HIV Continuum of Care Monitoring Framework

2014

Addendum to meeting report: Regional consultation on HIV epidemiologic information in Latin America and the Caribbean

Pan American Health Organization

World Health Organization
REGIONAL OFFICE FOR THE Americas

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Acronyms

AMDS	AIDS Medicines and Diagnostics Service
ANC	Antenatal care
ART	Antiretroviral therapy
ARVs	Antiretrovirals
CDC	United States Centers for Disease Control and Prevention
COMISCA	Council of Ministers of Health of Central America and the Dominican Republic
DHS	Demographic and Health Survey
EID	Early infant diagnosis
GARPR	Global AIDS response progress reporting
HIV	Human Immunodeficiency Virus
IDUs	Injecting drug users
IPT	Isoniazid preventive therapy
L&D	Labor and delivery
LAC	Latin America and the Caribbean
MDGs	Millennium Development Goals
MSM	Men who have sex with men
MTCT	Mother-to-child transmission of HIV
OECS	Organization of Eastern Caribbean States
ORAS	Andean Health Agency
PAHO	Pan American Health Organization
PLHIV	People living with HIV
STIs	Sexually transmitted infections
SWs	Sex workers
TB	Tuberculosis
UA	Universal Access indicator reported to WHO
UNAIDS	Joint United Nations Program on HIV/AIDS
UNFPA	United Nations Population Fund
UNGASS	United Nations General Assembly Special Session on HIV and AIDS
UNICEF	United Nations Children's Fund
VL	Viral load
WHO	World Health Organization

1 Introduction and Objective

Latin America and the Caribbean (LAC) is one of the regions of the world with one of the strongest response to HIV infection in terms of antiretroviral therapy (ART) and the prevention of mother-to-child transmission of HIV[1]. Certain aspects of managing health care programs are currently in transitional phases: public health principles are being applied, HIV infection is becoming consolidated as a chronic disease, and there is a need for greater integration and use of the different sources of information on HIV.

In order to discuss and move towards consensus on key recommendations for HIV surveillance and monitoring, in November 2012 in Panama, a *Regional Consultation for Latin America and the Caribbean on epidemiological information on HIV infection* was held. The participants were experts from 27 LAC countries, the United States, Canada, and international organizations active in the Region. Participants included health officials in charge of epidemiological surveillance of HIV in the member countries of the Pan American Health Organization (PAHO), as well as representatives of the United Nations agencies involved in the fight against AIDS (PAHO/WHO, Joint United Nations Program on HIV/AIDS—UNAIDS, United Nations Children's Fund—UNICEF, United Nations Population Fund—UNFPA), U.S. Centers for Disease Control and Prevention (CDC), Health Focus/GIZ, Organization of Eastern Caribbean States (OECS), Council of Ministers of Health of Central America and the Dominican Republic (COMISCA), Andean Health Agency (ORAS), and nongovernmental organizations.

Participants at this meeting discussed priority areas where epidemiological information is needed on HIV and other sexually transmitted infections (STIs), and identified the action that should be taken to close these information gaps. Their recommendations include the following:

- HIV surveillance should be based on cases of HIV infection (rather than on cases of AIDS) and should track the evolution of each case over time (longitudinal approach).
- Data should be collected for a minimum set of standardized variables, including risk behaviors and factors (such as sexual behavior, injecting drug use, and exposure to transfusion) and immunologic and treatment variables (such as viral load, CD4 cell count, and initiation of antiretroviral therapy—ART).
- Surveillance should include an assessment of access and quality throughout the continuum of care: diagnosis, initiation of care and treatment, retention in care and treatment, and control of viral load.

This document is intended to support the dissemination of the meeting's conclusions and the implementation of its recommendations in LAC countries, and to focus national programs on prioritizing key indicators in order to monitor the full cascade of HIV health care services.

Introduction and Objective

This document seeks to promote and prioritize the strategic use of information to improve the quality and outcomes of HIV treatment and care.

This technical document presents:

- A summary of the proposed framework, its logic, and its applications
- The methodology used to select the indicators
- The agreed indicators for the monitoring framework and their technical specifications, including their definition, rationale and use, method of calculation, disaggregation, and strengths and weaknesses.

2 Monitoring Framework

In 2013, WHO published consolidated guidelines for diagnosing HIV infection, caring for people living with HIV, and using antiretroviral drugs not only to treat HIV, but also to prevent its transmission[2].

To achieve a reduction in HIV transmission, antiretroviral treatment programs should guarantee a set of effective, high-quality services, including HIV testing, referrals to health care services, determination of eligibility to initiate ART, and support for the adherence and retention of patients in HIV care.

As countries adapt and implement the new recommendations, it will be necessary to adapt the information structures and systems to properly monitor the products and outcomes associated with these recommendations. It will also be essential to monitor outcomes both for individuals and for the general population, including mortality, survival, incidence, toxicity and adverse effects, drug resistance, and suppression of viral load. Accordingly, the monitoring and evaluation strategy will enable national programs to document the effects of the modified guidelines and will help evaluate their impact.

At the *Regional Consultation in Latin America and the Caribbean on epidemiological information on HIV infection*, a proposal was made to monitor HIV programs based on the "continuum of care" concept, implemented as a cascade that starts with diagnosis and is followed by linkage to the health care system, treatment, retention in care and treatment, and suppression of the viral load. This framework, which was accepted by the countries, supports the expansion and sustainability of treatment in Latin America and the Caribbean.

Operationally, the cascade is a monitoring framework that uses cross-sectional indicators to quantify the number of people diagnosed, linked to care, retained in care, on ART, and with a suppressed viral load, as a proportion of the estimated number of people living with HIV in the country (data generated by EPP/Spectrum models or retroactive calculation) in a given reporting year.

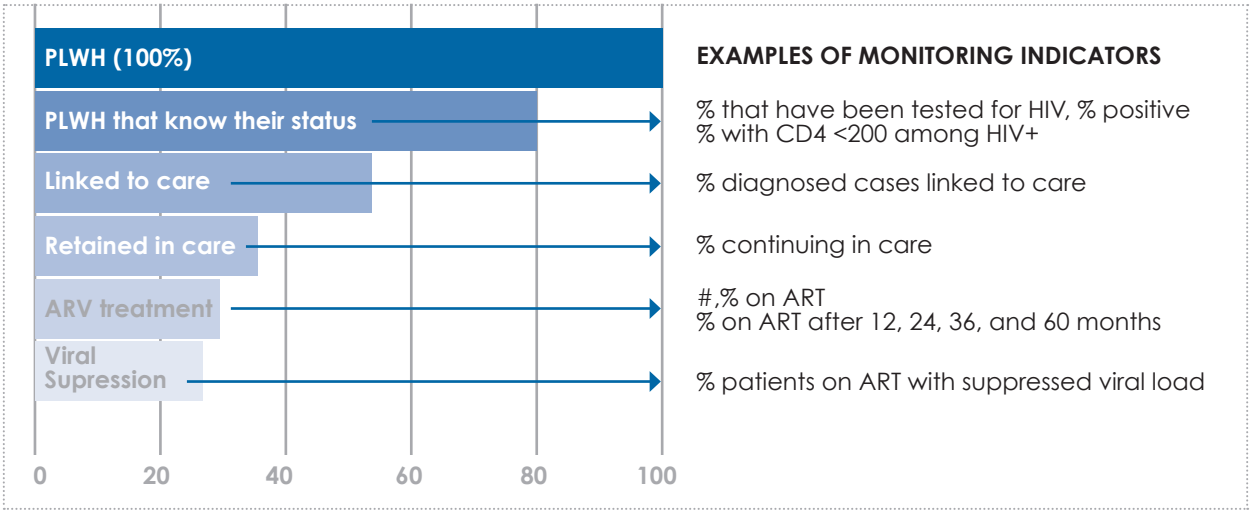
The cascade can be used to identify gaps in the effectiveness and impact of national policies for HIV diagnosis, care, and treatment, and to generate valuable strategic information to support the expansion and sustainability of antiretroviral therapy in Latin America and the Caribbean.

This proposal offers a tool for program monitoring and is based in large part on the reorganization and strategic use of indicators and data that already exist. By using the indicators in the continuum of care cascade (Figure 1), it is

possible to identify gaps in health care services at the individual level as well as the impact on the population (reduction of morbidity and mortality, and incidence of new infections).

At the regional consultation meeting, additional indicators of relevance and feasibility were proposed. These additional indicators were prioritized and divided into five areas: HIV testing, linkage to care, ART, adherence and retention in care, and suppression of viral load (Table 1).

Figure 1.
"Continuum of care cascade" indicators



Source: Adapted from Gardner EN et al. The spectrum of engagement in HIV care and its relevance to test-and-treat strategies for prevention of HIV infection. Clinical Infectious Diseases, 2011, 52:793–800.

Notes to Figure 1:

PLHIV
All persons from the population of a given locality (country, city, etc.) that are infected with HIV at a given time. It is a population based measurement, thus based on estimates from mathematical models such EPP/Spectrum
PLHIV who know their status
Persons in a population, who have been diagnosed with HIV, know their diagnosis, and who are still alive at a given time. The fact that a person knows their diagnosis of HIV+ is the first step in accessing the care and treatment of HIV.
PLHIV linked to care
Diagnosed HIV+ persons that have been linked to HIV care services and are alive. Linking to services can be measured with proxy indicators. For example, the opening of a clinical history, patient monitoring tests that are performed once the patient is in care (CD4 or viral load), or prescription or pick up of antiretroviral drugs.
PLHIV retained in care
Retention in care is defined as continuous engagement in appropriate medical care. In addition, treatment of HIV infection can be effective only if patients are retained in care over time. Personas retained in care are those linked to HIV care that continuously receive said services. This is measured as a proxy indicator with the time period of generally one year. For example, HIV+ linked to care that collect ARV drugs at least three times in the year or that have two CD4 or viral load tests performed during the year.
PLHIV on antiretroviral treatment
This are HIV+ persons in care, that meet criteria for ARV treatment and receive it. It is usually measured as at the end of a calendar year. Operationally it is often considered that a patient is in treatment if ARV drugs have been collected any time during the 3 months prior to the end of the calendar year.
PLHIV with viral suppression
PLWH linked to HIV care, with at least one viral load measurement result with less than 1,000 copies/ml in the period (usually a calendar year).

Table 1.

Proposed monitoring framework indicators for HIV programs based on the "continuum of care" concept

Indicator	Comments/Reference
Indicator group 1: Diagnosis of HIV infection	
1.1. Total number of people living with HIV (PLHIV): total population and key populations (MSM, SWs, and IDUs) **(first column of the cascade)**	Estimated value (EPP/Spectrum models or retroactive calculation).
1.2. Number and percentage of PLHIV diagnosed with HIV infection and know their serological status and percentage respect to the total number of PLHIV: total population and disaggregated by key populations (MSM, SWs, and IDUs) **(second column of the cascade)**	New indicator: based on HIV case monitoring (total reported and still alive). Cumulative data of all diagnosed persons who are still alive.
1.3. Number of PLHIV in key populations that know their serological status and percentage from the total of PLHIV in key populations **(optional second column of the cascade for key populations)**	New indicator: based on surveys of key populations.
1.4. Number of newly diagnosed HIV cases	New indicator: based on HIV case based surveillance.
1.5. Percentage of pregnant women who were tested for HIV and know their results	GARPR/UA indicator
1.6. Percentage of TB patients who had an HIV test result recorded in the TB register	WHO TB-HIV indicator
1.7. Median CD4 value closest to the time of diagnosis (first CD4 after diagnosis)	New indicator
1.8. Percent distribution of patient CD4 levels closest to diagnosis, by relevant thresholds (for example: <200; 200-349; 350-500; >500 cells/µl)	New/UA indicator
1.9. Percentage of HIV-positives among those tested for HIV, by subgroup (total and by subgroup: TB, pregnant women, and by testing strategy)	New indicator
1.10. Percentage of women and men aged 15-49 who received an HIV test in the last 12 months and know their results	GARPR/UA indicator
1.11. Percentage of SWs, IDUs, and MSM who received an HIV test in the last 12 months and know their results	GARPR/UA indicator
Indicator group 2: Linkage with care and retention in care	
2.1. Number of persons with an HIV diagnosis in HIV care and treatment services and percentage of all PLWH (linked to care) **(third column of the cascade)**	UA indicator
2.2. Number of newly diagnosed HIV cases who are linked to HIV care and treatment services and percentage of all PLHIV	New indicator
2.3. Number and percentage of PLHIV retained in HIV care and treatment services **(fourth column of the cascade)**	New indicator

2.4. Percentage of adults and children enrolled in HIV care starting isoniazid preventive therapy	WHO TB-HIV indicator
2.5. Percentage of adults and children enrolled in HIV care that had TB status assessed and recorded during their last visit	WHO TB-HIV indicator
2.6. Median time between HIV diagnosis and first contact with HIV care (proxy for first contact: CD4 count and/or viral load and/or first ARV pick-up)	New indicator
Indicator group 3: ARV Therapy (ART)	
3.1. Number of adults and children receiving antiretroviral therapy and percentage of total PLHIV **(fifth column of the cascade)**	GARPR/UA indicator
3.2. Number of adults and children receiving antiretroviral therapy and percentage of total PLHIV who are eligible for treatment	GARPR/UA indicator
3.3. Percentage of HIV-positive pregnant women who received antiretrovirals to reduce the risk of mother-to-child transmission	GARPR/UA indicator
3.4. Number of people in ART by treatment line (first, second, and third) and percentage of persons on ART	AMDS indicator
3.5. Number of first- and second-line ART regimens in use	AMDS indicator
3.6. Number and percentage of patients in each of the first- and second-line treatment regimens in use	AMDS indicator
3.7. Percentage of estimated HIV-positive incident TB cases that received treatment for both TB and HIV	GARPR and TB-HIV indicator
3.8. Average number of viral load tests per patient in ART, per year	AMDS indicator
3.9. Percentage of health facilities dispensing ARVs that experienced a stock-out of at least one ARV	UA indicator
3.10. Number of ARV stock-outs	PAHO indicator (according to the operational definition given at the meeting in the Dominican Republic)
Indicator group 4: Retention in ART	
4.1. Percentage of adults and children with HIV known to be on treatment 12, 24, 36, and 60 months after initiation of antiretroviral therapy	GARPR/UA indicator
Indicator group 5: Suppression of viral load	
5.1. Number and percentage of PLHIV with suppressed viral load **(sixth column of the cascade)**	New indicator
5.2. Percentage of PLHIV in ART with suppressed viral load	New indicator

GARPR: Global AIDS response progress reporting
AMDS: Antirretroviral medicines and diagnostics survey, WHO.
Where applicable, indicators should be disaggregated by age group (<>15 years old) and sex.

3 Methodology

This monitoring framework is a synthesis of consensus-based international recommendations for monitoring HIV treatment and care, and is based on the countries' experience with the monitoring of the HIV response and the use of indicators. International indicators were reviewed such as those referring to monitoring HIV drug resistance, HIV testing and counselling, HIV treatment, TB/HIV co-infection, prevention of mother-to child transmission (PMTCT), and treatment as prevention (TasP).

The indicators measure access to care, retention in care, and when and how care is received. The indicators provide a snapshot of the status of the HIV continuum of care, from early diagnostic testing to life-long antiretroviral therapy. A public health approach is used, based on existing global recommendations of a set of key indicators for use in the countries of the Region. The framework is based on routine monitoring data so that it can be used for periodic evaluation and improved quality at the national and subnational levels.

Information for the calculation of national HIV care and treatment cascades

The HIV care and treatment cascade is usually calculated for all patients living with HIV in the country at a given time (for example, December 2013). The cross-sectional indicators should be calculated for each column. Cascades can also be calculated by subgroups (age, sex, and key populations, if these data are available). Partial cascades can also be calculated for subgroups of patients, for example, newly diagnosed cases in 2012. The available information systems may not provide the necessary information to build the cascade, requiring assumptions and estimates based on samples or other procedures. In such cases, it is important to document all the assumptions and data limitations to ensure a correct interpretation of the results.

4 Technical Specifications of the Indicators

Indicator Group 1: Diagnosis of HIV infection	
1.1. Total number of people living with HIV (PLHIV): total population and key populations (MSM, SWs, and IDUs) (first column of the cascade)	
Rationale	HIV infection has become a major public health problem and it is crucial to monitor the clinical course of the epidemic and the impact of interventions. Both the Millennium Development Goals (MDGs) and the United Nations General Assembly Special Session (UNGASS) on HIV/AIDS have set targets to reduce the prevalence of HIV.
What it measures	This indicator measures the number of persons with HIv that are alive in the reporting period. Estimated magnitude of the epidemic and the advances made in the reduction of HIV prevalence in the general population and other key populations, including MSM, SWs, and IDUs.
Numerator	The estimated number of people with HIV who are still alive at the end of a given year.
Denominator	Not applicable.
How to measure / Measurement tools	Spectrum projection model[1]. In this case, the data can be obtained as follows from Spectrum software: . For total population: results > total population > HIV population . For population aged 15–49: results > adults (15–49) > HIV population (15–49) . For population aged 15–49, by subgroup (IDUs, SWs, and MSM): results > adults (15–49) > HIV population, by risk group (15–49).
Disaggregation	Sex Age group: <15, ≥15 Population subgroups (IDUs, MSM, SWs) CD4 level
Strengths and weaknesses	Most countries do not conduct studies of HIV prevalence in the general population due to their high cost and complex implementation. Modelling procedures make it possible to obtain data on the number of infected people by sex, age, and population subgroups. Meanwhile, the quality of these estimates is directly related to the quality of programmatic data and the quality and representativeness of the surveillance data used in the modelling process.

[1] Spectrum software consists of a set of models that can be used to predict the impact of the HIV epidemic. Spectrum has been developed by Futures Institute and can be downloaded from http://www.futuresinstitute.org/Pages/Spectrum.aspx.

Data use	Estimate of the magnitude of the epidemic at the national level, aimed at measuring advances in the diagnosis of people with HIV in the general population and in key populations. The estimated number of PLHIV is reflected in the first column of the continuum of care cascade and is used as the denominator for all indicators in the cascade.
1.2. Number and percentage of PLHIV diagnosed with HIV infection who know their serological status. (second column of the cascade) 	
Rationale	Knowledge of serological status is a critical factor in the decision to seek treatment.
What it measures	The progress made in implementing HIV testing and counseling, and in reporting HIV cases in the general population and key population.
Numerator	Total population: Number of people diagnosed and reported with HIV infection who are still alive at the end of the reference period (e.g. December 2012). Disaggregation by subgroups, for example MSM: Number of MSM diagnosed and reported with HIV infection who are still alive. SWs: Number of SWs diagnosed and reported with HIV infection who are still alive. IDUs: Number of IDUs diagnosed and reported with HIV infection who are still alive.
Denominator	Total population: Total estimated number of people living with HIV MSM: Estimated number of MSM living with HIV. SWs: Estimated number of SWs living with HIV. IDUs: Estimated number of IDUs living with HIV.
How to measure / Measurement tools	Numerator: Surveillance system for reporting cases of HIV infection: These are the cases diagnosed and reported in the HIV surveillance information system who are still alive at the time of the evaluation. Reported cases whose vital status has been updated as "deceased" are excluded from the numerator. Through linkage with the country-specific mortality database, the vital status of cases can be updated and underreporting can be reduced. Linkage with other information systems (e.g. laboratory, ARVT) can also reduce the underreporting of cases. Denominator: Estimate of the number of people living with HIV based on models such as: Spectrum projection model . In this case, the obtained data will be used as follows: For total population: results > total population > HIV population . For population aged 15–49: results > adults (15–49) > HIV population (15–49) . For population aged 15–49, by subgroup (IDUs, SWs, and MSM): results > adults (15–49) > HIV population, by risk group (15–49).
Disaggregation	Sex Age group: <15; ≥15 Most at risk key population subgroups Pregnant women

[2] Spectrum software consists of a set of models that can be used to predict the impact of the HIV epidemic. Spectrum has been developed by Futures Institute and can be downloaded from http://www.futuresinstitute.org/Pages/Spectrum.aspx.

Strengths and weaknesses	For the denominator, the quality of these estimates is directly related to the quality of the programmatic data and surveillance data used in the modelling process. Disaggregation by key population is not always possible due to low-quality data in the surveillance information system, or in the linked systems. Many countries do not know how many reported cases of HIV infection are still alive, especially by population subgroups, since the reporting of risky behavior is very irregular in quality. One way of determining this for the key subpopulations is through serological surveys (See indicator 1.2. Option b).
Data use	Monitor the progress made in expanding testing activities in the general population and key populations; estimates the diagnostic gap in people with HIV in the country. The numerator (people diagnosed with HIV who are still alive) is the second column of the continuum of care cascade.

1.3. (Sub-indicator for key population) Number of PLHIV in key populations that know their serological status and percentage from the total of PLHIV in key populations Optional second column of the cascade for key populations

Rationale	Knowledge of serological status is a critical factor in the decision to seek treatment.
What it measures	The progress made in implementing HIV testing and counseling, in key populations and diagnosis of HIV among PLHIV among key populations, using representative key population surveys.
Numerator	MSM: Number of MSM who participated in the survey and who tested positive for the HIV and who previously knew their HIV status. SWs: Number of SWs who participated in the survey and who tested positive for the HIV and who previously knew their HIV status. IDUs: Number of IDUs who participated in the survey and who tested positive for HIV and who previously knew their HIV status.
Denominator	MSM: Number of MSM who participated in the survey and who tested positive for HIV during the survey. SWs: Number of SWs who participated in the survey and who tested positive for HIV during the survey. IDUs: Number of IDUs who participated in the survey and who tested positive for HIV during the survey.
Calculation	Calculated by population subgroup: Numerator/denominator *100 To estimate the value of the 2nd pillar of the cascade, the previous percentage should be multiplied by the estimated number of people living with HIV in the subgroup (estimated in Spectrum).
How to measure / Measurement tools	The numerator and denominator are calculated through special surveys (e.g. integrated biological and behavioral surveys) In addition to the serological results, participants are asked: 1. *I don't want to know the results, but have you been tested for HIV?* 2. *If the answer is yes: I don't want to know the result, but do you know the result of the test?*
Disaggregation	Sex (if applicable) Age group: <24; ≥25
Strengths and weaknesses	This indicator is useful when there are surveillance surveys of key populations that serve as representative samples. In this type of survey, the sample may not be representative and may be subject to selection bias.

Data use	Follows the progress made in expanding testing activities in the key populations; estimates the diagnostic gap in the highest-risk population subgroups in the country.
Other considerations	This calculation methodology can be used if the country does not have an HIV surveillance system or if the system is not sufficiently complete and reliable. It will serve as a good approximation to indicator 1.2 only if the survey's sampling methodology ensures the representativeness of the studied subpopulation.
1.4. Number of newly diagnosed HIV cases in the reporting year	
Rationale	Knowing the number and characteristics of newly diagnosed HIV cases is important in order to monitor the response to the epidemic, to understand HIV transmission patterns, and for interventions to prevent HIV.
What it measures	The number of new HIV cases diagnosed and reported in the reporting period (generally a calendar year).
Numerator	Number of people diagnosed and reported with HIV infection in the reporting period (generally a calendar year).
Denominator	Not applicable.
How to measure / Measurement tools	Surveillance data on new HIV cases diagnosed and reported in the period. Linkage with other information systems (e.g. laboratory, ARVT) can reduce the underreporting of cases.
Disaggregation	Sex Age group: <15; ≥15 Population subgroups
Strengths and weaknesses	The quality of this data is directly related to the quality of the HIV surveillance system. Disaggregation by key population is not always possible due to unreliable and/or low-quality data in the surveillance information system.
Data use	This indicator is useful when the trend over time is considered for new cases of HIV infection and their distribution by population group, age, and sex.
1.5. Percentage of pregnant women who were tested for HIV and know their results	
Rationale	The risk of mother-to-child transmission (MTCT) of HIV can be reduced through a series of interventions, including the provision of antiretroviral prophylaxis to women during pregnancy and labor. Receiving HIV testing and counseling in the earliest possible stage of pregnancy enables HIV-positive pregnant women to benefit from HIV services and to access interventions that reduce the likelihood of transmitting the virus to their babies.
What it measures	This indicator measures the percentage of pregnant women who were tested for HIV in the last 12 months and received their results; i.e. the percentage of pregnant women who became aware of their HIV status in the last 12 months.
Numerator	Number of women who received antenatal, labor and delivery (L&D), and postpartum health care services, and who received an HIV test and know their results, plus HIV-positive women who received antenatal care (ANC) for a new pregnancy in the last 12 months.
Denominator	Estimated number of pregnant women in the last 12 months.

How to measure / Measurement tools	Numerator: Program/health facility registers. Denominator: Estimated population of pregnant women in the country. How to measure it: The numerator is the sum of categories a-d: a) pregnant women who were tested for HIV and received their results during ANC; b) pregnant women attending L&D with unknown HIV status who were tested for HIV in the L&D facility and received their result; c) women with unknown HIV status attending postpartum services within 72 hours of delivery who were tested for HIV and received their result; d) pregnant women with known HIV infection attending ANC for a new pregnancy. The denominator is generated through a population estimate of the number of pregnant women giving birth in the last 12 months, which can be obtained from Centralized Statistics Office estimates of births or UN Population Division estimates.
Disaggregation	Service type: antenatal care, labor and delivery, postpartum.
Strengths and weaknesses	This indicator makes it possible to monitor trends in HIV testing among pregnant women and women receive postpartum services. This indicator provides a good measure of how effectively HIV testing and counselling services are being provided to pregnant women and women receiving postpartum services. There is a risk for double counting women in the numerator since a pregnant woman can be tested more than once while receiving ANC, L&D, or postpartum services.
1.6. Percentage of TB patients who had an HIV test result recorded in the TB register	
Rationale	TB is the leading cause of morbidity and mortality among people living with HIV in many countries. High rates of HIV coinfection are found among TB patients in settings with high HIV prevalence. In these settings, ensuring that TB patients receive HIV testing and counselling services should be a high priority. Knowledge of HIV status enables HIV-positive TB patients to access the most appropriate HIV prevention, treatment, care and support services. Trends over time will demonstrate progress towards national and international targets.
What it measures	This indicator measures the coverage of HIV testing among TB patients.
Numerator	Number of TB patients who had an HIV test result recorded in the TB register.
Denominator	Total number of TB patients registered in the reporting year.
How to measure / Measurement tools	Program records. Routine recording and reporting forms and registers recommended by WHO (http:/www.who.int/tb/dots/r_and_r_forms/ in/index.html). Quarterly Report on TB Case Registration in Basic Management Unit (BMU). How to measure it: Data for this indicator can be collected using national program records aggregated from facility registers, either the TB register or a separate HIV testing and counselling register. Where available, data should come from the national TB control program surveillance system and should include data from TB services delivered in public and private health facilities and prisons, as well as from TB services delivered by faith-based and nongovernmental organizations Data should also be disaggregated based on the result of the HIV test.

Disaggregation	Sex Age group: 0-4, 5-14, ≥15. HIV status: HIV-positive, HIV-negative.
Strengths and weaknesses	This indicator is based on the WHO-recommended monitoring and evaluation system for national TB control programs. These data will help national programs to project HIV testing needs and related inputs, as well as national requirements for human resources training. Tracking this number from year to year will provide information on whether TB patients are receiving sufficient HIV testing and counselling, so that HIV-positive TB patients can access appropriate HIV services. A limitation of this indicator is that health providers may treat TB without registering with the national TB control program, which means that these individuals would not be counted.
1.7. Median CD4 count closest to the time of diagnosis	
Rationale	As countries expand access to HIV diagnosis it is important to monitor whether people are receiving a diagnosis at an early stage.
What it measures	This indicator measures the median of the initial CD4 count among people who had an initial CD4 count during the reporting period.
Numerator	Calculation of the median initial CD4 count at the time of diagnosis among PLHIV diagnosed in the reporting period.
Denominator	Not applicable.
How to measure / Measurement tools	This indicator is based on data from laboratory information systems and from the records of patients in treatment.
Disaggregation	Sex Age group: <15; ≥15
Strengths and weaknesses	The initial CD4 count is not necessarily calculated at the time of diagnosis or in a timely manner. The available data may not correspond to all individuals diagnosed in the reporting year. This indicator does not distinguish between people who were given a late diagnosis and those who were late in seeking treatment. In order to differentiate between these two situations, it is necessary to look at the diagnosis date and the date of the initial CD4 lymphocyte count. See indicator 2.6.
1.8. Percent distribution of patient CD4 levels closest to diagnosis, by relevant thresholds (for example: <200; 200-349; 350-500; >500 cells/µl)	
Rationale	As countries increase HIV-related services, it is important to monitor whether people are receiving a diagnosis at an early stage (or what percentage is still receiving a diagnosis at a later stage).
What it measures	This indicator measures the proportional distribution of the initial lymphocyte count in the following categories: <200; 200-349; 350-500; >500 cells/µl.
Numerator	HIV-positive individuals whose initial CD4 lymphocyte count was: a. less than 200 cells/µl in the reporting period b. 200-349 cells/µl in the reporting period c. 350-500 cells/µl in the reporting period >500 cells/µl in the reporting period. The reporting period is generally one calendar year.
Denominator	Number of HIV-positive individuals who had an initial CD4 lymphocyte count in the reporting period.

How to measure / Measurement tools	This indicator is based on data from laboratory information systems and from the records of patients in treatment.
Disaggregation	Sex Age group: <15; ≥15
Strengths and weaknesses	This indicator does not distinguish between people who were given a late diagnosis and those who were late in seeking treatment. In order to differentiate between these two situations, it is necessary to look at the diagnosis date and the date of the initial CD4 lymphocyte count. Where there is more than one month difference between the two dates, this may indicate a delay in linkage to care. A difference of less than 1 month suggests a late diagnosis. In addition, late diagnosis and late linkage to care may concur in the same patient. The available data may not include all individuals diagnosed in the reporting period.

1.9. Percentage of HIV-positives among those tested for HIV, by subgroup (total and by subgroup: TB, pregnant women, and by testing strategy)

Rationale	Knowledge of HIV status itself is a major factor in the decision to seek care and treatment. As HTC expands in coutries there is a wider focus on earlier diagnosis.
What it measures	Percentage of HIV-positive individuals among all persons screened in the reporting year.
Numerator	Number of people screened for HIV and who tested positive in the reporting year.
Denominator	Number of people screened for HIV in the reporting year.
How to measure / Measurement tools	Numerator and denominator: testing center registers (antenatal care clinics, TB health care centers, etc.).
Disaggregation	Sex Age group: <15; ≥15 Population group: TB patients and pregnant women Testing strategy/method
Strengths and weaknesses	This indicator does not necessarily replace the HIV prevalence indicator.

1.10. Percentage of women and men aged 15-49 who received an HIV test in the last 12 months and know their results

Rationale	It is important for people to know their HIV status. Knowledge of serological status is a critical factor in the decision to seek care and treatment.
What it measures	The progress made in providing HIV counseling and testing.
Numerator	Number of interviewees aged 15-49 who have had an HIV test in the last 12 months and know the results.
Denominator	Total number of interviewees aged 15-49.
How to measure / Measurement tools	Demographic baseline surveys (Demographic and Health Survey–DHS or other representative population surveys). Interviewees are asked: 1. *I don't want to know the results, but have you been tested for HIV in the last 12 months?* 2. *If the answer is yes: I don't want to know the result, but do you know the result of the test?*

Disaggregation	Sex Age group: 15-19, 20-24, and 25-49
Strengths and weaknesses	The initial statement, "I don't want to know the results, but..." improves the reporting process and reduces the risk of having limited information on HIV tests among people who do not wish to reveal their serological status. Knowing the result of the HIV test carried out in the last 12 months does not guarantee that interviewees know their current serological status. An interviewee may have contracted HIV since the last test.
Other considerations	For more information on DHS methodology and instruments, visit http://www.measuredhs.com/.

1.11. Percentage of SWs, IDUs, and MSM who received an HIV test in the last 12 months and know their results

Rationale	It is important for people to know their HIV status. Knowledge of serological status is a critical factor in the decision to seek care and treatment.
What it measures	The progress made in implementation of HIV testing and counselling among sex workers, injecting drug users, and men who have sex with men.
Numerator	Number of SWs/MSM/IDUs who have had an HIV test in the last 12 months and know the results.
Denominator	Number of SWs/MSM/IDUs included in the sample.
How to measure / Measurement tools	Follow-up behavioral survey or other special survey. SWs/IDUs/MSM are asked: 1. *Have you had an HIV test in the last 12 months?* If the response is yes: 2. *I don't want to know the results, but do you know the result of the test?* Whenever possible, data should be obtained from SWs/MSM/IDUs through civil society organizations that have worked closely with this population in the field. The information that the study participants provide should be kept confidential.
Disaggregation	Sex Age group: < 25 and ≥ 25
Strengths and weaknesses	It can be difficult to have access to SWs/MSM/IDUs and/or to conduct surveys among them. Consequently, the obtained data may not be based on a representative national sample of SWs/MSM/IDUs. If there is concern that the data are not based on a representative sample, this concern should be reflected in the interpretation of the survey data. When there are various data sources, the best available estimate should be used. Information on sample size, quality and reliability of data, or any other related problem should be included in the report presented with this indicator. It can be difficult to monitor SWs/MSM/IDUs to measure the progress made: these groups are in constant movement and are difficult to reach, since many of them are hidden populations. As a result, the information on the nature of the interviewed sample should be included in the descriptive report in order to facilitate its interpretation and analysis in the future. In order to maximize the usefulness of these data, it is recommended that the sample used to calculate this indicator also be used to calculate the other indicators related to these populations.

Other considerations	For more information, consult: UNAIDS (2008). A Framework for Monitoring and Evaluating HIV Prevention Programmes for Most-At-Risk Populations. Geneva: UNAIDS. UNAIDS (2007). Practical Guidelines for Intensifying HIV Prevention: Towards Universal Access. Geneva: UNAIDS. WHO. Prevention and Treatment of HIV and other Sexually Transmitted Infections for Sex Workers in Low- and Middle-income Countries. Recommendations for a public health approach. Available at: http:/apps.who.int/iris/bitstream/10665/77745/1/9789241504744_eng.pdf.

Indicator Group 2: Linkage with treatment and care

2.1. Number of persons with an HIV diagnosis in HIV care and treatment services and percentage of all PLWH (third column of the cascade) 

Rationale	With increased diagnosis and an expanded HIV care network, a constantly increasing number of people with HIV have access to health care and treatment services. It is important to monitor progress in the linkage between diagnosed patients and treatment/care.
What it measures	This indicator offers cross sectional information on the proportion of people who receive HIV care (measured as those who had a CD4 lymphocyte count and/or viral load, and/or picked up ARVs at least once in the reporting year).
Numerator	Total number of HIV-positive individuals who had a CD4 lymphocyte count or VL, or who picked up ARVs or were seen at least once for HIV infection in the reporting year.
Denominator	Estimated number of people living with HIV in the reporting year.
How to measure / Measurement tools	Numerator: Health facility registers of patients in treatment. Number of patients with a CD4 count or VL, or who picked up ARVs or had a consultation in the reporting period is counted. Denominator: Estimated number of PLHIV in the reporting period (Spectrum estimates).
Disaggregation	Sex Age group: 0-4, 5-14, ≥15 Pregnant women
Strengths and weaknesses	This indicator makes it possible to monitor trends in the linkage between people diagnosed with HIV infection and health care services, but does not measure details or the quality of care provided. Neither does it capture retention in health care services during the period.
Other considerations	This is a core indicator of the continuum of care cascade.

2.2. Number and percentage of newly diagnosed HIV cases in the reporting year who were included in HIV treatment and care services

Rationale	With increased diagnosis and an expanded HIV care network, a constantly increasing number of people with HIV have access to health care and treatment services. It is important to monitor progress in the linkage between diagnosed patients and treatment/care.
What it measures	This indicator measures the proportion of newly diagnosed cases in the reporting year that received health care services (a CD4 lymphocyte count and/or viral load, and/or picked up ARVs). This indicator measures timely access to health care services.

Numerator	Number of people diagnosed with HIV infection in the reporting year who had one of the following: a CD4 lymphocyte count or VL, or picked up ARVs or a had consultation for HIV treatment in the reporting year.
Denominator	Number of newly diagnosed HIV cases in the reporting year.
How to measure / Measurement tools	Numerator: Health facility registers of new patients in treatment. Number of patients with a CD4 count or VL, or who picked up ARVs or had a consultation in the reporting period is counted. Denominator: Newly diagnosed HIV cases in the reporting year, based on case monitoring registers.
Disaggregation	Sex Age group: <15; ≥15
Strengths and weaknesses	This indicator makes it possible to monitor trends in inclusion in health care services, but does not measure details or the quality of care provided. Neither does it capture retention in health care services during the period.

2.3. Number and percentage of PLHIV retained in HIV health care services (fourth column of the cascade)

Rationale	Ensuring that people with HIV remain in the treatment process is fundamental in order to obtain optimal health outcomes. For people who do not show signs that they immediately need ART, medical consultations offer the opportunity to detect, prevent, and treat other disorders and comorbid conditions, as well as clinical and laboratory monitoring, so that ART can be initiated as soon as there are signs that the time is right to do so.
What it measures	Number and percentage of people with HIV in treatment services who: a) Have had two or more consultations in the last 12 months b) Have had a CD4 lymphocyte count two or more times in the last 12 months or c) Have had their viral load measured two or more times in the last 12 months or d) Have picked up ARVs at least twice in the last 12 months; (or based on country's policy).
Numerator	Number of people with HIV in treatment services who: a) Have had two or more consultations in the last 12 months b) Have had a CD4 lymphocyte count two or more times in the last 12 months or c) Have had their viral load measured two or more times in the last 12 months or d) Have picked up ARVs at least three times in the last 12 months.
Denominator	Estimated number of PLHIV.
How to measure / Measurement tools	The numerator is obtained from patient treatment registers and the laboratory and pharmacy information system. Denominator: Spectrum/EPP estimate.
Disaggregation	Sex Age group: 0-14, ≥15 years
Strengths and weaknesses	This indicator makes it possible to monitor trends in linkage and retention in health care services for people diagnosed with HIV. Where there are limitations in the provision of CD4 or VL testing, or stock-out situations, the indicator may underestimate the number of people retained in care.

2.4. Percentage of adults and children in HIV care starting isoniazid preventive therapy (IPT)	
Rationale	To ensure that eligible HIV-positive individuals are given treatment for latent TB infection and thus to reduce the incidence of TB in people living with HIV.
What it measures	Number of adults and children newly enrolled in HIV care who are started on treatment for latent TB infection (isoniazid preventive therapy, also called isoniazid prophylaxis), expressed as a proportion of the total number of adults and children newly enrolled in HIV care during the reporting period.
Numerator	Total number of adults and children newly enrolled in HIV care who start (are given at least one dose of) IPT during the reporting period.
Denominator	Total number of adults and children newly enrolled in HIV care during the reporting period.
How to measure / Measurement tools	HIV care and treatment registers. The data needed for this indicator are collected from patient registers at the HIV care service sites where the IPT is to be provided. HIV-positive individuals should be screened for TB. Those who are found not to have evidence of active TB will be offered IPT, in accordance with national guidelines. All those accepting IPT and receiving at least the first dose of treatment should be recorded.
Disaggregation	Sex Age: <15; ≥15
Strengths and weaknesses	Treatment of latent TB infection will reduce the incidence of TB disease developing in people living with HIV who are infected with TB but have no active TB disease. This information is the minimum necessary to ensure that IPT is being offered to HIV-positive individuals without clinical signs of active TB.
2.5. Percentage of adults and children enrolled in HIV care who had TB status assessed and recorded during their last visit	
Rationale	This is a process indicator for an activity intended to reduce the impact of TB among people with HIV. It reflects the level of implementation of the recommendation that people with HIV should be screened for TB.
What it measures	Number of adults and children enrolled in HIV care who were screened for TB during their last visit.
Numerator	Number of adults and children enrolled in HIV care who were screened for TB during their last visit during the reporting period.
Denominator	Number of adults and children enrolled in HIV care during the reporting period.
How to measure / Measurement tools	WHO recommends the use of a simplified screening algorithm for intensified TB case findings that includes four clinical symptoms: (1) current cough, (2) fever, (3) weight loss, and (4) night sweats. This simplified algorithm to assess TB status should be used at each visit and recorded on the patient HIV care, at all facilities providing routine HIV care. "Enrolled in care" includes all those continuing in care and those newly enrolled during the reporting period This data should be analyzed and reported together with other cross-sectional data at the national level. The numerator is taken from the patient care registers by counting the number of patients who had their TB status assessed during the reporting period. The denominator is taken from the patient care registers by counting the number of patients with a visit during the reporting period. TB and HIV programs should collaborate to ensure that agreed criteria for identifying a TB suspect and methods of TB screening are used that are consistent with TB control program protocols.

Disaggregation	Sex Age group: <15; ≥15
Strengths and weaknesses	TB status assessment among people living with HIV, followed by prompt referral for diagnosis and treatment, increases the chances of survival, improves quality of life, and reduces transmission of TB in the community. TB status assessment identifies HIV-positive clients who show no evidence of active TB and would benefit from treatment with isoniazid for latent TB infection. The indicator does not measure the quality of intensified TB case-finding nor does it reveal whether those identified as suspects are investigated further or effectively for TB. However, it does emphasize the importance of intensified TB case-finding for people living with HIV at diagnosis and at every contact they have with HIV treatment and care services. Programs should aim for a high value for this indicator (close to 100%) but should interpret it in conjunction with values of indicators related to the % of people in HIV care who: a) are on TB treatment; and b) who were given treatment for latent TB infection, to ensure that appropriate action follows the screening process.
2.6. Median time between HIV diagnosis and first contact with HIV care (proxy for first contact: CD4 count and/or viral load and/or first ARV pick-up)	
Rationale	As countries increase HIV care services, it is important to monitor whether people are receiving an early diagnosis. A late diagnosis is an important predictor of morbidity and mortality among people living with HIV. It is critical that people diagnosed with HIV and linked to health care services as soon as they are diagnosed.
What it measures	How quickly patients diagnosed with HIV are linked to patient care.
Numerator	Time, in months, between the date of HIV diagnosis and the date of the first CD4 count or viral load or ARV pick-up or consultation with HIV care services. Based on these values, the median is determined.
Denominator	Not applicable.
How to measure / Measurement tools	The diagnosis date can be obtained from HIV case registers or files. The date of the first CD4 count or viral load or ARV pick-up can be obtained from laboratory information systems (date of blood sample can be used as second date) or from pharmacy information systems (second date is first ART prescription).
Disaggregation	None.
Strengths and weaknesses	If CD4 or viral load are not measured immediately in all patients, or if there is a shortage of reagents for these tests, this could compromise the results of the indicator.
Indicator Group 3: ARV Therapy (ART)	
3.1. Number of adults and children currently receiving antiretroviral therapy and percentage of total estimated PLHIV (fifth column of the cascade) 	
Rationale	As the HIV epidemic matures, increasing numbers of people are reaching advanced stages of HIV infection. Antiretroviral therapy (ART) is a key intervention that has proven to be effective in reducing mortality and morbidity among people with HIV. ART should be provided in conjunction with broader care and support services.
What it measures	Progress towards providing antiretroviral therapy to all people eligible for treatment.

Numerator	Number of eligible adults and children currently receiving antiretroviral therapy at the end of the reporting period.
Denominator	Estimated number of children and adults living with HIV in the reporting period.
How to measure / Measurement tools	For the numerator: facility-based antiretroviral therapy registers drug supply management systems. For the denominator: HIV estimation models, such as Spectrum.
Disaggregation	Sex Age group: 0-5, >5-14, ≥15
Strengths and weaknesses	The indicator makes it possible to measure the gap in the HIV continuum of care, although it does not consider that, depending on national criteria, not all HIV-positive people are eligible for ARV treatment. The indicator does not attempt to distinguish between different forms of antiretroviral therapy or to measure the cost, quality, or effectiveness of the treatment regimen provided. This indicator of ARV treatment is the most comparable year-to-year since it is independent of variations in eligibility for initiating treatment.
Other considerations	This is an indicator in the cascade.

3.2. Number of adults and children currently receiving antiretroviral therapy and percentage of total PLHIV who are eligible for treatment

Rationale	As the HIV epidemic matures, increasing numbers of people are reaching advanced stages of HIV infection. Antiretroviral therapy (ART) has been shown to reduce mortality among people with HIV and efforts are being made to make it more affordable in low- and middle-income countries. ART should be provided in conjunction with broader care and support services.
What it measures	Progress towards providing antiretroviral therapy to all people eligible for treatment. This is the standard ARVT outreach indicator for eligible PLHIV.
Numerator	Number of eligible adults and children currently receiving antiretroviral therapy in accordance with the nationally approved treatment protocol (or WHO standards) at the end of the reporting period.
Denominator	Estimated number of eligible adults and children.
How to measure / Measurement tools	Data should be collected continuously at the facility level and aggregated periodically. Program monitoring and HIV surveillance. For the numerator: facility-based antiretroviral therapy registers drug supply management systems. For the denominator: HIV estimation models, such as Spectrum
Disaggregation	Sex Age group: 0-4, 5-14, ≥15

Strengths and weaknesses	The criteria for ART eligibility vary by country. To make this indicator comparable across countries, global reports present ART coverage for adults based on the eligibility criteria currently recommended by WHO. However, the criteria for initiating treatment have changed in recent years, based on new scientific evidence. This fact should be taken into account when assessing ART coverage trends. The indicator makes it possible to monitor trends in coverage but does not attempt to distinguish between different forms of antiretroviral therapy or to measure the cost, quality or effectiveness of the treatment regimen provided. These will each vary within and between countries and are liable to change over time. The proportion of people needing antiretroviral therapy varies with the stage of the HIV epidemic and the cumulative coverage and effectiveness of antiretroviral therapy among adults and children. National criteria for ART eligibility varies by country. The indicator measures the number of people provided with medication but does not measure whether the individual took the medication; thus, it is not a measure of adherence.
3.3. Percentage of HIV-positive pregnant women who received antiretrovirals to reduce the risk of mother-to-child transmission	
Rationale	The risk of mother-to-child transmission can be significantly reduced by providing antiretroviral drugs (as life-long therapy or prophylaxis) to the mother during pregnancy and delivery, with antiretroviral prophylaxis for the infant, and antiretrovirals for the mother or child during breastfeeding (if this occurs), and using safe delivery practices and safer infant feeding practices. This indicator tracks progress toward national and international targets for the elimination of mother-to-child transmission. When disaggregated by regimen type, it will also assess progress in implementing more effective regimes.
What it measures	Progress in the prevention of mother-to-child transmission during pregnancy and childbirth through the provision of antiretroviral drugs. This indicator allows countries to monitor the coverage of antiretroviral drugs to HIV-positive pregnant women to reduce the risk of HIV transmission to their babies during the pregnancy and delivery. When disaggregated by regimen, this indicator can show increased access to more effective antiretroviral drug regimens for prevention of mother-to-child transmission of HIV, as well as ART.
Numerator	Number of HIV-positive pregnant women who received antiretroviral drugs in the last 12 months to reduce the risk of mother-to-child transmission. The numerator should exclude pregnant women who received a single dose of nevirapine as this is not considered an appropriate regimen for the prevention of mother-to-child HIV transmission.
Denominator	Estimated number of HIV-positive pregnant women in the last 12 months.
How to measure / Measurement tools	For the numerator: program records on pregnant women who receive ARV. For the denominator, there are several options: a) estimation models, such as Spectrum b) HIV prevalence in pregnant women (obtained from surveillance surveys in antenatal health care centers in combination with population data to estimate the total number of pregnant women in a year, adjusted according to survey coverage in antenatal health care centers). c) Data on HIV prevalence in pregnant and parturient women, based on program data in combination with population data to estimate the total number of pregnant women in a year.

Disaggregation	The numerator should be disaggregated into the following four general categories: 1. Life-long antiretroviral therapy: 1.a. The woman is newly initiated on ART during the current pregnancy. 1.b. The woman was already on ART prior to the current pregnancy. 2. Maternal triple ARV prophylaxis (prophylaxis component of WHO Option B): after the pregnancy the mother will discontinue ART. 3. Maternal AZT (prophylaxis component during pregnancy and delivery of WHO Option A or WHO 2006 guidelines). 4. Other (please specify: e.g. specific regimen, uncategorized, etc.).
Strengths and weaknesses	Since the indicator measures antiretroviral drugs dispensed and not those consumed, it is not possible to determine adherence to the regimen. This indicator does not capture the use of postpartum regimens for the mother (to reduce transmission and viral resistance) or for the infant (to reduce peripartum transmission) that should accompany antiretroviral drug regimens to reduce peripartum mother-to-child transmission.
Other considerations	The prevention of mother-to-child transmission is a rapidly evolving programmatic area. Methods for monitoring coverage of this service are therefore also evolving. To access the most current information available please consult the following links: www.who.int/hiv/pub/mtct/en/ www.who.int/hiv/pub/me/en/.

3.4. Number and percentage of people in ART by treatment line (first, second, and third)

Rationale	This indicator provides a snapshot of patient distribution by treatment line. By studying the trend over time, the degree of change in this distribution can be observed.
What it measures	The proportion of people in ARV therapy by treatment line.
Numerator	Number of HIV-positive adults (≥15 years of age) and children (<15) who received first-, second-, or third-line treatment at the end of the reporting year. **Patients in first-line treatment are defined as:** those who continue with the initially administered regimen after starting antiretroviral therapy. It is agreed that this number includes patients who, due to toxicity, have changed one or two of the drugs in the regimen (i.e. a "substitution" scenario). **Patients in second-line antiretroviral treatment are defined as:** those in ARV treatment who suffered treatment failure in the first regimen provided and whose regimen has been changed as a result of this failure. The second line should not include patients who have changed regimen due to toxicity: only those who have done so due to treatment failure. **Patients in third-line antiretroviral treatment are defined as**: those in ARV treatment who have suffered treatment failure in the second regimen provided and whose regimen has been changed as a result of this failure.
Denominator	Number of HIV-positive adults (≥15 years of age) and children (<15) who received treatment at the end of the reporting year.
How to measure / Measurement tools	The necessary instruments for data collection include national treatment guidelines and pharmacy registers or ART registers.
Disaggregation	Sex Age group: <15, ≥15

Strengths and weaknesses	This categorization is feasible when the country has national treatment standards with standardized regimens. Patient information may sometimes be missing due to a change of regimen, which makes it difficult to calculate this indicator. When health centers request antiretrovirals from pharmacies, the forms should specify the total number of patients by treatment regimen. This information makes it possible to quantify demand, determine appropriate procurement levels, and identify the most commonly used combinations of ARVs.
3.5. Number of first- and second-line ART regimens in use	
Rationale	PAHO/WHO recommends a preferred first-line regimen of up to six first-line therapies and six second-line therapies (WHO. Consolidated guidelines on the use of antiretroviral drugs for treating and preventing HIV infection. Geneva, 2013).
What it measures	Whether there is nationally standardized implementation of antiretroviral therapy regimens, as well as the dispersion of patients in different first- and second-line regimens.
Numerator	Number of treatment regimens with antirretrovirals administered in the reporting year, by treatment line (first, second, and third).
Denominator	Not applicable.
How to measure / Measurement tools	Pharmacy registers or ART registers. National ARV database for logistics of ARV procurement and distribution, or national patient monitoring systems. Some pharmacy databases only register dispensation by ARV drug and not by regimen.
Disaggregation	Age 0-14; ≥15
Strengths and weaknesses	The number of regimens in use in the country is an indicator of health system overload; however, this indicator should be assessed together with the percentage of patients in each regimen. The majority of patients are often concentrated in a small number of therapies in each line. Private sector data can be difficult to incorporate and the private sector may have different prescription practices that do not comply with national recommendations.
3.6. Number and percentage of patients in each of the treatment regimens in use	
Rationale	This indicator gives the relative weight of each antiretroviral treatment regimen in the country. Some HIV medicines are linked to higher rates of toxicity and have more complex dosage regimens: using them can hinder treatment adherence and effectiveness. Antiretroviral drugs such as d4T, ddI, IDV, and NFV have been gradually excluded from international and national treatment recommendations and are considered obsolete. It is recommended that these drugs be abandoned as patients migrate to less toxic, simpler regimens. Nevertheless, a certain number of patients continue to receive obsolete drugs for different reasons (e.g. patients who have experienced resistance to various drugs, toxic effects of other drugs, drug availability, etc.).
What it measures	This indicator quantifies which regimens are prescribed for the greatest number of patients and how many patients are on obsolete or highly toxic ARVs, and how many patients are in preferred regimens.

Numerator	Number of patients in each regimen in use, by treatment line. For example, for the first line: Total patients on TDF+3TC+EFV: 300 patients Total patients on AZT+FCT+EFV: 150 patients, etc.
Denominator	Total patients in treatment, by line.
How to measure / Measurement tools	ART registers and pharmacy registers, or national database for ARV drug management.
Disaggregation	First, second, and third line of treatment Age group: <15, ≥15 years Obsolete drugs (d4t, IDV, NFV, ddI)
Strengths and weaknesses	Private sector data can be difficult to incorporate and the private sector may have prescription practices that do not comply with national recommendations.
Data use	Tracking antiretroviral prescription practices and compliance with national ART guidelines over time; and for monitoring the abandonment of obsolete drugs in the country.

3.7 Percentage of estimated HIV-positive incident TB cases that received treatment for both TB and HIV

Rationale	Tuberculosis (TB) is a leading cause of morbidity and mortality in people living with HIV, including those on antiretroviral therapy. Intensified TB case-finding and access to quality diagnosis and treatment of TB in accordance with international/national guidelines is essential for improving both quality of life and life expectancy for people living with HIV. A measure of the percentage of HIV-positive TB cases that access appropriate treatment for their TB and HIV is important.
What it measures	Progress in detecting and treating TB in people living with HIV.
Numerator	Number of HIV-positive people who received antiretroviral combination therapy in accordance with the nationally approved treatment protocol (or WHO/UNAIDS standards) and who were started on TB treatment (in accordance with national TB program guidelines) in the reporting year.
Denominator	Estimated number of incident TB cases in people living with HIV. Annual estimates of the number of incident TB cases in people living with HIV in high TB burden countries are calculated by WHO and are available at: http://www.who.int/tb/country/en.
How to measure / Measurement tools	Facility antiretroviral registers and reports. Data and estimates of incident TB cases in people living with HIV.
Disaggregation	None.

Strengths and weaknesses	Adequate detection and treatment of TB will prolong the lives of people living with HIV and reduce the community burden of TB. WHO provides annual estimates of the burden of TB among people living with HIV, based on the best available country estimates of HIV prevalence and TB incidence. Incident TB cases are defined as new cases that have occurred in that year, and latent cases are specifically excluded. All or most people living with HIV who have tuberculosis should receive antiretroviral therapy, depending on country-specific eligibility criteria. TB treatment should be provided according to national tuberculosis program standards. This indicator provides a measure of the extent to which collaboration between the national TB and HIV programs is ensuring that people with HIV and TB disease are able to access appropriate treatment for both diseases. However, this indicator will also be affected by low uptake of HIV testing, poor access to HIV care services and ART, and poor access to TB diagnosis and treatment. Separate indicators exist for each of these factors and should be referred to when interpreting the results of this indicator. It is important that those providing HIV care and antiretroviral therapy record TB diagnosis and treatment, as this information has important implications for antiretroviral therapy eligibility and choice of antiretroviral regimen. It is therefore recommended that the date of starting TB treatment be recorded in the ART register.
3.8 Average number of viral load tests per patient in ART, per year	
Rationale	Measurement of HIV viral load reflects the burden of infection and the magnitude of viral replication. It is used to evaluate the risk of disease progression and is fundamental for monitoring the virological response to ART and virological failure. Viral load should be measured at regular intervals, according to the clinical status of the patient. For stable patients in treatment, viral load is usually measured every six months. Viral load should be measured at more frequent intervals when treatment is initiated or changed, or in cases of significant changes in viral load or CD4 count, or deterioration of clinical status.
What it measures	The average frequency at which an HIV patient's viral load is assessed per year.
Numerator	Total number of viral tests load carried out in patients in treatment in the reporting year.
Denominator	Number of patients with HIV in treatment in the reporting year.
How to measure / Measurement tools	Calculations are based on laboratory or HIV care facility registers.
Disaggregation	Sex Age group: 0-14, ≥15 years
Strengths and weaknesses	The advantage of indicator this is that it enables countries to monitor to what extent the people living with HIV are receiving an intervention essential for monitoring their response to antiretroviral drugs. It also helps determine the validity of the indicator for the percentage of patients with suppressed viral load, since a very low per-patient rate of VL testing would limit the validity of this indicator.

3.9. Percentage of health facilities dispensing ARVs that experienced a stock-out of at least one ARV in the last 12 months	
Rationale	As countries scale up ART services, it is important to ensure that ARVs are available to those who need them. ART is a long-term treatment strategy for people living with advanced HIV infection, and treatment interruptions may lead to treatment failure and HIV drug resistance. Efficient supply management is needed to ensure an uninterrupted supply of ARVs.
What it measures	This indicator measures a key aspect of ARV drug supply management: whether health facilities dispensing these drugs have run out of stock of at least one required ARV in the last 12 months.
Numerator	Number of health facilities dispensing ARVs that experienced a stock-out of one or more required ARV drug in the last 12 months.
Denominator	Total number of health facilities dispensing ARVs.
How to measure / Measurement tools	This information is collected from inventory control reports submitted by health facilities, indicating the stock level of each item in the report. Information can also come from ARV requisition forms submitted by facilities in a given time period (e.g. last order period, last quarter, last year), and from the list of ARVs that each facility is expected to dispense, if this is not already included in the inventory control reports or requisition forms. If there is a national logistics management information system (LMIS) with details on ARV availability at the health facility level, information should be extracted from this system to construct this indicator. In countries where ARV drugs are dispensed at pharmacies or other non-health facility delivery points, stock-outs should also be monitored in these venues; feasibility will depend on the coverage of the LMIS.
Strengths and weaknesses	This indicator captures a crucial component of the ART program: whether or not there is a continuous, uninterrupted supply of ARV drugs at the health facility level. This indicator does not, however, provide information on why stock-out problems occur; which ARV drugs were out of stock; or how long the stock-out lasted for a particular ARV drug. It also does not provide information on the quality of ARV drug storage, delivery, and distribution.
Data use	If stock-outs exist, assess whether the problem lies in the national distribution system or if it is a local problem. Determine whether they are due to projections of supply order or the distribution system, or some other issue. Use this as an opportunity to see whether the LIMS functioning. In some situations, simply monitoring stock-outs could be misleading because a facility may keep reserve stocks while maintaining a policy of not distributing them. These facilities would not be counted as having experienced a stock-out using this indicator definition, even though a patient would not be receiving a required ARV drug for treatment. In settings where reserve stock is not issued during ARV stock-outs, it is preferable to collect information on a functional stock-out (i.e., the inability to access or make use of a required ARV drug).

3.10. Number of ARV stock-outs	
Rationale	As countries scale up ART services, it is important to ensure that ARVs are available to those who need them. ART is a long-term treatment strategy for people living with advanced HIV infection, and treatment interruptions may lead to treatment failure and HIV drug resistance. Efficient supply management is needed to ensure an uninterrupted supply of ARVs.
What it measures	This indicator measures a key aspect of ARV drug supply management: the number of stock-outs of at least one required ARV in the last 12 months. According to the PAHO-Horizontal Technical Cooperation Group operational definition, based on the consensus of the 2010 Dominican Republic meeting: A stock-out is defined as a situation in which a product cannot be dispensed for lack of supplies and that causes the forced interruption of treatment in at least one patient.
Numerator	Number of stock-outs of one or more required ARV drug in the last 12 months.
Denominator	Not applicable.
How to measure / Measurement tools	This information is collected from inventory control reports submitted by health facilities, indicating the stock level of each item in the report. Information can also come from ARV requisition forms submitted by facilities in a given time period (e.g. last order period, last quarter, last year), and from the list of ARVs that each facility is expected to dispense, if this is not already included in the inventory control reports or requisition forms. If there is a national logistics management information system (LMIS) with details on ARV availability at the health facility level, information should be extracted from this system to construct this indicator. In countries where ARV drugs are dispensed at pharmacies or other non-health facility delivery points, stock-outs should also be monitored in these venues; feasibility will depend on the coverage of the LMIS.
Disaggregation	If a stock-out occurs, indicate which ARV is involved, the cause and length of the stock-out, and the number of patients affected.

Indicator Group 4: Retention on ART

4.1. Percentage of adults and children with HIV known to be on treatment 12, 24, 36, and 60 months after initiation of antiretroviral therapy	
Rationale	Antiretroviral therapy is a life-long intervention. Measuring retention on ART is critical to determine the effectiveness of programs and to highlight the obstacles to expanding and improving them.
What it measures	This indicator measures the retention on ART related to the increase in survival and adherence to the treatment. This indicator completes program coverage by measuring its effectiveness.
Numerator	Number of adults and children who continue on ART at: a) 12 months, b) 24 months, c) 36 months, and d) 60 months after initiating treatment (among those who initiated ART in: a) 1 year ago; b) 2 years ago; c) 3 years ago; d) 5 years ago.

Denominator	a) At 12 months: Total number of adults and children who initiated ART in 2012 (or another specified period), who were expected to achieve 12-month outcomes within the reporting period (or 12 months after the specified initiation period), including those who have died since starting ART, those who have stopped ART, and those recorded as lost to follow-up at 12 months. b) At 24 months: Total number of adults and children who initiated ART in 2012 (or another specified period), who were expected to achieve 24-month outcomes within the reporting period (or 24 months after the specified initiation period), including those who have died since starting ART, those who have stopped ART, and those recorded as lost to follow-up at 24 months. c) At 36 months: Total number of adults and children who initiated ART in 2011 (or another specified period), who were expected to achieve 36-month outcomes within the reporting period (or 36 months after the specified initiation period), including those who have died since starting ART, those who have stopped ART, and those recorded as lost to follow-up at 36 months. d) At 60 months: Total number of adults and children who initiated ART in 2009 (or another specified period), who were expected to achieve 60-month outcomes within the reporting period (or 60 months after the specified initiation period), including those who have died since starting ART, those who have stopped ART, and those recorded as lost to follow-up at 60 months.
How to measure / Measurement tools	Numerator and denominator: Program monitoring tools, ART and HIV case monitoring register, and cohort analysis forms. In measuring retention, it is important to carefully select patients according to the period in which they initiated ART and to check their outcomes in the scheduled follow-up period. Assessing outcomes at 12 months should include all patients who initiated treatment one year ago; at 24 months, all patients who initiated treatment two years ago; at 36 months, all patients who initiated treatment three years ago; and at 60 months, all patients who initiated treatment five years ago.
Disaggregation	Sex Age group: 0-14, ≥15 years Pregnant women, or pregnant in the last 12 months. Among the people who started treatment (denominator), in addition to reporting the number of people alive and on treatment (numerator), it is also important to report the number lost to follow-up, who abandoned treatment, and who died. These four results should add up to the number of people who initiated antiretroviral therapy. When generating information at site level, patients transferred in should be included in the statistics and patients transferred out should be excluded. From the compilation of site reports, if the number of patients transferred in and transferred out is added up at the national level, these statistics should be reported for 12-month analysis.
Strengths and weaknesses	Continuation on ART is mostly related to survival (but also willingness to continue treatment). Survival may reflect the services offered, but also depends on the baseline characteristics of the patients who have started treatment. Clinical, immunological, and virological staging are independent predictors of survival on ART. Baseline characteristics of the cohort of patients should help in interpreting the results and, in particular, comparing ART sites.

Other considerations	The numerator does not require patients to have been on antiretroviral therapy continuously for the 12-, 24-, 36-, or 60-month period. For example, patients who may have missed one or two appointments or drug pick-ups, and temporarily stopped treatment but are recorded as still being in treatment at month 12, 24, 36, or 60 are included in the numerator. On the contrary, the numerator does not include those patients who have died, abandoned treatment, or are considered lost to follow-up at 12, 24, 36, or 60 months after initiating treatment. In countries where this indicator is not produced at all ART sites but only in a sub-set of facilities, the representativeness of the data should be kept in mind when interpreting it, and this should be stated in the Comments section.
Data use	Note any particularly low retention and assess the reasons behind it by analyzing the distribution of patients who are not on ART, either because they have died, stopped treatment, or are lost to follow up. If data are available, try to assess the lost-to-follow-up population to see if they are likely to have died, stopped treatment, or transferred out. Compare cohorts.

Indicator 5: Suppression of viral load

5.1. Number and percentage of PLHIV with suppressed viral load (sixth column of the cascade) 

Rationale	As the provision of the antiretroviral therapy expands in countries around the world, monitoring VL offers information on an ART program's success and gives an idea of the amount of virus circulating in the country and the risk of transmission. In addition to serving as a way to assess the status of the epidemic in terms of achieving optimal health outcomes and reducing the risk of HIV transmission, this indicator also provides information on adherence to treatment and the prescription of effective drug regimens.
What it measures	This indicator measures the estimated proportion of patients in care who achieved virological suppression (viral load under 1000 copies/ml).
Numerator	Number of patients with a viral load under 1000 copies/ml in the last test in the reporting year.
Denominator	Estimated number of persons living with HIV.
How to measure / Measurement tools	Numerator: facility registers on patients in treatment. The number of patients with a VL under 1000 copies/ml is recorded, indicating virological suppression.
Disaggregation	Sex Age group: <15 years, ≥15 years
Strengths and weaknesses	If less than 70 percent (<70%) of patients HIV care have their VL measured, this will limit the use and interpretation of the indicator.
Other considerations	This is a core indicator of the continuum of care cascade. Several tests of HIV-1 viral load are available in the market. The range of detectable levels of virus differ with each type of test. A viral load under the "undetectable" level indicates that the test is unable to detect HIV in the plasma, but does not mean that the virus is absent or eliminated from the body.

5.2. Percentage of PLHIV on ART with suppressed viral load	
Rationale	A goal of any antiretroviral therapy program is to increase the survival rate among infected individuals and to reduce the likelihood of HIV transmission. Viral load testing helps identify individuals who have problems taking their medication regularly, making it possible to provide more counselling to improve their adherence to the treatment. Secondly, VL testing detects the development of drug resistance, allowing a timely change in treatment regimen for patients who require this. This helps avoid unnecessary switches to more expensive medication, which would reduce a patient's future treatment options.
What it measures	Percentage of PLHIV in treatment for at least six months, with suppressed viral load (<1000 copies/ml).
Numerator	Number of PLHIV on ART for at least six months, with a final count of CV< 1000 copies in the reporting year.
Denominator	Number of PLHIV on ART for at least six months, with one VL carried out in the reporting year.
How to measure / Measurement tools	Numerator and denominator: Facility registers on patients on ART, or laboratory database. The number of patients with an undetectable VL in their final test is recorded.
Disaggregation	Sex Age group: <15 years, ≥15 years
Strengths and weaknesses	If less than 70 percent (<70%) of patients have their VL measured, this will limit the use and interpretation of the indicator.

REFERENCES

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[2]WHO. Consolidated guidelines on general HIV care and the use of antiretroviral drugs for treating and preventing HIV infection: recommendations for a public health approach. WHO, London, 2013..