

# HIV test–treat–retain cascade analysis

## Guide and tools

2017 *Second edition*



**World Health  
Organization**

Regional Office for the Eastern Mediterranean



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## Foreword to the revised edition

This is the second edition of the test–treat–retain cascade analysis guide for HIV published by the World Health Organization (WHO) Regional Office for the Eastern Mediterranean. This new edition builds on experiences of cascade analysis in multiple countries. It is aligned with new WHO guidelines on HIV testing (1) and treatment (2), and the monitoring and evaluation framework that has been introduced in WHO’s *Consolidated strategic information guidelines for HIV in the health sector* (3). Indicators marking the steps along the HIV test–treat–retain cascade are drawn from the global top 10 indicators and additional indicators recommended in the above guidelines. The methodology section introduces the concepts and use of cross-sectional and longitudinal data for HIV test–treat–retain cascade analysis. Additional guidance on how to target HIV testing services in order to scale-up HIV diagnosis most efficiently has also been included.





# Introduction

With the Sustainable Development Goals (SDGs), the United Nations General Assembly adopted in 2015 a new target to end the AIDS epidemic by 2030 (4). To this end, UNAIDS established the following ambitious but achievable new targets for HIV treatment scale-up beyond 2015 (5).

- By 2020, 90% of all people living with HIV (PLHIV) will know their HIV status.
- By 2020, 90% of all people with diagnosed HIV infection will receive sustained antiretroviral therapy (ART).
- By 2020, 90% of all people receiving ART will have viral suppression.

To achieve these goals, WHO promotes evidence-based interventions and service-delivery models for the early diagnosis of HIV infection, timely initiation of ART and retention in quality lifelong HIV care and treatment. The new WHO guidelines on the use of antiretroviral medicines (ARVs) recommend treating all PLHIV as soon as possible after infection in order to enhance individual treatment outcomes and to harness the prevention benefits of viral load (VL) suppression.

While countries in the WHO Eastern Mediterranean Region have succeeded over the past decade in increasing the number of PLHIV receiving life-saving ART, coverage of ART is, at just 14%, the lowest of all WHO regions. Moreover, while new HIV infections are on the decline globally they continue to increase in the Region, further increasing the number of people who need treatment.

The low ART coverage is the result of an accumulation of the weaknesses and failures of current HIV control strategies and programmes. New HIV infections are not prevented because key populations at increased risk of HIV infection do not have access to prevention services that respond effectively to their needs. The majority of PLHIV in the Region are unaware of their HIV infection, and health systems still fail to engage many people who have tested positive for HIV in life-saving treatment.

HIV test–treat–retain cascade analysis has become a widely applied methodology to describe and quantify losses and missed opportunities to engage and retain PLHIV along a continuum of care, and to guide further analysis to explore the reasons for these losses. In this way, HIV test–treat–retain cascade analysis helps to identify priorities and to address barriers that prevent PLHIV from accessing HIV diagnosis and treatment and achieving VL suppression.

## Purpose of this guide

The WHO Regional Office for the Eastern Mediterranean has developed this guide to help national AIDS programme managers and their partners carry out the HIV test–treat–retain cascade analysis in order to: assess their performance in terms of engaging PLHIV in a continuum of HIV care; systematically analyze causes for successes and failures; and use the findings for programme and service-delivery improvement.

Cascade analysis should be used for periodical programme reviews and the main indicators defining the cascade used for routine programme monitoring. A participatory process for conducting the cascade analysis is proposed in order to achieve broad stakeholder engagement, consensus on the findings of the analysis and ownership of the conclusions and recommendations resulting from it. It can also be used for targeted reviews of the performance of specific components of a countries' health care system for HIV, such as single clinics, services for key populations or the HIV programme at a subnational level.

## How to use this guide

The guide is presented in three main parts. The first part provides an overview of the concepts that underpin the continuum of care and the HIV test–treat–retain cascade analysis. The second part describes the methodology used and introduces the indicators to be measured along the cascade. The third part provides guidance on the analysis of each step of the cascade, including proposed key questions for exploring the underlying causes of the gaps seen in the cascade.

At the back of the guide, a set of practical tools is provided to help conduct the cascade analysis. These include: definitions of the indicators used in the cascade (Tool 1); a matrix for analysing the testing gap and setting targets for HIV testing services (Tool 2); analysis tools such as a fishbone diagram and problem/solution trees that can be used for categorizing the root causes of the gaps and identifying solutions (Tool 3); generic terms of reference for the steering committee, the technical working group and the national consultant (Tool 4); a concept note for a stakeholders' consultation (Tool 5); and the cascade analysis report outline (Tool 6). These tools are referred to in the guide where relevant.

# Concepts

## Continuum of care

The continuum of care is a concept that frames health care services in a patient-centred way. The continuum of care for PLHIV extends along steps from prevention interventions, HIV testing through enrolment in HIV care, ART initiation and retention in life-long ART (Fig. 1).

At each step of this continuum of care, the health system succeeds in engaging a certain proportion of beneficiaries (PLHIV) and fails to engage or retain others. The continuum does not dictate the means and models for service delivery, but provides a standardized way of analysing the performance of different approaches to the delivery of HIV testing, care and treatment services. The losses from one step to another can be visualized in the format of a HIV test–treat–retain cascade.



**Fig. 1. Continuum of HIV prevention, diagnosis, treatment and care**

## The test–treat–retain cascade

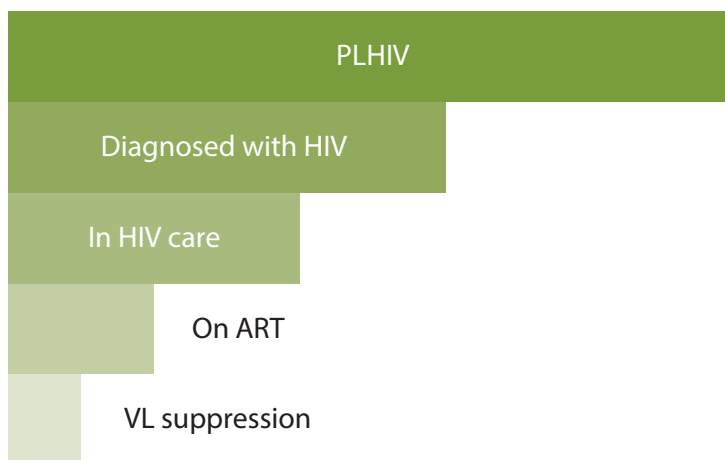
The HIV test–treat–retain cascade chart is a visual representation of the number or percentage of PLHIV who actually receive the benefits of HIV services along the continuum of care (Fig. 2). Each bar of the cascade chart represents absolute numbers or percentages of PLHIV reaching each step, and the denominator is the total number of possible beneficiaries (PLHIV).

Usually, the estimated number of PLHIV (the first bar of the cascade graph) is used as the relevant denominator for each of the subsequent indicators along the cascade.

As stated earlier, the main objective of an analysis of the HIV test–treat–retain cascade is to describe and quantify losses and missed opportunities to engage and retain PLHIV along the continuum of care, and to guide further analysis to explore the reasons for these losses.

Analysis of the first step in the cascade, that is getting to know one’s HIV status (HIV testing), may reveal low demand for, access to and utilization of HIV testing and counseling services. This situation prevails in the Region and results in the majority of PLHIV being unaware of their HIV status. Once diagnosed with HIV infection, many PLHIV are lost before they are linked to care or before they are initiated on ART.

Failure to retain PLHIV on life-long treatment after treatment initiation is another reason for loss of PLHIV and for the failure to achieve and sustain VL suppression. It is important to bear in mind that the situation at each step of the continuum of care



**Fig. 2.** HIV test–treat–retain cascade

may be different for different population groups and in different geographical areas, and may require different solutions.

Identifying losses and missed opportunities for engaging PLHIV along the continuum of care will inform the development of strategies, service delivery approaches and action plans for accelerating access to HIV testing and treatment.

## Cross-sectional and longitudinal data

Data and indicators used in cascade analysis can be classified to two distinct types: cross-sectional and longitudinal. Cross-sectional data look at a population at a specific point in time. Longitudinal data follow individual subjects over time.

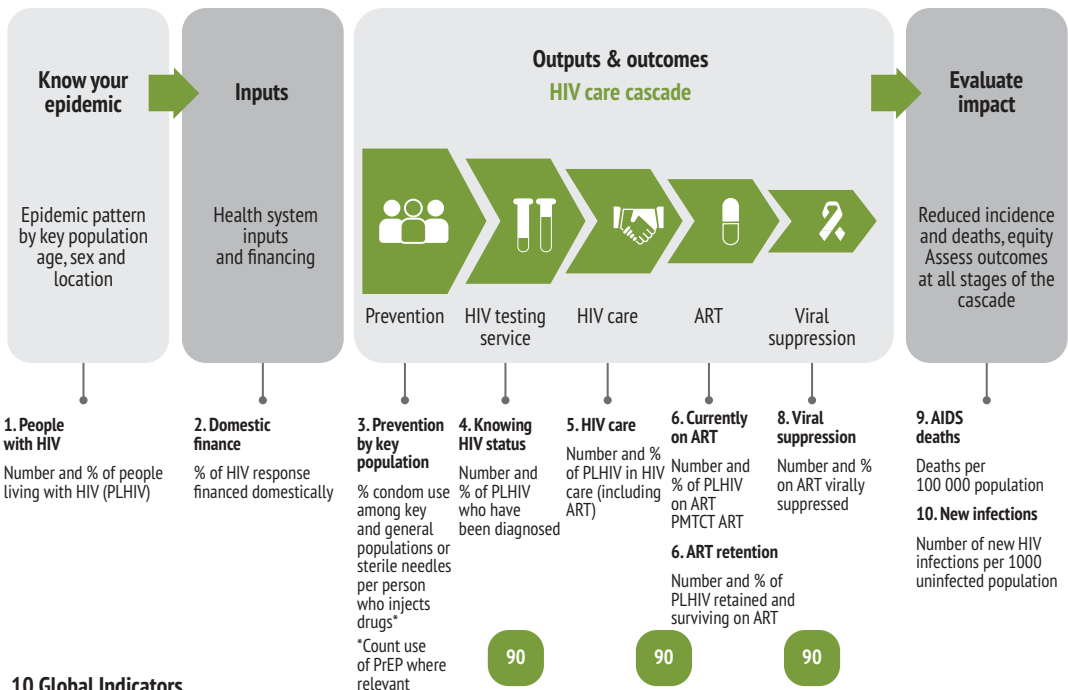
Most cascade indicators, such as those included in the WHO global top 10 indicators for monitoring the HIV response, are defined in cross-sectional terms, that is they look at the number of people who are HIV infected and alive (PLHIV) at a given time (as of a certain date), the number of PLHIV who know their HIV status, the number of PLHIV on ART and the number of PLHIV who have achieved viral suppression. Cross-sectional measures can be time-bound, such as counting the patients diagnosed or the patients enrolled in care in the last year. Using cross-sectional indicators across the cascade does not presume the same individuals are represented along all steps of the cascade. This brings flexibility in using different data sources, but also has limitations. Cross-sectional data is not informative on transitions and cannot tell if the people enrolled in care in the last year were diagnosed that year or at some earlier time.

Longitudinal data follows a group of individuals, a cohort, over time. This requires a system where individual patient records can be identified and followed up over time using a unique identifier code. The ability to follow individuals creates strong requirements for confidentiality. Unique identifiers can be constructed using existing codes such as national insurance numbers, creating new random numbers or constructing ciphered codes with various methods. This makes collecting longitudinal data more complex than repeated cross-sectional measurements that do not require tracking individuals over time. However, the ability to track individual patients is an essential element of a patient monitoring system and thus an important element of good quality care. Ideally, HIV service delivery systems should record data on PLHIV from diagnosis through life-long care and treatment using a single unique identifier for each individual patient. Such systems facilitate longitudinal data analysis, which provides a more precise picture of the losses along the cascade. Among the global top

10 indicators relevant for the cascade, indicator 7 (retention in care) always requires longitudinal data collection.

## WHO strategic information framework and top 10 indicators

WHO published consolidated strategic information guidelines for HIV in the health sector in 2015 (3). These guidelines propose a monitoring and evaluation framework built on measuring indicators that reflect the epidemic and health system context, inputs, outputs, outcomes and impact. This framework has at its center the HIV care cascade and related indicators (Fig. 3). The cascade of services as defined by indicators 1, 4, 5, 6, 7 and 8 is central to this guide.



**Note:** It is also important to link HIV-negative people to preventive interventions as appropriate.

**Source:** Consolidated strategic information guidelines for HIV in the health sector. Geneva: World Health Organization; 2015.

**Fig 3. Global top 10 indicators**

# Overview of the methodology

## Road map for HIV test–treat–retain cascade assessment

In order to achieve broad ownership of the cascade analysis exercise, and the findings and conclusions resulting from it, decision-makers from relevant government bodies and partner agencies, and representatives of service providers, civil society organizations and beneficiaries, must be involved.

The following implementation process is proposed.

1. Establishment of a steering committee (see terms of reference in Tool 4. Generic terms of reference) and holding the first meeting to explain the cascade analysis exercise and get their input.
2. Establishment of technical working group (see terms of reference in Tool 4) and recruitment of a national consultant, if needed (see terms of reference in Tool 4).
3. Initial meeting for the technical working group to familiarize the members with the methodology and discuss, and agree on, the concepts and indicators.
4. Collection of quantitative data to draw the HIV test–treat–retain cascade chart.
5. Drawing the cascade chart and identifying the main gaps along the steps of the cascade.
6. Collection of the additional quantitative data relevant to each step, such as breaking down the main steps of the care continuum into sub-steps and/or disaggregating cascade indicators by sex, age (adults and children), specific population groups and geographical/administrative areas.
7. Discussion of the cascade and the additional quantitative data collected in the technical working group, determining further needs for quantitative and qualitative data that can explain the causes for the gaps, and identification their source and collecting the needed data.
8. Identification and selection of key stakeholders for interviews/discussion and of sites to be visited to fill the information gaps.
9. Development of tools for collection, categorization and compilation of data (see Tool 3. Data analysis tools).
10. Data collection.

11. Data analysis: quantification and description of engagement of PLHIV along the HIV test–treat–retain cascade, and interpretation and summary of findings related to the losses/gaps in the treatment cascade.
12. Presentation and discussion of the main findings to the steering committee for their input.
13. National stakeholders meeting: presentation, discussion and validation of the assessment findings, and development of recommendations for urgent action to be taken to accelerate HIV testing and treatment scale-up (see Tool 5. Concept note for a stakeholder consultation).
14. Development of a report summarizing assessment process and implementation, main findings and discussion, conclusions and recommendations (see Tool 6. The cascade analysis report: outline).
15. Steering committee meeting to agree on planning process for implementation of recommendations.

## The cascade analysis process

The HIV test–treat–retain cascade analysis (“cascade analysis”) examines the achievements and losses/gaps in engaging PLHIV along the continuum of care. It starts with a description of how the HIV testing, care and treatment services are organized and provided in the country.

This is followed by determining the values of key indicators along the HIV care continuum and drawing the cascade graph accordingly. The cascade graph visualizes the magnitude of the gaps and losses along the HIV care continuum.

Thereafter, the causes for the observed gaps and losses are explored in depth to better understand what prevents the engagement and retention of PLHIV in testing, care and treatment, and how this could be remedied. This analysis often requires a further breakdown of the major steps of the care continuum into sub-steps based on the country-specific processes for HIV testing, enrolment in care, ART initiation and retention on ART. Also, disaggregation of indicators by sex, age (children and adults) and specific population groups is recommended.

Experience with implementing the cascade analysis in countries of the Region shows that it is useful for data collection and analysis to distinguish three interlinked steps along the continuum of care:

- Step 1: HIV testing



- Step 2: HIV care and ART
- Step 3: Viral suppression.

For each of these steps the cascade analysis will:

- briefly describe current policies and practices;
- collect the relevant data to determine the magnitude of gaps/losses and missed opportunities;
- address key questions regarding the most relevant factors that determine the magnitude of gaps/losses (those related to policies, practices, patients and the health system) and explain the gaps/losses; and
- identify missed opportunities (services that are lacking, population groups that are not well covered or not addressed, geographical areas not covered and so on).

It is also important to see if any gaps are in fact the result of problems with indicator measurement.

The findings of the cascade analysis should be validated through consultation with the representatives of all relevant stakeholders before a final report is produced. The cascade analysis findings will be used to undertake planning with stakeholders for remedial action to address lost opportunities for engaging PLHIV in the HIV care continuum.

## Data collection methods and data sources

Cascade analysis requires the collection of quantitative and qualitative information and data collection therefore employs a combination of methods and draws on various data sources.

It is proposed that data collection and analysis is carried out through a process that involves: 1) collecting and analysing relevant information to determine the magnitude of gaps/losses at each step of the continuum of care; 2) exploring underlying causes and drawing conclusions about the determinants of the observed gaps/losses; and 3) developing recommendations for action.

This guide uses the global top 10 indicators of the WHO monitoring and evaluation framework for the HIV health sector response. However, actual data availability varies in countries, and different indicator definitions can be agreed on, where data on the standard indicators are not available. It is important that the availability of data is reviewed at the start of the cascade analysis, alternative indicators are agreed

**Table 1. Data collection methods and sources of information**

Data collection method	Sources of information
Desk review	National policies and strategies; guidelines for HIV testing and counseling and HIV clinical management; standard operating procedures; annual programme reports; programme reviews and monitoring and evaluation reports; clinic registers; cohort analysis reports
Interviews/discussions with stakeholders	Policy makers, public, private and nongovernmental organization health service providers, social service providers, clients of services, PLHIV associations, civil society organizations, law enforcement, prison authorities, individuals from key populations, health workers (e.g. voluntary counselling and testing [HCT] staff, HIV clinic staff, antenatal staff, tuberculosis [TB] clinic staff, nongovernmental organization staff), national AIDS programme team
Site visits and observations	Observations of service organizations, patient flow in health facilities and community services, client and patient registers

where the needed data cannot be collected, and a plan is made on how to collect the necessary information.

## Data analysis

The quantitative data collected across the steps of the continuum of care and the cascade chart help to determine the magnitude of the gaps and losses from one step to the next. The qualitative information gathered helps to identify and explain the underlying causes of those gaps and losses. Bringing together all this information completes the picture along the steps of the continuum of care and allows the identification of remedial action.

This guide suggests the use of diagrams to facilitate systematic analysis of observations made regarding cause and effect. Technical working groups may opt to use one or both of the proposed tools, that is the fishbone diagram and the problem/solution trees (see Tool 3).

## Limitations

Cascade analysis is a data intensive exercise that involves the collection of quantitative and qualitative data and the use of various sources. The cascade is typically constructed combining estimates, case notifications, death records, facility-based testing and treatment records, and sometimes surveys. Combining multiple data sources is often problematic because data from different sources has been collected for different purposes with different assumptions and biases. Often some of the relevant data are not readily available.

The quality of data available for cascade analysis may vary a lot depending on the type and reliability of data sources in each country. However, while countries conducting the cascade analysis should do their utmost effort to have the best possible quality of data, it should be emphasized that the cascade analysis aims to provide useful information to guide the national AIDS programme and focus efforts on the problems identified. This means that the findings have to be credible to the extent that they reflect the overall picture. But for the purpose of identifying weaknesses in engaging people along the continuum of care, the numbers do not have to be exact or be able to withstand strict scientific scrutiny.

# Implementation: Assessing the cascade step by step

## Getting started for data collection

Once a technical working group has been established to carry out the HIV test–treat–retain cascade analysis, it needs to take time to familiarize itself with this guide and to reach a common understanding of the relevant concepts and the methodology, including the continuum of HIV care, the HIV test–treat–retain cascade, and related indicators and definitions.

The technical working group members should be familiar with the HIV service delivery system and its stakeholders in the country. Knowing the HIV service delivery system will help to describe the services that are available and how they are linked to build a continuum of care. It is important that all people involved in the analysis reach and share an understanding of how the care system is expected to work and where data can be found.

In their first meeting, the technical working group members need to go through and discuss the quantitative indicators of the cascade and those relevant to each step. The members need to ensure that they have a common understanding of the definition of each indicator. Furthermore, the technical working group should identify the sources of data for each indicator. If data for one or more indicators is not available in the country, the technical working group needs to agree on standardized operational definition(s) for the indicator(s) based on the available data, or identify a proxy indicator or indicators that can best inform the analysis.

## Drawing the cascade

At the beginning of the HIV test–treat–retain cascade analysis, a cascade chart for the country should be drawn to visualize the achievements at each step and gaps/losses. Standard definitions for indicators that mark the steps of the cascade can be found in the WHO consolidated strategic information guidelines for HIV in the health sector (3) and Tool 1 in this guide.

The indicators mentioned in Table 2 and their values can be populated in an electronic spreadsheet. A bar chart of those indicators provides a visual representation of the cascade that shows the gaps between the different steps.

**Table 2. Drawing the cascade: information required**

Indicator	Value (add values in this column)	Operational definition (see Tool 1)	Data sources
Estimated number of PLHIV		Global indicator 1. People living with HIV	Country and UNAIDS published most recent country estimate
Number of PLHIV who know their HIV status		Global indicator 4. Number of people living with HIV who have been diagnosed	HIV case registry, Death registry
Number of PLHIV in care		Global indicator 5. Number of PLHIV who are receiving HIV care (including ART)	ART site records/registers
Number of PLHIV on ART		Global indicator 6. Number of PLHIV who are currently receiving ART	Global AIDS Response Progress Report (GARPR), ART site records/registers
Number of PLHIV with suppressed VL		Global indicator 8. Number of PLHIV and on ART who have a suppressed VL (< 1000 copies/mL).	Patient records/registers

## Starting point: Understanding the client navigation pathways

It is important to understand client navigation pathways for seeking HIV testing, getting tested, enrolling in HIV care, initiating treatment and remaining in care at the start of the cascade analysis. This helps to explore those barriers arising from pathways that make it complicated for PLHIV to navigate the care continuum and that should be simplified to become more client-friendly.

Some programmes have designed cumbersome pathways that require a lot of effort, commitment and resources from patients in order to navigate through them. Services situated far from each other, for example HIV testing services situated far from the community, in a hidden location within a hospital or far from treatment services, may result in patients not taking the test and dropping-out before enrolling in care. Similarly, ARV dispensing sites located far from treatment clinics may result in delays in collecting medicines and may affect adherence and compliance with medical check-ups. Some programmes require a lot of stages for patients along the pathway. For example, once diagnosed HIV positive, patients have to go to one place to register, to a second to enrol in care, to a third to get a laboratory assessment, to a fourth to get a prescription and to a fifth to dispense it. Moreover, if these processes may have to be repeated frequently, for instance monthly.

The client navigation pathway can be illustrated in a drawing with potential barriers identified across it. Fig. 4 provides a fictitious example of a patient navigation in a country. The drawing visualizes how complicated the pathways are for PLHIV seeking HIV care in this country.

## Step 1. HIV testing (knowing ones' HIV status)

HIV diagnosis is the entry point to care and treatment. In the WHO Eastern Mediterranean Region, the majority of PLHIV have not been tested for HIV and does not know their HIV status. Increasing HIV diagnoses involves putting in place the appropriate strategies to create demand for HIV testing, reaching out and providing targeted services for key populations at increased risk of HIV within their communities, putting in place provider-initiated testing and counselling (PITC) services in health care services (such as TB, antenatal care and sexually transmitted infection [STI] services), encouraging partner testing, and introducing modalities for safe self-testing. For patients presenting with signs and symptoms of opportunistic infections (such as recurrent pneumonia, oral candidiasis or other), HIV testing is part of good clinical management.

HIV testing services should be delivered in a way that facilitates the uptake of services by the target group and, eventually, effective linkage to HIV care and treatment services. Countries should also explore the possibilities of introducing new technologies that have proven potential for increasing the uptake of HIV testing, such as self-testing and test for triage in the community.

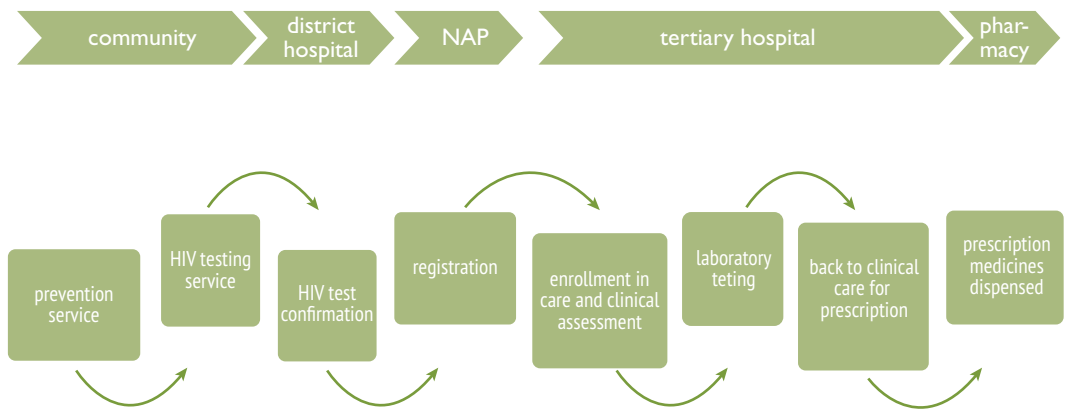


Fig. 4. Illustration of navigation pathway drawing

In the Region, the majority of HIV testing is performed in low risk populations. This does not contribute meaningfully to increasing the coverage of services for PLHIV, as the number of PLHIV in the tested group is small and the linkage to care and treatment is often weak. It is thus important to target testing activities strategically toward populations at higher risk of HIV infection.

Following HIV diagnosis, patients should be linked to care and treatment services without delay. Testing services should always have a clear referral pathway and feedback mechanism to enable service providers to monitor linkage to care and treatment.

In the cascade analysis, this step is represented by global indicator 4 (number of PLHIV who have been diagnosed). The data stems from surveys, case reports or programme records. The cumulative number of PLHIV that have been diagnosed during the past can be obtained from historical testing data or case notification data. In the absence of accurate death records and mortality data, an assumption has to be made of how many PLHIV ever diagnosed are still alive at the time of the cascade analysis. This will depend on factors affecting mortality, such as age and immunological status at diagnosis and coverage of treatment.

## Key questions

### HIV testing

- What proportion of PLHIV know their HIV status?
- What is the strategy for testing and diagnosing more PLHIV (case finding)?
- Are the right population groups prioritized for HIV testing (populations at higher risk of HIV infection)? (6, 7)
- How big is the HIV testing gap among each of the prioritized populations?
- Are the right strategies/approaches used for each of the target populations to create demand for HIV testing?
  - Do the service delivery approaches for HIV testing facilitate uptake by the target populations?
  - Does the approach to provider-initiated HIV testing facilitate uptake of HIV testing in health care facilities?
  - Do the approaches to delivering client-initiated HIV testing facilitate uptake? Are testing services adapted to the needs of the target population(s)?

### Linkage to HIV care

- Are PLHIV being lost between an HIV positive diagnosis and enrollment in HIV care? If so, what are the reasons?
- What system is in place to ensure that people who are diagnosed HIV positive are effectively linked to HIV care services? How effective is this system? What are the specific challenges for infants/children?

**Relevant quantitative information (make use of Tool 2. HIV testing gap analysis and target setting matrix)**

- Number of people tested in the past year (by target population)
- Number of people tested in the past year (by target population) and diagnosed with HIV
- Number of PLHIV diagnosed (by target population), that is the cumulative people tested, diagnosed and alive.

Example for roughly calculating all people diagnosed with HIV who are alive:

- apply a mortality rate of 10% per year for all people diagnosed before ART was available in country
- apply the countries' general population mortality rate for PLHIV diagnosed in the previous

**Problem analysis**

**Factors to be considered when exploring the determinants of gaps/losses (issues related to policy, strategy, service delivery, health systems and clients/patients)**

**Demand creation and HIV testing**

- What are the priority target groups for HIV testing and counselling (HTC)?
- What are the HIV testing coverage targets (by target population)?
- What approaches are used to motivate target populations to get tested? Consider coverage of outreach to target populations, approaches to offering the test in PITC settings (routine offers, risk-based offers, opt-in versus opt-out approaches, HIV testing onsite or referral to other facility).
- How appropriate are the approaches to HCT service delivery (such as community-based centres, outreach, integrated in prevention services for key populations, health facility-based, PITC, mobile)?
- To what extent are the services accessible (in terms of location, opening hours, safety of clients and providers, stock-outs of tests, and so on)?
- To what extent are the HTC services acceptable to target groups and in particular to key populations? (consider factors such as trust between key populations and service providers, staff attitudes, staff competence, confidentiality, barriers related to cumbersome HIV testing procedures, partner notification policies and practices, exclusion of population groups from access to HIV testing)?
- Discuss the quality of testing and counselling:
  - the appropriateness of HIV testing strategies and algorithms, and quality assurance
  - observation of the 5 Cs (confidentiality, counselling, consent, correct results, connection to care and treatment)
- Is the cost a barrier for the client?
- Is there coordination between the HIV programme and other programmes, such as TB or maternal and child health, to facilitate the integration of HIV testing?

**Referral system**

- Is there adequate information about HIV care and treatment during post-test counselling?
- Is there structured referral from HIV testing to HIV care:
  - what mechanisms are in place and how effective are they (referral cards, patient navigators, community mediators, referral reports, scheduling appointments)?
  - what is the role of HIV testing providers in ensuring proper monitoring of referrals?

For common issues/challenges related to the patient/client (beneficiary) and to health systems that may lead to gaps in this step please refer to pages 27–31.



## Step 2. HIV care and ART (PLHIV currently in HIV care, including those on ART)

WHO recommends offering ART to all PLHIV at the time of diagnosis. This recommendation is based on a wealth of evidence indicating better treatment outcomes when treatment is initiated early. Linkage to HIV care services and ART initiation should therefore happen with very little time interval, almost simultaneously. In this case the number of PLHIV in HIV care and the number of PLHIV on ART should be (almost) identical.

Delays in initiating treatment can result in the attrition of some patients before they start ART. Those delays can be due to many reasons, including:

- policies, such as requiring a CD4 test result before initiating ART or requiring a long treatment preparedness period;
- structural factors, including lack of access to certain base-line laboratory tests, long patient waiting lists or unavailability of services within the proximity of the patient;
- service quality factors, such as low quality post-test counselling and medicine shortages;
- the attitude of the care providers such as a reluctance to initiate treatment for certain patients, such as people who inject drugs (PWID); and
- patient-related factors, such as an unwillingness or inability to start treatment due to misconceptions about ART, fear of stigma and discrimination.

The definition of “the number of PLHIV who are in care” can vary widely from country to country. Tool 1 defines it as “the number of PLHIV who received HIV care in the past 12 months”. However, the most commonly used definition in countries is “the number of PLHIV who have collected their ARVs in the past 3 or 6 months” (depending on the ARV dispensing frequency in the country).

## Key questions

### HIV care before ART initiation (see also key questions on linkage to HIV care in Step 1)

- Are PLHIV being lost between an HIV positive diagnosis and enrolment in HIV care? If so, what are the reasons?
- Are PLHIV being lost between enrolment in HIV care and ART initiation? If so, what are the reasons?
- How big is the attrition while PLHIV are in HIV care before ART initiation and what are the main reasons for attrition?

### ART initiation

- What are the reasons for deferring initiation of ART in PLHIV?
- Are certain populations denied HIV treatment?

## Relevant quantitative information

### Enrolment in care

- Number of PLHIV newly enrolled in care in the past year
- Ratio of new PLHIV enrolled in HIV care to number of people newly diagnosed with HIV
- Time between HIV diagnosis and enrolment in HIV care (median time, range) and/or number of PLHIV enrolled in care within a certain period of time after HIV diagnosis (as per definition agreed in country, such as within 1, 3 or 6 months of HIV diagnosis, > 6 months)
- Mean and median CD4 count at time of enrolment in HIV care

### ART initiation

- ART coverage: percentage of adults and children currently receiving ART (GARPR indicator 4.1)
- Time between enrolment in HIV care and initiation on ART (median time, range)

## Problem analysis

### Some factors to be considered when exploring the determinants of gaps/losses (issues related to policy, strategy, service delivery, health systems and clients/patients)

### Enrolment in care

- What is the definition of "enrolled in HIV care"? What could be causes for under- or overestimating the number of PLHIV enrolled in HIV care after HIV diagnosis?

### Assessment of ART eligibility (according to WHO guidelines (2) eligibility for ART no longer depends on CD4 count: all PLHIV should be offered ART without delay)

- Is CD4 still required for starting ART?  
If yes:
  - Is CD4 testing available and accessible for all when needed?
  - How many CD4 testing sites are there? Where?
  - How often during the year is CD4 testing not available (machine broken, stock out of reagents, other reason)?
  - Is this one reason for loss to follow-up?

### ART

- How many health facilities deliver ART? How far do patients have to commute to reach the site?
- How is the service delivered? What is the clinic experience for patients?
- How does fear of stigma and discrimination affect their attendance?
- Has there been shortages or stock-outs of ARV drugs and laboratory reagents supply that prevented initiation of treatment?
- What are the unique challenges for some populations groups to access and remain in care (such as PWID)? And how are they counteracted?

### Step 3. VL suppression (PLHIV retained on ART and virally suppressed)

ART is lifelong and, once started, should never be stopped. Successful retention of patients on ART depends on the organization of treatment services. Services have to be accessible and acceptable to the target population. Medication should be available and unnecessary barriers to accessing ART should be removed.

Monitoring of retention of PLHIV on ART and VL suppression relies on patient registries and the availability of longitudinal data for individual patients over time. It is recommended to construct annual cohorts of PLHIV starting from the date of diagnosis or entry into care or ART initiation, and to follow these up using standard definitions of endpoints (treatment, viral suppression, death, loss to follow-up, transfers out).

A main objective for engaging PLHIV in the continuum of HIV care is for the maximum number of PLHIV to achieve VL suppression. Therefore, VL measurement should be the primary laboratory technique to follow up ART. This enables PLHIV to live a healthy life and prevents the spread of the virus. In a clinical setting, VL measurements can be taken routinely at certain intervals or by clinical indication, such as suspected treatment failure.

#### Key questions

- What proportion of PLHIV on ART is achieving VL suppression?
- What is the extent of attrition while on treatment?
- Is VL measured routinely at certain intervals or only on clinical indication?

#### Relevant quantitative information

- Percentage of adults and children still alive and known to be on treatment 12 months after initiating ART (global indicator 7.)
- Percentage of patients initiating ART whose VL is < 1000 copies/ml after 12 months of ART (HIV drug resistance early warning indicator)
- Percentage of health facilities dispensing ARV drugs that experienced a stock-out of at least one required ARV drug in the last 12 months (GARPR indicator 4.4)

### **Problem analysis**

**Some factors to be considered when exploring the determinants of gaps/losses (issues related to policy, strategy, service delivery, health systems and clients/patients)**

- What are the main reasons or contributing factors for attrition among patients on ART?
- What ART regimens are used? Do the prescribed regimens take into account drug interactions, co-morbidities, toxicity, side effects, pill burden?
- What is done to help patients remain in care?
- What is done to ensure that patients are adherent to their treatment?
- How would patients be identified as having dropped-out from care?
- How would patients be encouraged to attend their appointments or to re-engage with care services when they drop-out?
- How is treatment outcome monitored? How often?
- How is treatment failure identified? What happens when it is? How long does it take after treatment failure to switch the treatment regimen?

# Common issues to be explored for all steps of the cascade

## Special considerations for PWID

The ART coverage for PWID is especially low in the WHO Eastern Mediterranean Region. Studies have shown that ART for PWID can be as successful as for any other PLHIV. However, in addition to the factors related to their life circumstances as drug users, PWID may face legal and structural barriers to knowing their HIV status, linking to care and treatment, and adherence to and retention in lifelong treatment. In many instances HIV testing service models may be too cumbersome for PWID. Thereafter, distance to treatment sites, follow-up requirements, mutual lack of trust between PWID and service providers, and other factors may result in them dropping out before being linked to care and treatment services. Furthermore, when linked to care and treatment services, PWID are more likely to have poor adherence to treatment and poor retention in care. Certain interventions have proven effectiveness in improving the engagement of PWID along the continuum of HIV prevention, diagnosis, care and treatment, and can result in successful treatment outcomes. Such interventions include:

- outreach and community-based HIV testing;
- opioid substitution therapy (OST); and
- time-limited case management involving assisted or accompanied linkage to care and treatment, community-based adherence support and supervised medicine intake.

### Key question

- Why are PWID not accessing treatment?

### Relevant quantitative information

- Number of PWID reached with HIV prevention services
- Number of PWID who received an HIV test and know the result in the past year
- Number of PWID who know their HIV status
- Number of PWID ever enrolled in care (and percentage of total PLHIV ever enrolled in care)
- Number of PWID ever started on ART (and percentage of total PLHIV ever started on ART)
- Number of PWID currently on ART (and percentage of total PLHIV currently on ART)
- Number of PWID who achieve viral suppression

## Problem analysis

Some factors to be considered when exploring the determinants of gaps/losses (issues related to policy, strategy, service delivery, health systems and clients/patients)

### Diagnosis and linkage to care

Most PWID are diagnosed with HIV outside the mainstream health system (through outreach programmes, nongovernmental organization facilities, and so on)

- Are safe HIV testing service points available?
- Are HIV testing services accessible?
- How close are testing services to treatment and care services?
- What are the mechanisms to link/refer PWID from testing to ART services?
- How is linkage to care for PWID monitored?
  - time from diagnosis to enrolment in care
  - percentage enrolled in care out of those diagnosed

### Pre-ART care

- Are there programmes to provide adequate education/information about HIV for PWID diagnosed HIV positive?
- How are PWID prepared for ART?
- What community support mechanisms are available to ensure PWID engagement?
- Are there integrated or co-located HIV care and drug dependence treatment services, notably OST?

### Initiation of ART to retention in lifelong successful ART

- What are the issues/challenges that limit access to ART based on a history of, or current, injecting drug use, such as restrictions in guidelines, access, or reluctance on the part of the prescriber?
- Is OST available?
- Are co-infections such as TB, hepatitis B and hepatitis C managed in an integrated manner?
- Is there any collaboration/co-location/integration between ART sites treating PWID and drug dependence treatment facilities, especially OST and nongovernmental organizations working with PWID?
- What measures are there to ensure continuity of treatment services between the community, arrest, imprisonment and release?
- What community support mechanisms are there to support PWID after diagnosis with HIV? Discuss psychosocial support and adherence support (such as treatment buddies).
- How are PWID supported financially to be able to access services? (such as transport costs)
- What strategies are in place to ensure retention in care for PWID? (such as case management strategies to improve engagement and retention in care)

### Cross-cutting factors

- What are the legal barriers to reaching out to PWID or to PWID receiving HIV services and how can they be overcome?
- What are the HIV service providers' attitudes towards PWID?
- Are there any community systems for supporting the engagement of PWID along the continuum of care?

## Health system issues

The organization and efficiency of health systems and the way HIV programmes and services are integrated or not integrated in the existing system can have major effects

on access to and utilization of services. Health system-related issues are often common for all components of the test–treat–retain continuum of care (demand creation for testing, testing, enrolment in care, ART, retention).

In order to capture major causes for loss along the HIV test–treat–retain cascade, it is recommended to primarily explore issues related to four elements of health systems: governance, financing, human resources, and procurement and supplies management. This does not require an extensive and thorough review of the health system of the country. Questions that will help to shed light on important health systems related causes for gaps/losses along the HIV care continuum are proposed below.

### **Governance**

- Which stakeholders have influence on policy and strategy development – and which not? Are other government sectors, civil society, community members and private sector providers involved?
- Is the development of policies and strategies for HIV integrated in health policy/strategy development processes in the country – or is it happening through separate processes?
- Which body has administrative responsibility for HIV service delivery? (same body as for other health services? National AIDS Programme?)
- Does any of the above have an impact on access and/or utilization of HIV services?

### **Financing**

- Which bodies decide on allocation of: (1) national budget; and (2) larger donor funds?
- Are there obstacles to investing in certain public health approaches due to restrictions imposed by government or donors? (such as obstacles to contracting nongovernmental organizations or private sector providers)
- What are the financing modalities for HIV services? (this may vary between services)
  - Government budget?
  - Health insurance/pooling/ pre-payment?
  - User out-of-pocket?
  - External donor funds (such as The Global Fund)?
- What are the positive/negative effects of the financing modalities for HIV services on access and/or utilization?

**Human resources**

- Are human resources for HIV service delivery adequate in number, professional skills and competences?
- Which body is responsible for human resources planning for HIV? Is human resources planning for HIV integrated in overall human resources planning for health?
- Is the staff of HIV services an integral part of the overall pool of staff of the health services where they work?
- On whose payroll is staff providing HIV service? (this question is linked to the financing mechanism)
  - Service provider?
  - National AIDS Programme?
  - Nongovernmental organization?
  - United Nations?
  - Other?
- Are staff/volunteers sufficiently motivated? Is there a strategy/system in place to keep health workers motivated? Is there a special strategy/system for staff providing HIV services?
- Does any of the above have an impact on access and/or utilization of HIV services?

**Procurement/supplies management**

- Does the way procurement and supplies are managed affect access to and utilization of HIV services?

**Information systems**

- Are their challenges with regard to the health information system that impede HIV testing and treatment scale-up?

## Beneficiaries' perspectives

For each step in the cascade, explore the perspective of beneficiaries with regard to issues and challenges affecting access to and utilization of services.

**Key questions**

- To what extent are the beneficiaries aware of the services?
- To what extent are the beneficiaries satisfied with the services?
- What are the challenges faced by beneficiaries at each step of the cascade?

**Issues/challenges related to beneficiaries' knowledge, perceptions and acceptance of the service**

- How do people learn where they can get the services (HIV test, pre-ART care, ART, support services for PLHIV)?
- To what extent do community members know where to get the services?
- How easy is it to access a service (HTC, enrolment in care and treatment, support services)?
- How do PLHIV perceive the quality of the services (including health workers attitudes, health workers skills and competencies, safety of procedures, responsiveness to needs of clients)?
- What aspects of the existing services would encourage community members to seek/accept the services (HTC, care and treatment, support services)?
- What aspects of the existing services that would deter community members from seeking/accepting the services (HTC, care and treatment, support services)?



### Issues/challenges related to service requirements

- How do PWID perceive the procedures and papers required for registration/admission?
- What is their experience with the waiting time at the service?
- How many health care providers do they see in order to receive the service and how does this affect their satisfaction with the service?
- How many visits do they have to make to the facility in order to get a service (such as number of visits needed to get counselled, tested and informed about the test result, number of visits needed for ART preparation, number of follow-up visits per year) and how does this affect their satisfaction with the service?
- How far do they need to commute to get the service and how does this affect their access to the service?
- Are service opening hours suitable?
- Are the fees for services, medications (other than ART), laboratory test or other components affordable?

### Issues/challenges related to referrals and linkages

- What mechanisms are there for referral and linkages between prevention, HTC and treatment and care services?

### Issues/challenges related to active involvement

- What is the role of community members and PLHIV in patient support and service navigation?
- Are there any community support groups?
- To what extent are PLHIV involved in committees, working groups and decision-making forums?

### Other issues/challenges

- Relevant issues/challenges in the country not covered above

## Tools

Tool 1. Global indicator definitions

Tool 2. HIV testing gap analysis and target setting matrix

Tool 3. Data analysis tools

Tool 4. Generic terms of reference

Tool 5. Concept note for a stakeholder consultation

Tool 6. The cascade analysis report – Outline

## Tool 1. Global indicator definitions

Global indicator	Definition N = numerator D = denominator	Measurement methods	Comments
<b>1</b>	PLHIV  Number and % of PLHIV	Globally consistent estimation method Estimations based on data stemming from surveys, routine surveillance (including case-based surveillance) National demographic and programme data	<p>Basin for determining HIV care and treatment service needs</p> <p>Only numerator used for cascade analysis</p> <p>Serves as denominator for subsequent cascade steps</p> <p>Disaggregation for analysis of cascade related to specific population groups by sex, age, location, key population, pregnancy, etc.</p>
<b>4</b>	PLHIV who have been diagnosed  D: Number of PLHIV	<p>Best estimate based on available data sources, such as: Facility data N: Cumulative number of reported HIV diagnoses minus deaths D: national PLHIV estimate based on internationally consistent modeled estimates, e.g. Spectrum, AIM</p> <p>Population-based surveys collecting HIV serostatus and with a question to assess whether respondents their positive status. The indicator will be calculated as known PLHIV who report knowing their status</p>	<p>Diagnosis and awareness of HIV-positive status are necessary precursors to care and treatment</p> <p>Disaggregation for analysis of cascade related to specific population groups by sex, age, location, key population, pregnancy, etc.. Disaggregated estimates can reveal gaps in diagnosing PLHIV in specific population groups</p> <p>Accurate number requires good reporting on testing and complete registration of deaths</p> <p>In many countries national reporting of (i) newly diagnosed PLHIV and (ii) deaths of PLHIV is incomplete. In this situation one method to very roughly estimate the number of all people diagnosed with HIV who are alive is the following: - apply a mortality rate of 10% per year for all people diagnosed before ART was available in country - apply the countries' general population mortality rate for PLHIV diagnosed in the years since ART has become available to PLHIV</p> <p>Population-based surveys with HIV serostatus can be useful for key populations or in generalized epidemics</p>

**Tool 1. Global indicator definitions** (continued)

Global indicator	Definition N = numerator D = denominator	Measurement methods	Comments
<b>5</b> HIV care coverage Number and % of PLHIV who are receiving HIV care (including ART)	N: Number of PLHIV who received HIV care in the past 12 months as proxied by receipt of at least one of the following during the past 12 months: clinical assessment (WHO staging) or CD4 count or viral load or currently receiving ART D: Number of PLHIV	N: Programme records, e.g. pre-ART and ART registers, visit records D: Estimated PLHIV: internationally consistent modeling estimates, e.g. Spectrum, AIM	Reflects the linkage between testing and care services Disaggregation for analysis of cascade related to specific population groups by sex, age, location, key population, pregnancy, etc. Definition of "HIV care" may vary. "Received a CD4 count or VL or clinical assessment within past 12 months" can be used. PLHIV currently on ART are included
<b>ART 3</b> ART coverage Number and % of PLHIV who are receiving ART	N: Number of PLHIV who are currently receiving ART D: Number of PLHIV	N: Programme records, e.g. ART register and reporting forms D: Estimated PLHIV: internationally consistent modeling estimates, e.g. Spectrum, AIM	Measures the extent to which needs for ART is met Cannot distinguish alone between programmes with low levels of case finding, poor linkage between diagnosis and care, and programmes with inadequate ART resources or restrictive eligibility criteria Disaggregation for analysis of cascade related to specific population groups by sex, age, location, key population, pregnancy, etc.

## Tool 1. Global indicator definitions (continued)

Global indicator	Definition N = numerator D = denominator	Measurement methods	Comments
<b>ART 5</b> ART retention Number and % of PLHIV and on ART who are retained on ART 12 months after initiation Also recommended at 24, 36, 48, 60 months, etc.	N: Number of ART patients alive and on ART 12 months (or 24, 36, 48, 60 months, etc.) after initiating ART D: Number of patients initiating ART up to 12 months (or 24, 36, 48, 60 months, etc.) before the beginning of the reporting year. This includes those who have died since starting therapy, those who have stopped therapy and those lost to follow-up	N/D: Programme records, e.g. ART registers and cohort reporting forms. Ideally collected on all patients from all ART clinics. Where this is not possible, this indicator can tentatively be generated from a sample of patients from a subset of representative ART clinics Allowing a 3-month grace period before concluding a patient is lost to follow-up The cohort assessed should be those who start ART between 27 and 15 months before the survey start date	A high retention rate is an important measure of programme success and overall quality. Measures the ability to follow up persons who initiate ART after a specific period of time. Does not distinguish between those with good and those with poor measures of regimen adherence (timeliness, completeness, etc.) Disaggregation for analysis of cascade related to specific population groups by sex, age, location, key population, pregnancy, etc.
<b>VLS.3</b> Viral load suppression Number and % of PLHIV and on ART who are virologically suppressed	N: Number of PLHIV and on ART who have a suppressed VL (< 1000 copies/mL) Population-level D: Number of PLHIV who are currently receiving ART (numerator of ART 2 and 3).	ART registers and cross-sectional report, patient records. Population-based survey, such as the health impact assessment surveys that collect data on ART coverage and viral suppression	Gauges the proportion of people on ART whose VL is suppressed. A high proportion with suppressed VL implies a low rate of onward transmission. Viral load suppression among a cohort 12 months after ART initiation should also be monitored Disaggregation by sex, age, key populations Results depend on VL monitoring policy. If VL is measured on suspected failure, rates of suppression are lower than when VL monitoring is routine

## Tool 2. HIV testing gap analysis and target setting matrix

HIV prevalence is rarely the same among different populations in a country. In concentrated HIV epidemics, such as in most countries of the WHO Eastern Mediterranean Region, a large proportion of HIV transmission may occur in well-defined populations at increased risk and in specific geographical areas. In such an epidemic context, HIV testing in low risk populations rarely contributes meaningfully to increasing the coverage of services for PLHIV, as the number PLHIV in the tested group is small. It is thus important to target testing strategically to reach populations at increased risk rather than increasing the number of people tested indiscriminately.

While testing populations at increased risk will yield relatively larger numbers of people testing positive, it can be difficult and labour intensive. On the other hand, routine testing in antenatal settings can have very low unit costs, but may identify very few cases in low level epidemics. However, antenatal testing has the added benefit of preventing mother to child transmission.

The HIV testing matrix presented in Table 3 can be used to assess the effectiveness of current HIV testing activities in terms of increasing the number of PLHIV who know their status. It can also be used as a basis for discussions on necessary and feasible re-orientation of HIV testing towards different target groups or through using different service delivery approaches. Lastly, it can be used for setting targets for HIV testing programmes. The populations may be defined at a national or subnational level.

The testing matrix presented in Table 3 relies on prevalence data from surveys and monitoring and population size estimation data. This data may not be available for all populations in all locations, but it is important if services are planned for specific populations. Missing data can be substituted with extrapolation and assumptions where necessary to complete the picture. The sum of the numbers of expected PLHIV in all populations together should be close to the estimated number of PLHIV in the country (or the geographical area).

Testing data should be time bound (population tested in the past year and/or in the past few years, maximum up to five years), as risk behaviours constituting membership of a high-risk population is often not lifelong. Moreover, longer periods of observation would require corrections for mortality.

The target setting can be extended to yearly targets for several years, and the construction of targets should take resources and feasibility of scaling-up into account.

Table 3. Testing matrix

Populations	Epidemiology			HIV testing (define timeframe: past 1 year; past 1 to maximum 5 years)			Target setting		
	Population size (N)	Prevalence (P)	Expected PLHIV (N x P)	People tested (T)	People testing positive (I)	Percentage positive (I/T)	Undiagnosed (N x P - I)	Target number	Percentage of regional/ national target
PWID									
Men who have sex with men									
Female sex workers									
Prisoners									
Partners of PLHIV									
Other groups									
General pop									

**Table 3. Testing matrix** (continued)

Clinical settings	Epidemiology		Current testing		Target setting	
TB patients						
STI patients						
Children born to mothers living with HIV						
Other; if relevant or data available (e.g. emergency ward patients, hospital admissions)						



## Tool 3. Data analysis tools

### Fishbone diagram

A fishbone diagram is a data analysis tool. Its purpose is to provide a systematic way of understanding the effects and causes of the gaps identified in the cascade analysis. The design of the diagram looks like the skeleton of a fish, hence it is referred to as a fishbone diagram. An example of a generic diagram is shown in Fig. 5. Drawing fishbone diagrams can be of great value in assisting the technical working group to categorize the many potential contributing factors to gaps/losses along the steps of the continuum in a systematic way.

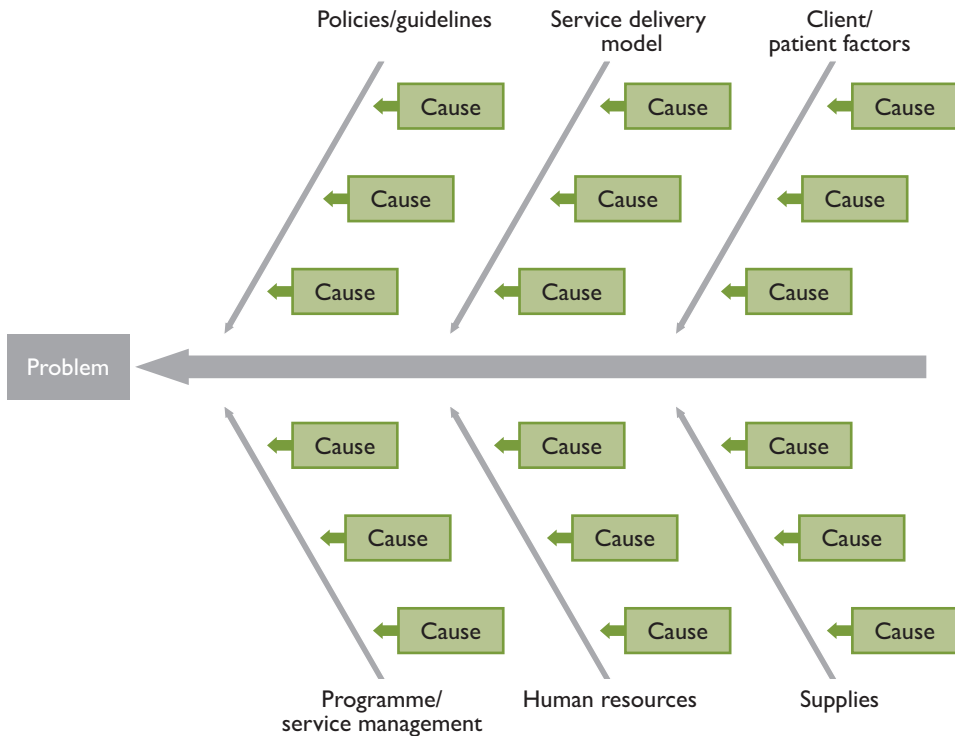


Fig. 5. Fishbone diagram template

## Generic instruction for using fishbone diagrams for problem analysis

1. Draw a fishbone diagram.
2. List the problem/issue to be studied in the head of the fish.
3. Label each bone of the fish.
4. Repeat this procedure with each cause under the category to produce sub-causes.
5. Continue until you no longer get useful information as you ask, “Why is that happening?”
6. Analyze the results of the fishbone diagram after team members agree that an adequate amount of detail has been provided under each major category. Do this by looking for those items that appear in more than one category. These become the “most likely causes”. For those items identified as the “most likely causes”, the team should reach consensus on listing those items in priority order, with the first item being the “most probable” cause.

## Problem and solution trees

A problem tree provides an overview of all the known causes and effects of an identified problem. It will likely reveal multiple branches (cause and effect relationships) leading to the core problem. A problem tree involves writing down the main problems (such as lack of service delivery points, stock-out of supplies). Reversing the problem tree, by replacing problem statements with solutions to those problems, creates a solution tree. A solution tree identifies particular priorities and interventions that need to be tackled to alleviate the cause and effects identified in the problem tree. Fig. 6 and Fig. 7 provide examples of a problem tree and a solution tree.

## Generic instructions for constructing problem/solution trees

1. Settle on the core problem, such as a limited number of PLHIV know their HIV status. The core problem is written down in the middle of the paper or on a sticky-note that is placed in the middle of a wall.
2. Identify the causes. Primary or direct causes, for example, can be limited uptake of testing by key populations and lack of PITC in STI and TB services. Each primary cause can have one or more secondary causes, such as limited availability of community-based HTC services, far location of HTC services, low caseload at HTC points, poor linkage between prevention and HTC, frequent stock-out of test kits, key populations do not trust existing HTC providers, and cumbersome HIV testing strategies. Each cause can be written down on a sticky-note. The

primary or direct causes to the problem are placed in a line below that of the core problem. The secondary causes are placed in a line below the primary causes. If more underlying causes are identified, they can be placed in subsequent lines.

3. Identify the immediate effect(s) of the problem, such as low coverage of HIV treatment. Each effect identified can be written on a sticky-note and placed in a line above the problem. If any further or subsequent effects are identified, they should be written down and placed above the line of immediate effects.
4. Develop the linear cause-effect relationship for a problem tree. It is important to review the sequence of cause and effects to make sure that they are clear and make logical sense, such as does this lead to that, or is there a missing step, and is this the effect of that happening? It is important to ensure that there is agreement among the technical working group. If there is more than one cause to an effect, they can be placed side by side.
5. Link the causes and effects with lines and arrows. Once the order or placement of all the cause and effect relationships is agreed, they can be linked with vertical lines. Horizontal lines can be used to join related causes or effects. The result is a problem tree which outlines the cause and effect relationship between the different levels.
6. Develop a solution tree. A solution (also called objectives) tree is developed by reversing the problem statements from the problem tree into solutions. For example, a cause stated in the problem tree such as cumbersome testing strategies would become a solution such as “simplify testing strategies”. The core problem/solution represents the immediate objective or outcome. The branches below represent key strategies and activities that should be implemented, and the branches above the core problem/solution represent the longer term outcomes or impacts.
7. Identify priority strategies and activities to solve the problem. It is important to identify if any of the branches can have a bigger effect than others in solving a problem. These would be priority interventions. Depending on time, availability of funds and the complexity of the work, some activities may be more feasible than others in the shorter or longer terms. Planning the implementation of the solutions should take this into account, while prioritizing and deciding on a timeframe for implementation.

- Develop a logical framework matrix. The final product of the solution tree can be transferred into a logical framework matrix that displays a summary of activities, strategies, objectives, outcome and, possibly, impact of what needs to be implemented to solve the problem.

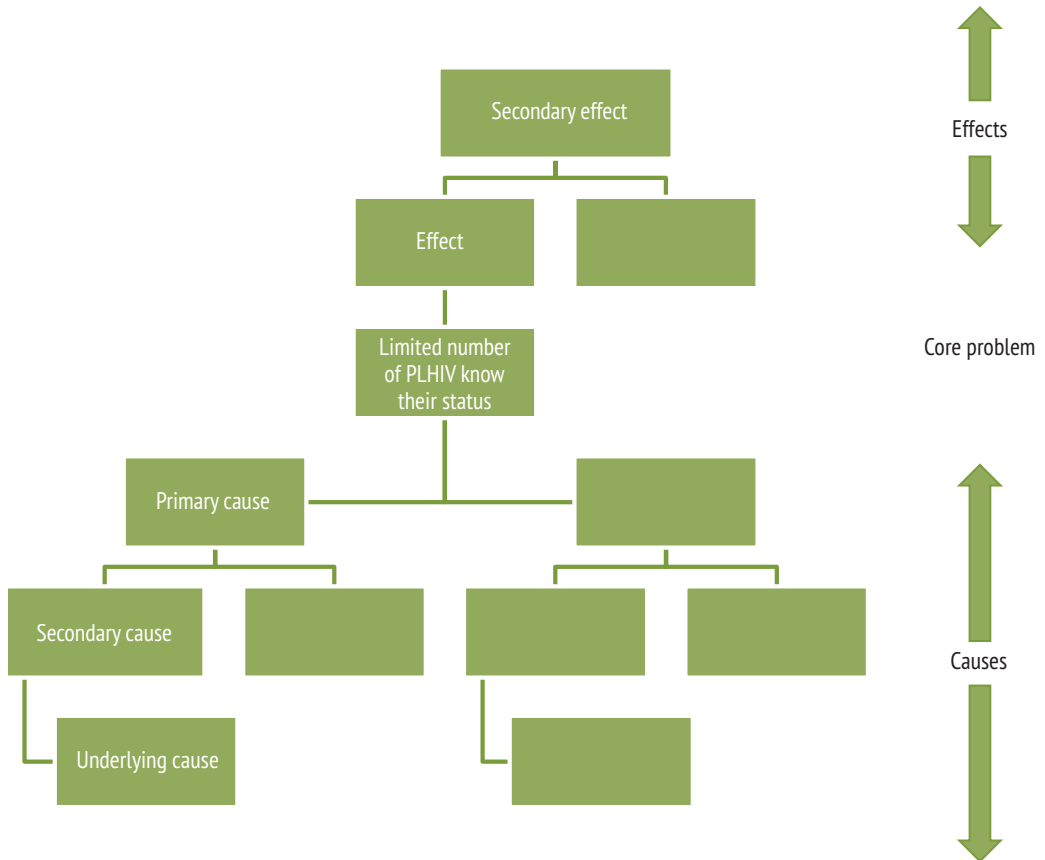


Fig. 6. Example problem tree

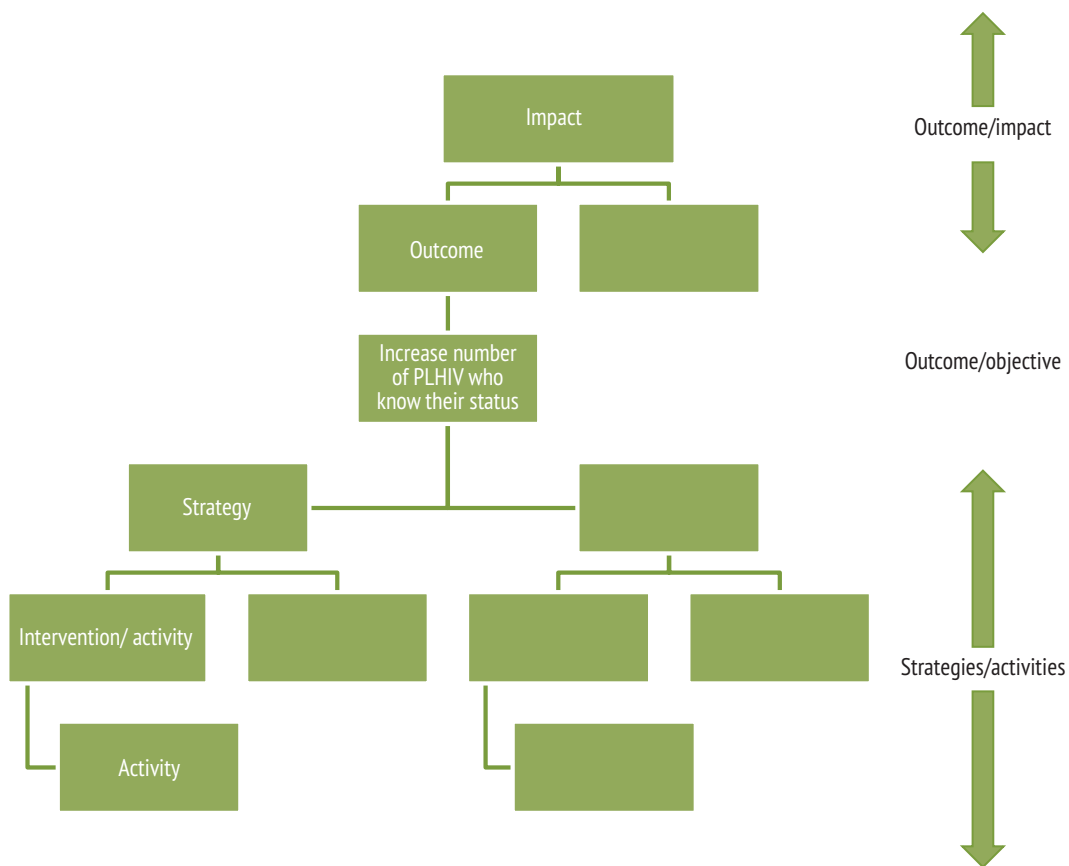


Fig. 7. Example solution tree

## Tool 4. Generic terms of reference

### Terms of reference of the steering committee

The implementation of the test–treat–retain cascade analysis will be guided by a steering committee to ensure high-level support by the relevant national authorities for the assessment. The steering committee will, furthermore, be instrumental in carrying forward assessment findings into future policy-making and planning processes.

## Composition

The guiding role of the steering committee requires that its members are stakeholders who have a significant influence on policy-making and planning processes regarding health and HIV services. It is therefore recommended that the steering committee comprises the following (or similar):

- Minister’s Deputy
- Directors of relevant Ministry of Health departments
- WHO Representative
- Chair of Country Coordinating Mechanism
- National AIDS Programme Manager
- Representative from nongovernmental sector involved in HIV service delivery.

## Roles and responsibilities

The steering committee will play a guiding role throughout the entire assessment process, spanning a period of approximately 1–2 months. In particular, the steering committee will be involved in the following activities.

1. Review the objectives and methodology of the HIV test–treat–retain cascade analysis exercise and advise on any additional important issues to be looked into.
2. Make recommendations to the technical working group with regard to key stakeholders to be included in the exercise.
3. Review the main findings related to the barriers/gaps in the test–treat–retain cascade analysis.
4. Provide the technical working group with contextual inputs relevant for further analysis.
5. Review and endorse the final report including findings and recommendations.
6. Agree on planning process for the implementation of recommendations.

It is anticipated that the steering committee will meet with the technical working group on three separate occasions.

- **First meeting.** This meeting will precede the primary data collection. During this meeting the steering committee will discuss the assessment objectives and methodology, particularly in their relation to the country context. The meeting is designed to ensure a broad base of support for the assessment processes itself and to create commitment to take forward its key findings.

- Second meeting. At the end of the data collection, the members of the technical working group will report the assessment progress and key preliminary findings to the steering committee. This meeting is designed to identify potential data gaps and provide contextual input useful to the data analysis.
- Third meeting. The technical working group will present the assessment findings and the outcomes of the national stakeholders meeting to the steering committee in a final meeting. This meeting is also planned to get agreement from the steering committee on the planning process for the implementation of recommendations.

## Terms of reference of the technical working group

Members of the technical working group will be nominated by the chair of the steering committee. The technical working group will facilitate the implementation of the assessment throughout the entire process.

### Composition

The technical working group will comprise:

- National AIDS Programme manager
- National consultant
- International consultant (only if support of an international consultant for cascade analysis is needed)
- One staff member working for the National AIDS Programme; this expert will have good knowledge of the activities of the Programme and will be in a position to facilitate interview appointments with key informants working within the national HIV response
- One staff member working for the Ministry of Health who has broad knowledge of the national health system; preferably this staff member will work in an area of the Ministry where activities cut across all programmatic areas, such as a department for policy and planning, human resources or health systems strengthening
- WHO HIV staff
- UNAIDS staff
- One nongovernmental organization representative
- One PLHIV representative.

## Roles and responsibilities

The technical working group will coordinate the day-to-day activities essential to implementation of the assessment. The technical working group has the following tasks.

1. Agree on operational definitions.
2. Prepare the background documents.
3. Obtain relevant information for a desk review.
4. Organize a first meeting to orient the steering committee on the test–treat–retain cascade analysis objectives and methodology.
5. If necessary, adapt the cascade analysis tool to the local context, taking into account the input from the steering committee.
6. Prepare an initial list of key informants.
7. Validate and contextualize findings, based on personal experience and knowledge.
8. Organize a debriefing meeting after completion of collection and analysis of information in order to inform the steering committee of assessment progress and preliminary findings.
9. Organize a national stakeholders meeting during which assessment findings and their implications are discussed and recommendations for urgent remedial action will be made.
10. Provide inputs on the draft recommendations of the national stakeholders meeting.
11. Organize a third meeting with the steering committee to discuss assessment findings, outcomes of the national stakeholders meeting and next steps in country.
12. Prepare the final version of the cascade analysis report with the assistance of the national/international consultant.

## Terms of reference of the national consultant

### Specific duties and responsibilities

The national consultant will work closely with the technical working group in the various stages of the cascade analysis implementation. S/he will work under the supervision of the WHO Representative/WHO HIV team leader to:

- ensure that all background and relevant documents for the cascade analysis are available and shared with the technical working group;
- coordinate and support the activities and meetings of the technical working group;



- develop the minutes of the technical working group meetings;
- assist in the preparation and organization of the steering committee meetings and prepare meeting minutes;
- support the technical working group in conducting the stakeholders analysis and in identifying key stakeholders;
- support identification of persons and groups for individual/group discussions;
- prepare and organize the site visits as well as individual/group discussions;
- participate with the technical working group in collection and compilation of information;
- provide inputs in the analysis of data;
- prepare a draft report on the cascade analysis findings for review by the technical working group and prepare the presentation of the findings for the stakeholders meeting;
- support the technical working group to prepare and organize the national stakeholders meeting;
- prepare the report on the meeting; and
- prepare the final cascade analysis report taking into account the technical working group and steering committee's comments and inputs.

## Tool 5. Concept note for a stakeholder consultation

### Background

Following the completion of the HIV test–treat–retain cascade analysis a stakeholder consultation should be conducted to validate and discuss the findings and conclusions and to recommend action to overcome the challenges and address the gaps in the continuum of care.

### Objective of the consultation

The main objective of the consultation is to brief key stakeholders on the findings of the HIV test–treat–retain cascade analysis and to provide the opportunity to discuss these findings and develop recommendations for urgent action to overcome the obstacles, gaps and missed opportunities identified through the cascade analysis. These recommendations are the basis of planning for effective strategies and interventions to accelerate HIV testing and treatment scale-up.

## Specific objectives

1. To present and discuss the findings of the HIV test–treat–retain cascade analysis with key stakeholders.
2. To validate the findings.
3. To make recommendations for urgent action to be taken to address gaps and missed opportunities.

## Participants

Participants should be key stakeholders, including representatives of institutions and organizations whose collaboration and contributions are required to accelerate HIV testing and treatment scale-up. This includes current HIV partners and the potential future partners as well. Stakeholders may include:

- civil society/nongovernmental organizations (representing beneficiaries and service providers)
- representatives of PLHIV
- the private sector
- health government sectors
- relevant non-health government sectors
- key development partners.

## Expected outputs

- Consensus on main findings of the HIV test–treat–retain analysis.
- Recommendations for urgent action to be taken to accelerate HIV testing and treatment scale-up.

## Tool 6. The cascade analysis report: outline

A report of the results of the cascade analysis should be written and should contain the following.

1. Title page.
2. Preface.
3. Acknowledgements page. Here all those who made it possible to carry out the assessment should be listed and thanked.
4. Summary page. In no more than one or one and half pages the HIV test–treat–retain cascade analysis should be summarized. The summary should state the objectives of the assessment, the methods and the findings related to the main barriers/gaps in the cascade.
5. Introduction section. In the introduction the current status of the treatment coverage being assessed should be described in detail. The HIV test–treat–retain cascade analysis methodology should be summarized. The objectives of the study should be clearly listed in a sub-section of this section. A sub-section on the limitation of the assessment should also be part of this section.
6. Methods section. The methods of the assessment should be described in full detail and should include thorough description of the data collection method, data entry and data analysis and any statistical methods used. Limitations of the data should also be discussed.
7. Findings section. The findings obtained should be described fully. Results should be given in narrative form and, wherever possible, tables, figures and graphs should be included. Gaps/leakages in the cascade should be clearly determined and their main identified causes are well-highlighted.
8. Conclusion. Conclusions should be drawn on the main reasons affecting access to and retention in care and treatment. This section summarizes the main problems as well as key opportunities for improvement. It should also discuss the reliability of the findings in light of the limitations identified in the methods section.
9. Recommendations. Key recommendations for improving the engagement and retention of PLHIV along the steps of the test–treat–retain cascade should be described in this section. These recommendations should be in line with the recommendations of the stakeholder consultation.

## References

1. Consolidated guidelines on HIV testing services. Geneva: World Health Organization; 2015 (<http://www.who.int/hiv/pub/guidelines/hiv-testing-services/en/>, accessed 10 November 2016).
2. Consolidated guidelines on the use of antiretroviral drugs for treating and preventing HIV infection: Recommendations for a public health approach. Second edition. Geneva: World Health Organization; 2016 (<http://www.who.int/hiv/pub/arv/arv-2016/en/>, accessed 10 November 2016).
3. Consolidated strategic information guidelines for HIV in the health sector. Geneva: World Health Organization; 2015 (<http://www.who.int/hiv/pub/guidelines/strategic-information-guidelines/en/>, accessed 10 November 2016).
4. Sustainable Development Goals. Goal 3: Ensure healthy lives and promote well-being for all at all ages. New York: United Nations; 2016 (<http://www.un.org/sustainabledevelopment/health/>, accessed 10 November 2016).
5. 90–90–90: An ambitious treatment target to help end the AIDS epidemic. Geneva: Joint United Nations Programme on HIV/AIDS; 2014 (<http://www.unaids.org/en/resources/documents/2014/90-90-90>, accessed 10 November 2016).
6. Service delivery approaches to HIV testing and counselling (HTC): A strategic policy framework. Geneva: World Health Organization; 2012 ([http://www.who.int/hiv/pub/vct/htc\\_framework/en/](http://www.who.int/hiv/pub/vct/htc_framework/en/), accessed 10 November 2016).
7. Guidance on couples HIV testing and counselling: including antiretroviral therapy for treatment and prevention in serodiscordant couples. Recommendations for a public health approach. Geneva: World Health Organization; 2012 (<http://www.who.int/hiv/pub/guidelines/9789241501972/en>, accessed 10 November 2016).



*This guide was developed to support national AIDS programme managers and their partners to implement the HIV test–treat–retain cascade analysis at country level. It includes guidance on how to use the cascade model to assess the magnitude and determinants of engagement along the continuum of care and also opportunities to improve the delivery of services to PLHIV and, ultimately, access to HIV testing and treatment. It suggests a process for conducting the cascade analysis in country in order to achieve broad stakeholder participation, consensus on the findings of the analysis and ownership of the conclusions and recommendations for improvements resulting from it.*

