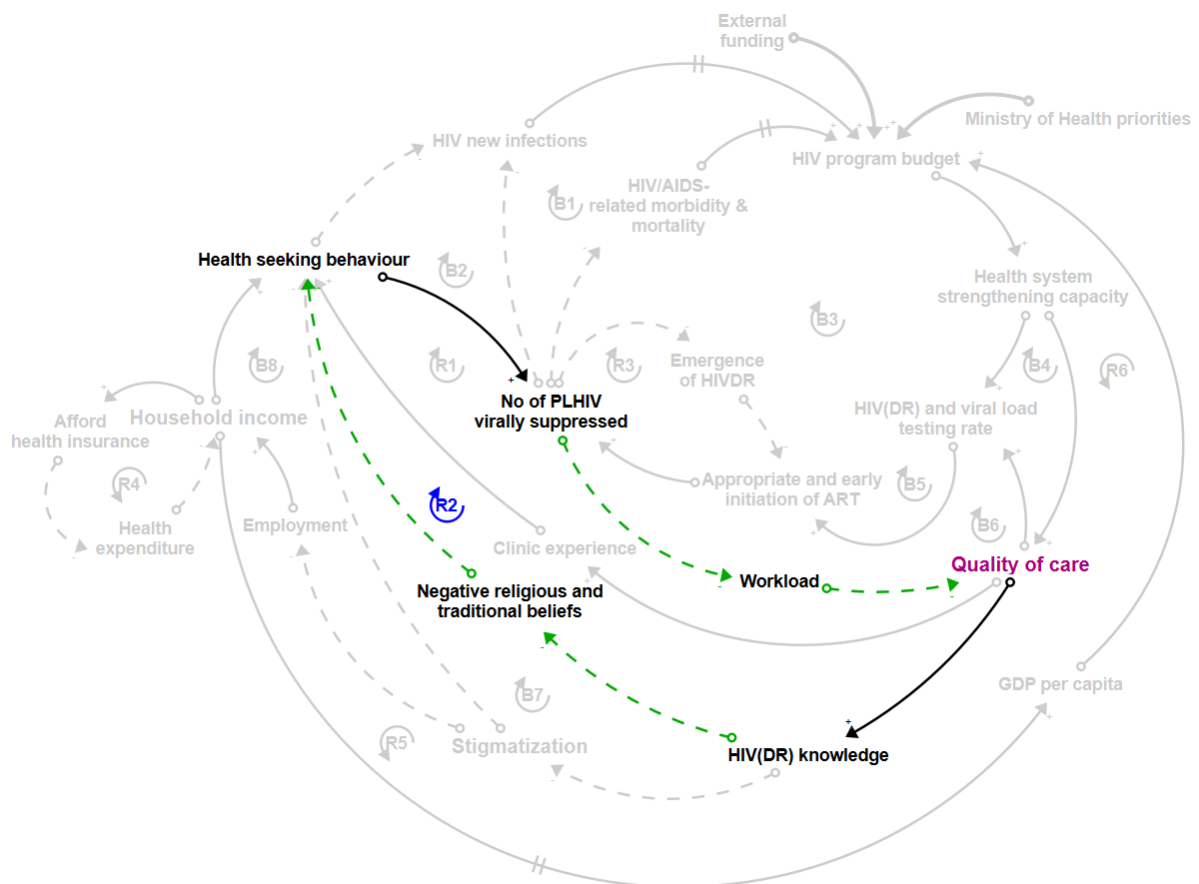


Figure 11: Reinforcing loop R2 of CLD depicting factors affecting HIVDR in Tanzania

Reinforcing loop R3: Appropriate and early initiation of effective ART to diagnosed patients leads to higher levels of viral suppression. Being virally suppressed reduces the chances of developing and transmitting HIVDR. This means that the available ART remains effective and continues to be used for early and appropriate therapy leading to even more virally suppressed individuals (*Figure 12*).



Figure 12: Reinforcing loop R3 of CLD depicting factors affecting HIVDR in Tanzania

Reinforcing loop R4: Sufficient household income ensures a patient's ability to pay for the contributions of health insurance schemes. Being part of an insurance scheme means there is less out of pocket expenditure for health which is often more costly than paying for insurance. The money saved then further contributes to increasing household income (*Figure 13*).

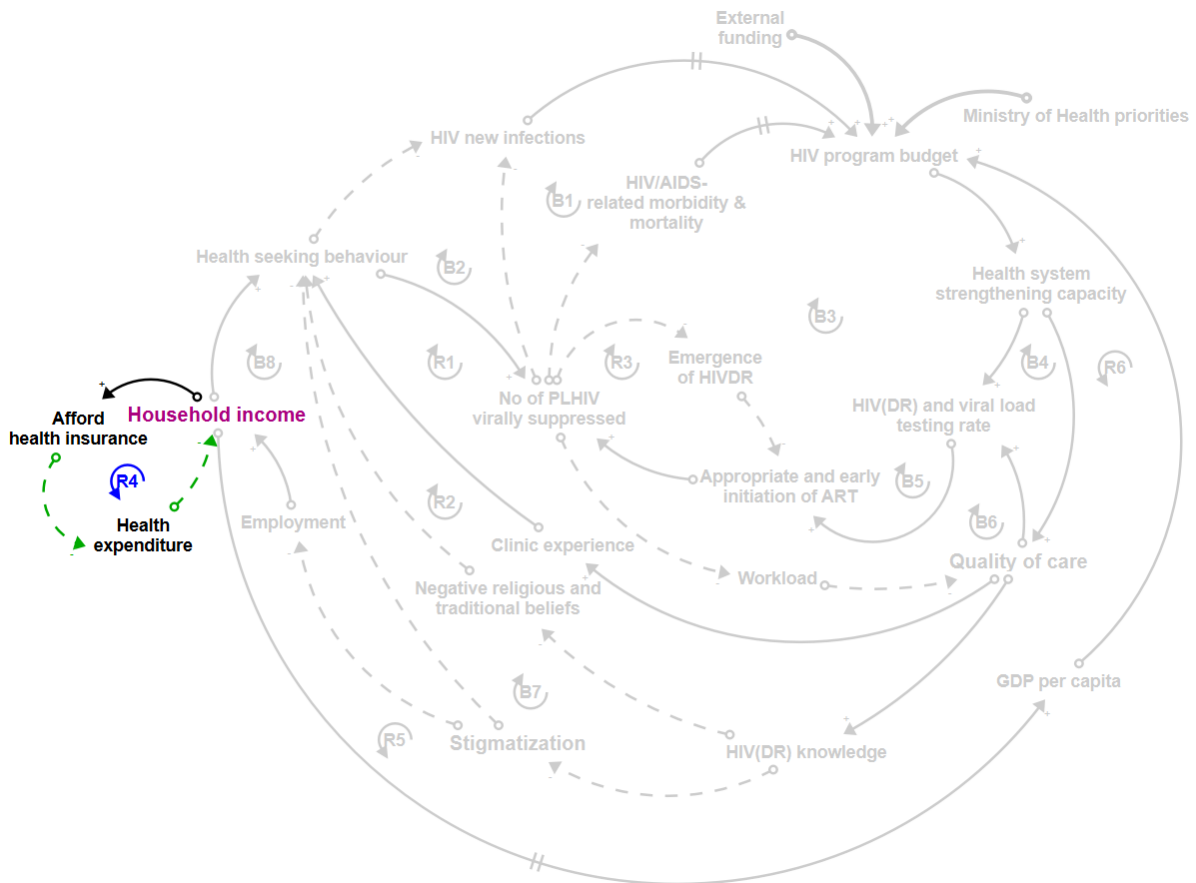


Figure 13: Reinforcing loop R4 of the CLD depicting factors affecting HIVDR in Tanzania

Reinforcing loop R5: In this loop, a high HIV program budget would lead to increased health system strengthening capacity including laboratory capacity, improved infrastructure, staff incentives and adequate staffing at healthcare facilities. These would improve privacy for patients at clinics, reduce healthcare workload and motivate staff, thus improving the quality of care. This will also mean that there are resources available for public health education to reduce stigmatization. Reduced stigma means more employment opportunities for PLHIV and more open communication about days off for clinic refill leading to more financial stability. Overtime, the increase in household income contributes to the GDP per capita of the country. The improved GDP per capita means that a larger amount can be budgeted for the HIV program further strengthening the HIV management and treatment program (*Figure 14*).

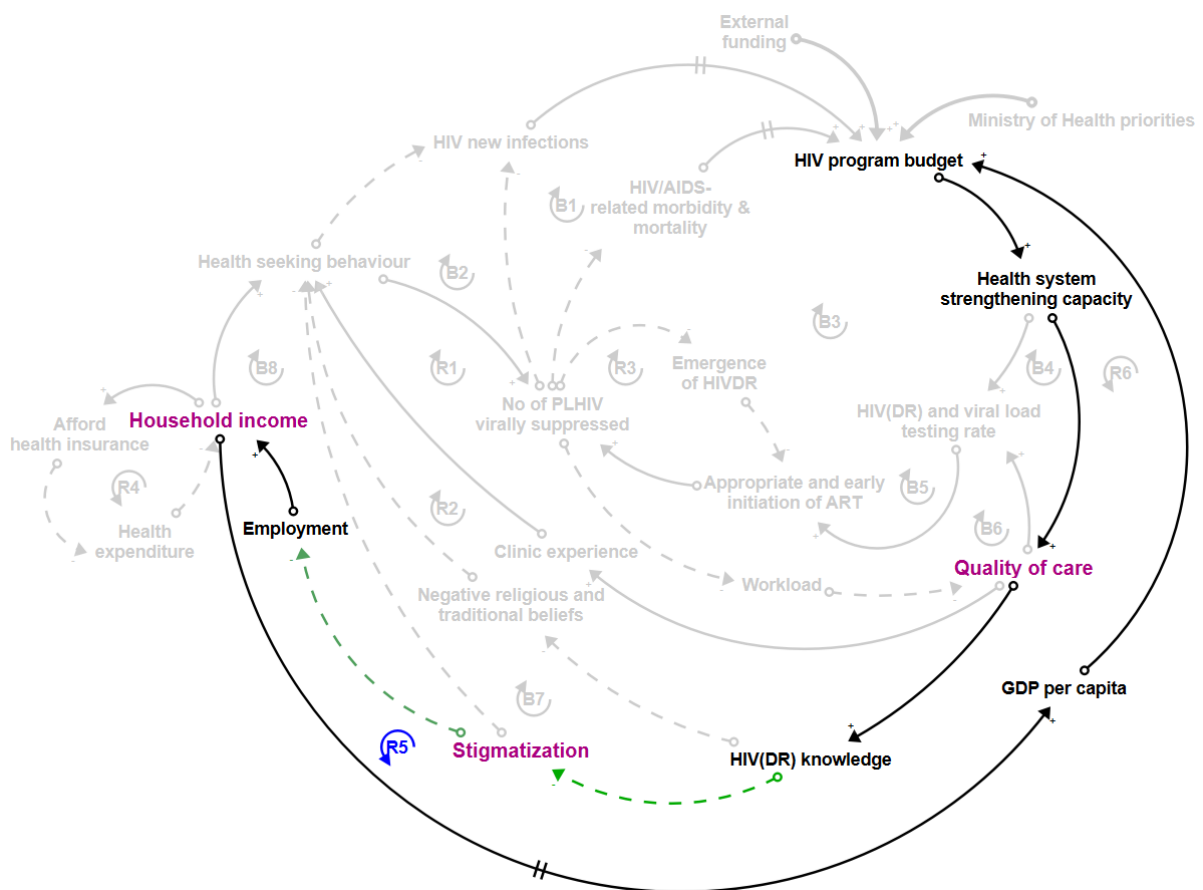


Figure 14: Reinforcing loop R5 of the CLD depicting factors influencing HIVDR in Tanzania

