ANALYSIS AND USE OF HEALTH FACILITY DATA

Guidance for HIV programme managers

WORKING DOCUMENT, MARCH 2019

World Health Organization

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MODULE 4. **Guidance for HIV programme managers**

LEARNING OBJECTIVES

The overall goal of this guidance document is to extend existing guidance in the 2015 WHO consolidated HIV strategic information guidelines familiarize HIV and HMIS programme managers with the tremendous potential of using standard dashboards to routinely analyse and use programme data to more effectively monitor and manage HIV programs By the end of this module, participants will be able to:

- Describe the essential, or "core" HMIS indicators recommended for use in routine programme management and how they relate to the recommended national and global indicators.
- Interpret each of the figures included in the reference HIV programme dashboard and apply them to improve programme management.
- Assess the quality of HIV programme HMIS data and understand implications for interpreting dashboard figures.

AUDIENCE

This module is relevant for different members of the health workforce and end-users of data within the health system working on HIV including:

- HIV programme managers, and
- Health management information system (HMIS) managers

at both the national (e.g. ministry of health) level and at subnational health offices including managers in charge of HIV service delivery at health facilities.

SUGGESTED REFERENCES

- Consolidated strategic information guidelines for HIV in the health sector. WHO, Global Task Force on Impact Measurement, Geneva, May 2015.
- Indicator Guidance Sheet for HIV. The Global Fund, Geneva, updated regularly and accessed from http://www.theglobalfund.org/en/me/documents/indicatorguidance/
- http://www.who.int/hiv/pub/guidelines/person-centred-hiv-monitoring-guidelines/en/

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Acknowledgements

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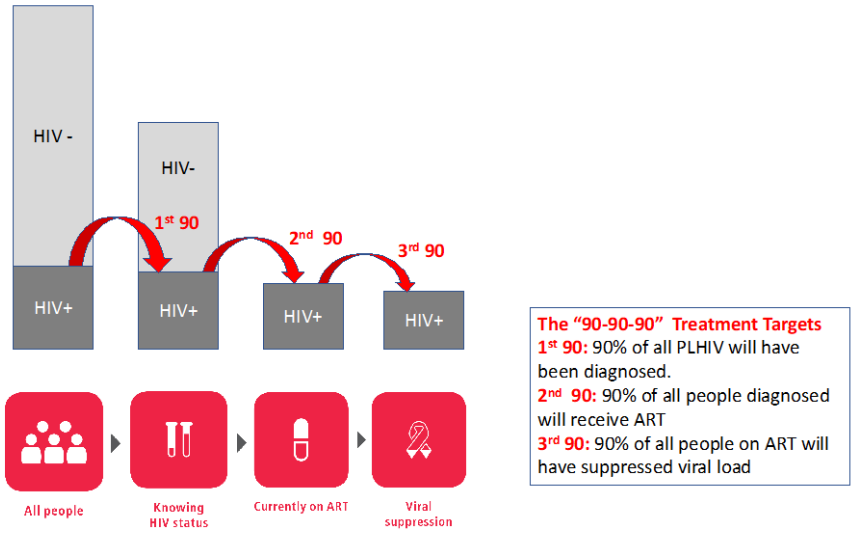
1. About the data

THE HIV CASCADE OF SERVICES – DATA TO IDENTIFY & FILL PROGRAMME GAPS

HIV health sector services can be depicted as a "cascade", encompassing prevention, diagnosis (testing), care and treatment, and patient and laboratory monitoring. The term cascade highlights how services must be linked to achieve desired impacts for patient- and programme-level success. The cascade illustrates the performance of an HIV response based on service coverage and quality. By focusing on the "90-90-90" coverage targets whereby 90% of all PLHIV will have been diagnosed; 90% of all people living with HIV (PLHIV) diagnosed will receive ART; and 90% of all PLHIV on ART will have suppressed viral load; national programmes can identify critical bottle necks that slow a country's progress toward epidemic control. Figure 1 shows the HIV cascade of services.

Figure 1. The HIV service cascade and "90-90-90" Treatment Targets



While the graphic shows a complete cascade as a sequence of steps, in the real world, individuals may follow a nonlinear progression through services. For example, PLHIV on treatment may start and then drop out of ART and return to it months or years later. These variations naturally add complexity to the analysis and interpretation of these indicators. This is particularly true in the context of facility-based data reported in a cross-sectional, aggregate manner.

WHO HIV SI guidelines address multiple inter-connected use-cases for routine HIV programme data, including: patient monitoring, program monitoring and management, national reporting, and global reporting. This guidance and toolkit package focuses on program monitoring and management.

Monitoring and assessment of the cascade of services for real-time program management requires identification of a standardized set of essential indicators covering the entire service spectrum. The WHO *Consolidated Strategic Information Guidelines for HIV in the health sector* recommends 92 "core" national indicators, including 10 identified for global monitoring, to gauge the health sector response to HIV.

The prioritized list of global indicators allows national HIV M&E and program teams to focus on the issues that require more extensive analysis, disaggregation and quality data to improve the impact of programmes.

The list of **10 global indicators** (Table 1) aims to offer focused, consistent information for all partners, in lieu of fragmented information due to many non-standardized indicators. This approach helps align national HIV programme managers and global partners on key issues in the health sector response and, thus, to improve dialogue toward improving service coverage and quality. The *WHO Consolidated Strategic Information* Guidelines are consistent with the Global AIDS Monitoring (GAM) system, the primary mechanism by which countries contribute to global tracking of the HIV epidemic and response.

Table 1. WHO 10 global indicators for HIV programmes

Short name	Short definition	Measured with Facility - based data?
1. People with HIV	Number and % of people living with HIV	No
2. Domestic finance	% of HIV resources financed domestically	No
3. Prevention	% of condom use among key and general populations	No
4. Knowing HIV status	% of people who have been diagnosed	Yes
5. Linkage to care[1]	# and % of PLHIV with HIV care (including ART)	Yes
6. Currently on ART	% of PLHIV on ART	Yes
7. ART retention	% of PLHIV retained and surviving on ART	Yes
8. Viral suppression	% on ART virally suppressed	Yes
9. AIDS deaths	Deaths per 100,000 population attributed to AIDS	No
10. New infections	# and % of new HIV infections	No

Of the 10 global indicators shown, five are indicators which are measured using data **primarily provided by health facilities**, either directly or via linkages with community-based service delivery. As such, these five indicators form the basis of core facility indicators that are recommended for routine collection by facilities and collated through health management information systems (HMIS). Some modifications of the global indicator definitions are necessary due to the cross-sectional, aggregate nature of most data collected through an HMIS,[2] which is in contrast to the longitudinal or cumulative perspective inherent to the HIV cascade. But the primary advantage of routine facility data is that by routinely analysing these HMIS indicators programme managers will have the essential

[1] As countries move to a "Treat All" policy this indicator will become redundant with % currently on ART and will likely no longer be collected separately. However, until countries reach that stage of programming, % on HIV care may continue to be an important indicator.

[2] In 2017, WHO published a guideline for HIV case surveillance and patient monitoring that promotes the use of routine data for patient care and to enable reporting on most programme, national and global indicators, including key global targets for HIV. These guidelines aim to improve the routine collection of HIV data from health facilities using a patient-level approach. Instead of collecting aggregated service-level data (e.g. the number of HIV tests provided), this approach follows individuals through a cascade of linked services to improve patient care and outcomes. As countries begin to adopt and, where existing, improve upon these types of routine facility data systems, guidance for the recommended HMIS data analysis will include options for analyzing individual-level, longitudinal and cumulative data. The document and annexes with all the annexes can be found at : http://www.who.int/hiv/pub/guidelines/person-centred-hiv-monitoring-guidelines/en/

information needed to track the effectiveness of the response and to trigger corrective actions to address bottle necks in the HIV service cascade at national, district, and health facility levels. At district and facility level, the ability to conduct routine analysis provides managers with a data-driven decision-making process and greater focus on access to and quality of care.

2. Data quality

One of the challenges to interpreting HMIS data is that responsibility for data entry, cleaning, and management is distributed across many individuals and facilities. Unlike special studies or surveys, there are often limited resources available for cleaning data impacting the quality and usability of routine monitoring data. As for all data sources, in addition to establishing systems and protocols to enhance good data collection and reporting, any analysis must consider whether the results are affected by data quality issues.

The WHO data quality review toolkit provides guidance for defining measures of data quality, conducting a desk review to assess data quality, and conducting data verification of routine facility data systems.[3] The five domains used for periodic assessments of data quality as recommended by this toolkit are summarized here:

Timeliness refers to whether reporting units submit their data according to the timeline set by national HMIS guidelines. And completeness measures the extent to which priority data elements are included in each report. Both timeliness and completeness of reporting can be assessed at national level and at any SNU level (e.g. facility, district, regional, etc.). Both timeliness and completeness can also be assessed separately for specific data forms used in reporting. For example, if HIV testing sites submit reports separately from ART sites, then completeness of HIV testing reports can be assessed as distinct from completeness of ART reports.

Internal consistency takes multiple forms: from identifying outliers, i.e. reported values which are unusually high or low compared to other reporting units or compared to historical performance. Indicators which are related to each other can also be used to develop internal consistency checks, e.g. if a country has a Treat All policy and no backlog of patients, the number of people enrolled in ART in a given month should be a subset of the number of people who got diagnosed with HIV that month.

External consistency and comparisons provide useful validation of routinely collected data against data sources which may be more rigorous but are collected less frequently due to the high resource requirements for that type of data collection. Such comparisons should be made as and when updated external data become available, e.g. annually or less frequently.

Table 2 describes example metrics for each domain. Note that metrics for each domain can be calculated using either "report" as the unit or "SNU" (e.g. % of reports submitted on time vs. % of districts submitting 100% of reports on time)

Table 2. Data quality review domains for routine facility data

Domain	Example Metric	Metric using sub-national level (SNU) as the unit
Timeliness	% of submitted district monthly reports (previous 1 year) that are received on time. Target: >75%	# and % of SNU that submitted on time at least 75% of the monthly reports received at national level

[3] Data quality review: a toolkit for facility data quality assessment. Data quality review: a toolkit for facility data quality assessment. Module 1. Framework and metrics; Module 2. Desk review of data quality; Module 3. Data verification and system assessment. Geneva: World Health Organization; 2017. Licence: CC BY-NC-SA 3.0 IGO.

Completeness	% of expected district monthly reports (previous 1 year) that are actually received. Target: >75%	# and % of SNU that submitted 75% of expected monthly reports
	% of 1) non-zero values; 2) non missing values (in the reporting period) per priority indicator	# and % of SNU with >90% 1) non-zero values; 2) non missing values for priority indicators
	Evaluate the trend in completeness of reporting over the past 3 years	
Internal consistency (outliers, consistency over time, consistency between indicators)	% of reported values for priority indicators that are extreme outliers (>3 SD* from the mean)	# and % of SNU which 1 or more reported value over the course of 1 year is an extreme outlier.
	Ratio of current year value to the average of the 3 preceding years) for indicators expected to remain constant (e.g. ART retention)	# and % of SNU whose current year-to-average of the preceding three years is >33% different from national ratio
	Ratio of # enrolled on treatment: # tested positive in the previous reporting period < 1 in a TREAT ALL setting	# and % of SNU meeting the test of consistency between testing and treatment indicators
External consistency with other data sources	Consistency between routinely reported data and population-based surveys of comparable populations.	# and % of SNU meeting test of consistency between routinely reported data and population-based surveys (among SNU with population based survey data).
External comparison of population data	Consistency between the population data used for calculating coverage and other sources of population estimates.	# and % of SNU meeting test of consistency between population data used for calculating coverage and other sources of population data.

*SD = standard deviation

Every country's HMIS governance bodies will adopt their own specific data quality standards that are appropriate for their data flow, reporting frequency, and supervisory structure. However, the standard should address each of the domains described above.

Quality assessments of timeliness/completeness and internal consistency of HMIS data for the core HIV indicators should be examined monthly by the reporting unit itself as well as for each supervisory level, e.g. districts should review % completeness of all facilities expected to report in their jurisdiction, regions should review % districts with reporting rates that meet target, and national level should review reporting rates of regions, etc.

Routine data review activities such as those described here should be complemented by periodic, intensive data quality assessments such as those characterized in the guidelines on Data Quality Assessment of National and Partner HIV Treatment and Patient Monitoring Systems (WHO, 2018).

3. Core facility indicators[4]

The following table presents a sub-set of the core facility indicators for use in the recommended HIV programme dashboards. This list reflects a minimum set of data elements which can be analyzed to produce figures which will help HIV programme managers in assessing programme performance and taking actions to strengthen or accelerate service delivery. This set of indicators is aligned with global guidance developed by WHO and its partners including the *Global Reference List of 100 Core Health Indicators (2018)* and the *Consolidated Strategic Information Guidelines for HIV in the health sector (2015)*.

Core Indicators	Definition	Disaggregations*
HIV tests performed	Number of HIV tests	Age (<15, 15+) Sex (Male, female, TG) Special pops (KPs, ANC attendees) Geographic location
PLHIV newly diagnosed	Number of confirmed HIV positive tests	Age (<15, 15+) Sex (Male, female, TG) Special pops (KPs, ANC attendees) Geographic location
HIV test positivity	N: Number of confirmed HIV positive tests D: Number of HIV tests	Age (<15, 15+) Sex (Male, female, TG) Special pops (KPs, ANC attendees) Geographic location
Newly on ART	Number of PLHIV who initiate ART	Age (<15, 15+) Sex (Male, female, TG) Special pops (KPs, ANC attendees) Geographic location
Crude Ratio linkage to treatment**	N: Newly on ART D: PLHIV newly diagnosed	Age (<15, 15+) Sex (Male, female, TG) Special pops (KPs, ANC attendees) Geographic location
Currently on ART	Number PLHIV currently receiving ART	Age (<15. 15+) Sex (Male, female, TG) Special pops (KPs) Geographic location
ART coverage rate (current)	N: Number PLHIV currently receiving ART D: Estimated number of PLHIV	Age (<15. 15+) Sex (Male, female, TG) Special pops (KPs) Geographic location
ART retention rate	N: Number of PLHIV retained on ART – for specified duration D: Number of PLHIV who initiated ART prior to (and during) the specified duration	Age (<1, ≥1) Sex (Male, female, TG) Special pops (KPs) Geographic location Specified duration (currently/ever, 12, 24, 36, 48, 60 months)***
VL testing coverage rate (annualized)**	N: Number of PLHIV tested for viral load X 12 D: Number of PLHIV currently receiving ART	Age (<15. 15+) Sex (Male, female, TG) Special pops (KPs) Geographic location
HIV viral load suppression rate	N: Number of PLHIV who are on ART who have suppressed viral load (<1000 copies /mL) D: Number of people receiving a viral load test during reporting period	Age (<15, 15+) Sex (Male, female, TG) Special pops (KPs) Geographic location Time of initiation (currently/ever, 12 months)*

[4] Several TB/HIV and PMTCT indicators are also included in the core HMIS list but are integrated into the analyses of the other programme areas.

PLHIV on newly enrolled in HIV care started on TB preventive therapy	*N: Total number of PLHIV newly enrolled in HIV care who are started on treatment for latent TB infection* *D: Total number of persons newly enrolled in HIV care, that is, registered in the pre-ART or ART register*	*Age (<15, 15+)* *Sex (Male, female, TG)* *Special pops (KPs)* *Geographic location*
PMTCT testing coverage rate	N: Number of pregnant women attending ANC and/or who had a facility-based delivery who were tested for HIV during pregnancy or already knew they were HIV- positive. D: Number of ANC attendees or number of facility- based deliveries	HIV status/test results: 1. known HIV infection at ANC entry 2. tested HIV-positive at ANC during current pregnancy 3. tested HIV-negative at ANC during current pregnancy Total identified HIV-positive women = 1+2. Optional disaggregation: ANC attendees who inject drugs.

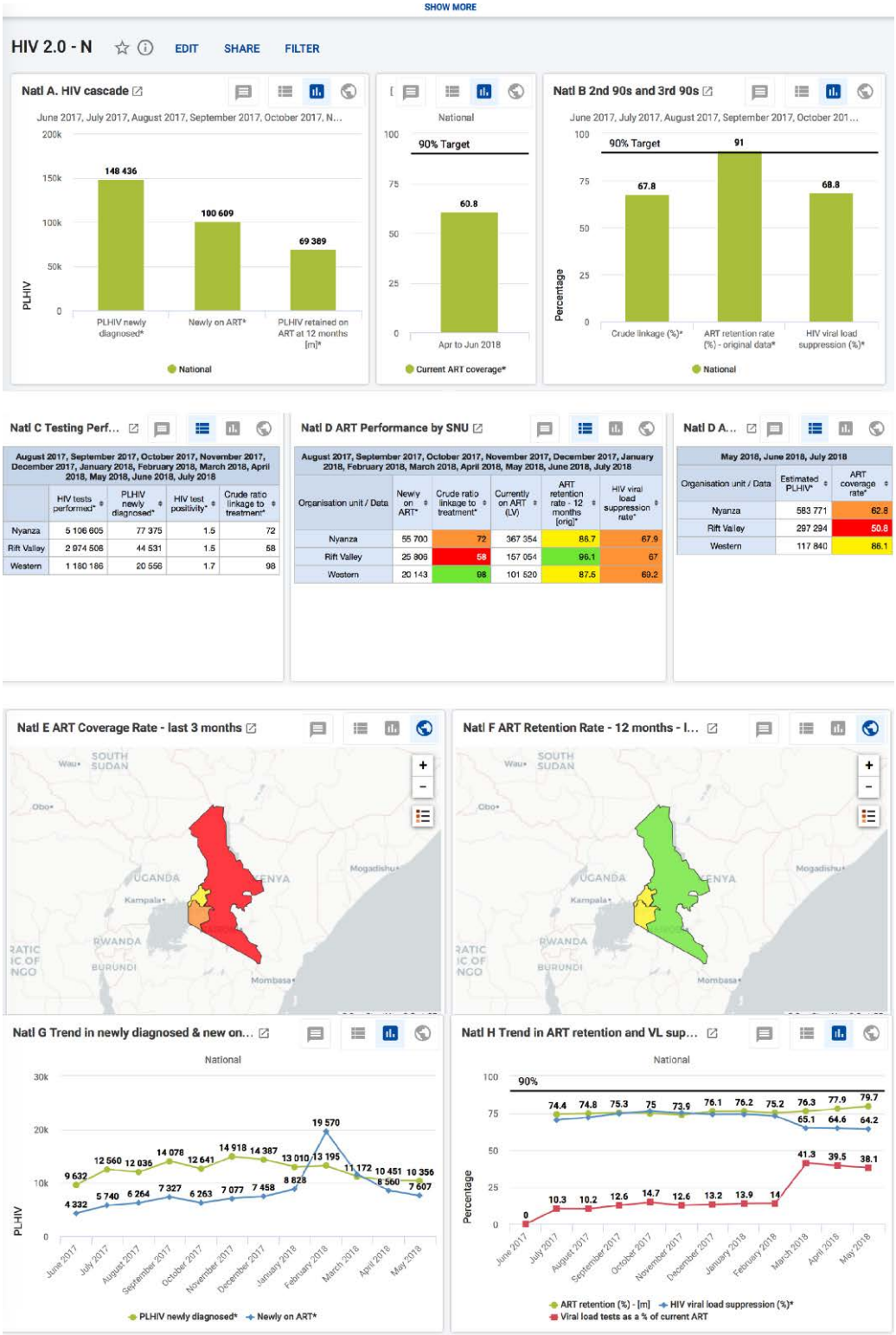
*Note: The age disaggregation recommended reflects a basic level of disaggregation that may be feasible for many countries reporting testing data in aggregate form. Finer levels of disaggregation are appropriate and recommended for countries with more robust routine information systems or where information systems receive support and have higher demands from funding partners.

**Note: These indicators are not part of the *100 Core health indicators or the Consolidated Strategic Information Guidelines*. Crude Ratio linkage to treatment is an essential proxy for estimating the 2nd 90 indicator: % of those diagnosed who initiate treatment using facility based data; and VL testing coverage is an indicator necessary for interpretability of the VL suppression rate from facility based data.

***Note: Specified duration refers to both numerator and denominator, e.g. # retained on ART at 12 months/# initiated on ART 12 months prior to the reporting period ; # currently retained on ART / # ever initiated on ART.

4. Core analysis

THE HIV DASHBOARD



To provide managers with an overview of key areas of programme performance, an HIV dashboard, i.e. standardized presentation of the core indicator data, is described in this module. One of the key advantages of integrating a standardized dashboard into the routine reports generated by an HMIS is that it can be made immediately available to the many different users of the HMIS at different levels of the health system. Alternatively, the dashboard can be sent to groups of non-HMIS users on a routine periodic basis (e.g. monthly or quarterly), to further encourage use of the information.

The Main HIV dashboard recommended in this module has four types of figures:

- Bar charts showing the HIV clinical cascade and three "90s" indicators
- Tables for showing SNU performance against key indicators in ranked order
- Maps for key indicators to identify which geographic areas are performing well and which are falling below expectations
- Line charts showing time trends of performance for key indicators

The most useful analysis of HIV data in an HMIS helps managers identify: the type of **person** who is and is not receiving services; the **the places** where programmes are most or less effectively provided; and whether performance is improving over **time**.

This document provides description of each figure in the Main HIV dashboard including the recommended disaggregation by ***person, place,*** and ***time*** and the alternative views for managers conducting more in-depth analysis of performance. This module focuses on a version of the main dashboard appropriate for managers at the national level. Variations of the main dashboard appropriate for sub-national unit (SNU) use, e.g. at regional, district, and facility level, are also described briefly.

ANALYZING PERFORMANCE WITH DISAGGREGATED DATA

The most powerful form of disaggregation of these core indicators is by place. Using maps or tables to show performance of these indicators by sub national unit is a critical view for managers to identify high performing and low performing areas, whether defined by relative disease burden or programmatic targets. Through this type of analysis managers can determine where to put more supervision and resources and where lessons can be drawn to strengthen performance in other areas.

In order to use HMIS data to identify who may be underserved, disaggregation by demographic characteristics is important. In line with the principle of focusing on a few, core indicators this module recommends a limited set of other variables for standard disaggregation including gender; special populations, such as pregnant women and key populations; and age (i.e. distinguishing between pediatric and adult populations). Having more and more fine-grained disaggregation would make both collection and management of the data more burdensome. However, countries with robust systems, already collecting data disaggregated by additional variables, can incorporate these variables into their customized dashboards.[5] In addition, implementation of case-based surveillance functionality with national HMIS should enable such disaggregated analyses to be performed more expediently.

[5] Considerations for which finer level age-disaggregations to introduce should include: 1) the multiplicative burden of reporting disaggregation by more than one variables, e.g. Age by Sex: <15 M, 15+M, <15 F, 15+ F; 2) limitations in age disaggregation available for modelled denominators (i.e. Spectrum estimates only available by <15, 15+ age groups; 3) ensuring the compatibility of age disaggregation when analyzing related indicators that may be reported from different sources(e.g. ability to age disaggregate all cascade indicators in the same age categories).

In many contexts, HMIS can disaggregate data by service type (e.g. ANC/PMTCT, TB, other), facility level (e.g. hospital, health centre, dispensary, etc.), ownership (public, non-governmental, private, etc.), or programme/funding source (e.g. PEPFAR, Global Fund, etc.). These variables are easy to include in HMIS because they reflect characteristics of the reporting unit and need only be entered at the time the unit is registered in the HMIS or updated with a new planning cycle (e.g. every 5 years, if changes in funding occur). Programme managers may find these types of disaggregation of the data helpful for examining the impact of different operational models, management structures, or necessary to produce reports consistent with funders' reporting requirements.

Compared to non-routine data sources, a critical advantage of HMIS data is the ability to review and display data over different time periods to assess performance trends. This module assumes data is collected with a monthly frequency, i.e. that the value of each indicator is known for each month. Doing so allows each indicator to be calculated cumulatively for different time periods (e.g. last month, last quarter, last year, etc.) and for indicators to be displayed as a trend to show progress or drop off in services. The analytic approach in this module assumes that managers may want to review the most recent performance. For this reason, charts and tables are presented for relative time periods, e.g. the 12 months or 3 months prior to the time the chart is generated. In practice, managers may also need access to dashboards which show data for fixed time periods corresponding to the planning and review cycle or reporting cycle, e.g. January – December 2016 or June-August 2016. Each user group of the dashboards will need to identify the timeframes that are most useful for their context and dashboards can be modified to serve those needs.

INCORPORATING TARGETS INTO THE DASHBOARD

Charts and figures used for performance monitoring should ideally incorporate the targets set for each indicator for each SNU. For some indicators, the target is a threshold percentage, e.g. 90% ART retention rate – 12 months. These types of targets are easily incorporated into standard dashboard figures through color coding table cells or maps or as a line appearing across a figure showing bar charts or trends. For other indicators, specific targets have been set using a formula applied to a local area or service provider's context. These types of targets can also be visualized in standardized dashboard figures but require countries to routinely import targets for local SNUs into the HMIS as and when they are updated in planning documents. This module details how absolute level targets can be incorporated into some figures and notes about how area/facility specific targets can be visualized.

TIPS FOR DASHBOARD CUSTOMIZATION

As mentioned earlier, the recommended dashboard in this module provides a standardized approach to considering key programme performance questions managers typically need to answer. The Main dashboard can be further customized for users at national/SNU1, SNU2, and facility levels. Many of the same indicators are used but the style of visualization has been adapted to reflect the perspectives of different users. In a few cases, some figures are not meaningful at the facility or SNU2 level.

Types of Dashboards	Primary User	Frequency of Use	# Figures
HIV 2.0 National/SNU1 (e.g. Regional or Provincial) level	Natl/SNU1 programme manager	Quarter/ Annual	8
HIV 2.0 SNU2 (e.g. District) Level	SNU2 programme manager	Month to Month	7
HIV 2.0 Facility Level	Facility programme manager	Month to Month	6

Even the "standard" dashboards used by a country may need to be further adapted for the AIDS control programme organizational structure, package of service, data availability, and differences in epidemic conditions. Customization of standard dashboards should include the following key steps:

1) Map recommended core indicators and data elements (and disaggregation variables) to what is collected in the country-specific HMIS;

2) Identify indicator definition modifications and implications for adopting the recommended HIV main dashboard figures. Note in some cases, an indicator cannot be disaggregated to the lowest level, e.g. ART coverage rate requires the estimated number of PLHIV, but in most countries estimates are not available below district level.

3) Identify critical indicators or based on routine facility data that are included in the national strategic plan but not in the recommended HIV main dashboard.

4) Identify the different groups of users at national and sub-national level

5) Determine the frequency and main uses of the dashboard for each user group (e.g. quarterly review, annual reporting, semi-annual supervisory site visits, monthly staff meeting, etc.); Identify uses that require additional or different dashboard figures for specific groups.

6) Modify dashboard configuration according for different user group and main uses, including figures displaying critical country-specific indicators not included in the standard dashboard.

Sometimes customization of a dashboard for a specific user group is simply creating the same dashboard figure but at a different level of granularity or different type of disaggregation. For example, maps which show the performance of specific facilities within a district, or that limit the dataset to only pregnant women. Or for some users, trend analysis may be more informative when displaying monthly changes, while for other levels of managers may find quarterly or annual changes more useful for the same indicator.

As greater granularity or disaggregation is applied, the number of service events (e.g. tests performed, PLHIV new on ART, number of viral load tests performed, etc.) becomes smaller. Caution should be taken when interpreting trends or comparing geographic areas when the number of events is small (e.g. <50). Often times analysts must make a trade-off between geographic granularity and time period granularity to enable meaningful analysis and comparison.

Analysis done in specific geographic units may also pose challenges in interpretation of cascade figures if there are large differences in the geographic accessibility between testing and ART sites. For example, if there is only one ART facility in a district, but 5 or 6 testing sites, meaningful cascade analysis may not be possible below district level. Similarly, if viral load testing is only readily available to patients who seek care at a limited number of places (e.g. tertiary treatment sites), comparing VL suppression rates at district level may not be meaningful.

Another key aspect of dashboard customization relates to the categories chosen for color coding sub-national units on maps. Because the use of maps in a dashboard is to distinguish geographic areas by high and low areas of performance the color coding of the map should correspond to meaningful levels of performance for a given indicator. Indicators that have an absolute level of good performance, e.g. 90% ART retention rate – 12 months often, use this threshold for the highest level of performance, while the categories for lower levels of performance can be modified to reflect values that trigger management action, e.g. supervisory visits, follow-up phone calls, intensified monitoring, etc.

Finally, when modifying how recent a time period to look at, consider the time-lag between providing services and entering/cleaning data in the HMIS. Systems which allow "real time" analysis of routinely

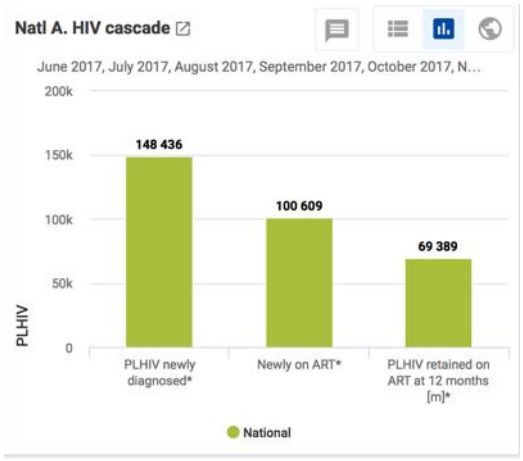
collected data may not indicate when reporting is incomplete for the last months' data. For example, if a country gives reporting units a 2-week period after the last day of the month to submit reports, a chart generated before that window has closed showing the last month's data may show lower numbers in automatically generated dashboards and be misinterpreted as declining performance.

THE HIV CASCADE BAR CHARTS

Purpose

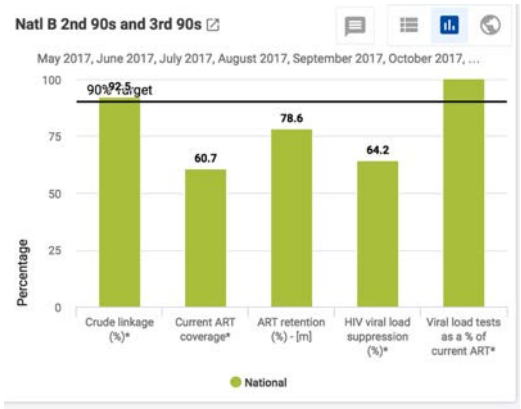
Provides managers with a summary of the HIV care cascade and the 90-90-90 targets using routine monitoring data.

Analysis

<table>
<tr><td colspan="3">A: HIV Cascade</td></tr>
<tr><td rowspan="4"> 
</td><td>Data elements & Indicators[6]</td><td>How do Managers Use It</td></tr>
<tr><td>• PLHIV newly diagnosed
• Newly on ART
• Number of PLHIV retained on ART – 12 months[7]</td><td>Summary of performance against 3 key cascade measures; Gender comparison identifies inequity in linkage between services.</td></tr>
<tr><td>Person, Place, Time Disaggregation</td><td>Alternate Views</td></tr>
<tr><td>All and by sex
National
Last 12 months (relative to date dashboard generated)</td><td>Generated for specific sub national units, especially low performing areas. Useful to generate for fixed periods corresponding to planning/budget cycle or for more recent time periods (e.g. last 3 months). Cascades can be constructed for specific sub-groups, such as pediatric, ANC/PMTCT, key populations, or by implementation partners.</td></tr>
<tr><td colspan="3">Targets – Chart can appear as stacked columns showing achievements as a portion of targets. Or as a set of "shadow" columns side by side, if they are color coded in a corresponding way, e.g. same colored outlines but not filled in.</td></tr>
</table>

B: 2nd 90s and 3rd 90		
	Indicators	**How do Managers Use It**
	• Crude ratio linkage to treatment • ART coverage rate	Measures for 2nd 90 (Linkage to ART and ART Coverage), and for 3rd 90 (% VL suppression or ART

[6] In these tables, the term data element refers to a single variable directly entered into an HMIS data base, while an indicator refers to a measure calculated from multiple data elements in an HMIS data base.
[7] See Considerations/issues for interpretation section below to understand why VL suppression is not used as the last bar in this cascade figure.

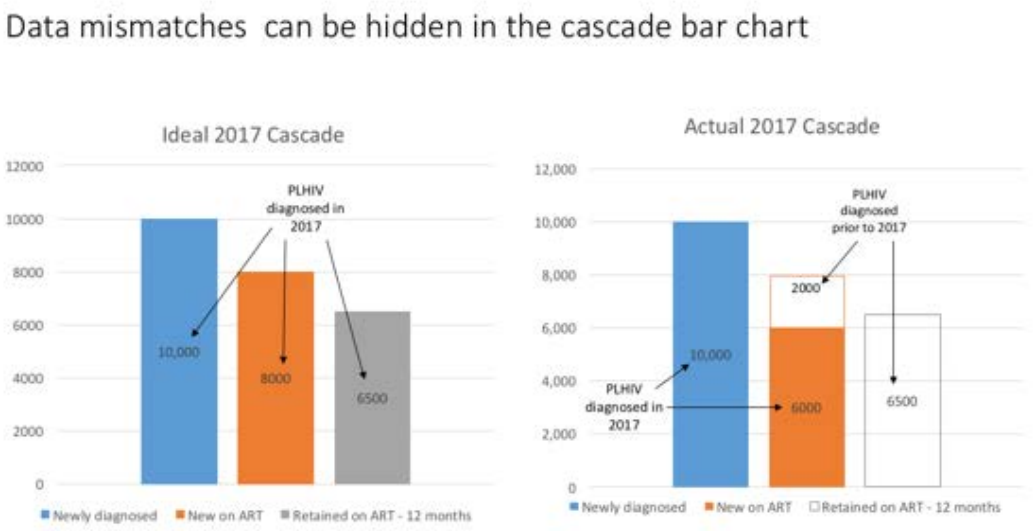
<table>
<tr><td rowspan="3"> 
</td><td>• ART retention rate – 12 months
• HIV viral load suppression rate
• VL testing coverage rate - annualized</td><td>retention – 12 months as a proxy).
(Countries with less reliable VL testing data will use ART retention – 12 months) To interpret VL suppression data, managers must know whether a majority of patients on ART are getting VL testing every year.</td></tr>
<tr><td>Person, Place, Time Disaggregation</td><td>Alternate Views</td></tr>
<tr><td>National
Last 12 months (relative to date dashboard generated) – for Crude Ratio, ART retention rate – 12 months, HIV viral load suppression and VL esting coverage rate;
Last month (relative to date dashboard generated) – for ART coverage rate</td><td>Generated for specific sub national units, especially low performing areas or for specific facility types. Useful to generate for fixed periods corresponding to planning/budget cycle or for more recent time periods (e.g. last 3 months). Figure can be constructed for specific sub-groups, such as pediatric, ANC/PMTCT, key populations, or by implementation partners.</td></tr>
<tr><td colspan="3">Targets – Target of 90% can be shown as a line running across the figure.</td></tr>
</table>

Considerations/issues for interpretation

- Cascade analysis using facility-based data for cascade analysis are limited to cross-sectional views of patient experience
- Data from countries transitioning to a “treat-all” policy may result in atypical cascades.
- In countries where VL testing is not routine in all areas, should rely on ART retention data rather than VL suppression data for cascade analysis based on facility-based data.

The bar chart showing cascade indicators as absolute numbers replicates the ideal HIV care cascade using data available from routine monitoring data. In a mature well-functioning “treat all” ART programme, the numbers of newly on ART would be expected to be 90% or more of those PLHIV newly diagnosed. And the number retained on ART for 12 months should be 90% or more of the number newly on ART (i.e. assuming the rate of diagnoses is similar from one year to the next).

However, the cross sectional, unlinked way that data are captured in most HMIS means that using these indicators may not always result in a typical cascade. This is due to inclusion of different groups of PLHIV in each bar. For example, some patients newly starting ART in the year represented by the figure may have been diagnosed more than a year earlier and have been waiting to enroll in treatment. And individuals included in the measure for ART retention for 12 months (third bar) by definition would have been diagnosed and initiated ART in the year prior to those people included in the second bar.



In the figure above, an example is given illustrating how the time-lag mismatch can be masked because the bars shown in the cascade have a relationship that looks as expected. However, in many countries these anomalies can result in a cascade charts where the second or third bars are larger than the previous bars. As ART programmes stabilize and reduce the backlog of diagnosed patients waiting to initiate treatment (expanding same-day ART initiation, etc.), the cascade figures will become more interpretable. Help end-users of the dashboard by adding notations about programmatic transitions or shifts to dashboard figures, when the information is critical to interpreting the results.

The cascade ratios shown in Figure B. display the coverage indicators related to the "2nd 90" and "3rd 90" indicators: a Crude Linkage measure for % of those diagnosed linked to care, the % of estimated PLHIV on ART, the % retained on ART for 12 months, and the % of ART patients with viral load suppression among those who had a viral load test. Because VL testing is not yet universal among all ART patients in most countries, the VL testing coverage is also shown in this figure to help interpret the generalizability of the "3rd 90."

With respect to interpreting possible inequity in service utilization through separate male and female cascades, analysts should also consider reviewing the data separately for ANC/PMTCT clients. Because PMTCT programmes follow a different set of guidelines and often have separate management, budgets and infrastructure for providing testing and treatment services, there may be a difference in HIV care cascades for women who are diagnosed in ANC settings and those who are diagnosed in non-ANC settings. At the same time, for program managers it may be useful to compare HIV testing services (HTS) across different service venues and modalities, including ANC/PMTCT, TB, out-patient, in-patient, and other PITC-focused settings.

HIV TESTING AND ART PERFORMANCE TABLES

Purpose

Displays SNUs in ranked order for the key indicators for testing performance and ART performance

Analysis

C. Testing Performance by SNU1

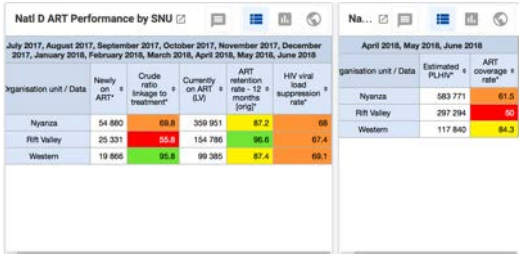
July 2017, August 2017, September 2017, October 2017, November 2017, December 2017, January 2018, February 2018, March 2018, April 2018, May 2018, June 2018

	HIV tests performed*	PLHIV newly diagnosed*	HIV test positivity*	Crude ratio linkage to treatment*
Homa Bay	1 460 282	21 110	1.4	64.4
Kisii	738 345	6 520	0.88	68.5
Kisumu	863 240	19 815	2.3	59.7
Migori	726 226	13 453	1.9	67.4
Nyamira	416 639	3 371	0.81	70.4
Siaya	762 432	14 401	1.9	94.1

Indicators Needed	How do Managers Use It
• HIV tests performed • PLHIV newly diagnosed • HIV test positivity • Crude ratio linkage to treatment	Allows manager to sort by any testing indicator in the table to identify high and low SNU2 performers. Side by side data on # of tests and test positivity allow managers to better assess efficiency of case finding.
Person, Place, Time	**Alternate Views**
All SNU1 (regional Last 12 month (relative to date dashboard generated)	Generated by sex or age by district level or specific facility types. Useful to generate for fixed periods corresponding to planning/budget cycle or for more recent time periods (e.g. last 3 months).

Targets: Table can be expanded to have separate column for % achievement against testing targets, then color coded according to which areas achieved or surpassed their targets.

D. ART Performance by SNU1



Natl D ART Performance by SNU

July 2017, August 2017, September 2017, October 2017, November 2017, December 2017, January 2018, February 2018, March 2018, April 2018, May 2018, June 2018

Organisation unit / Data	Newly on ART*	Crude ratio linkage to treatment*	Currently on ART (LV)	ART retention rate - 12 months [orig]*	HIV viral load suppression rate*
Nyanza	54 860	69.8	359 951	87.2	68
Rift Valley	25 331	55.8	154 786	96.6	67.4
Western	19 866	95.8	99 385	87.4	69.1

Na...

April 2018, May 2018, June 2018

ganisation unit / Data	Estimated PLHIV*	ART coverage rate*
Nyanza	583 771	61.5
Rift Valley	297 294	50
Western	117 840	84.3

Legend: Green =90%, Yellow = 75-89%, Orange = 60-75%, and Red = <60% coverage

Indicators Needed	How do Managers Use It
• Newly on ART • Crude Ratio linkage to treatment • Currently on ART • ART retention rate – 12 months • HIV viral load suppression rate • VL testing coverage rate – annualized • Estimated PLHIV • ART coverage rate	Allows manager to sort by any ART indicator in the table to identify high and low SNU2 performers. Achieved % are color coded by standard measures of performance (<60%. 60-75, 75-89, >90%)
Person, Place, Time Disaggregation	**Alternate Views**
All SNU1 Last 12 months (relative to date dashboard generated) – for all indicators except ART coverage Last month (relative to date dashboard generated) – for Estimated PLHIV and ART coverage rate	Generated by sex or age at sub-district level, or for specific facility types. Useful to generate for fixed periods corresponding to planning/budget cycle or for more recent time periods (e.g. last 3 months).

Targets – % achieved against target can be calculated and added as columns to the table. These can be color coded by performance using the standard HIV legend (<60%. 60-75, 75-89, >90%)

Considerations/issues for interpretation

- Tables of indicators display programme performance in a scorecard format which is helpful for ranking geographic areas or reporting units.
- Different managers may benefit from sorting high and low performing areas according to different indicators.

These tables function as a type of score card, presenting a summary view of programme performance across geographic areas (i.e. SNU) for the key indicators of the HIV testing programme and the ART programme. These lists can be sorted by any variable shown in the table. Color coding values in the table according to expected performance helps managers to easily scan for low and high performing geographic areas. It is also possible to determine which aspect of a testing programme or the ART programme creates challenges for large groups of SNU. Or to see patterns in low performance across multiple dimensions of the programme.

Scorecards made available to SNU level managers or facilities can see how their facility/SNU performs compared to other sites. The generation of these tables for specific sub-groups (e.g. by gender, for key populations, for specific types of facilities, or those funded using a specific service delivery model) can also be helpful in exploring inequity or under-performance.

The indicators selected for the tables reflect the key questions managers may have: where is HIV testing promotion and service expansion working and where are testing resources being used (i.e. # of tests performed)? where is case finding highest and been most efficient (i.e. # of PLHIV newly diagnosed, test positivity)? Where are the most number of new ART patients (i.e. # newly on ART)? Where is ART linkage to care poor (i.e. Crude Ratio of Newly on ART to newly diagnosed)? Where is ART enrollment highest (i.e. # currently on ART, ART coverage rate)? Where is ART quality high (e.g. ART retention rate >90%, VL suppression rate >90%)?

Note that assessment of testing performance relies on the number of tests performed, which is only a proxy for number of individuals tested for HIV. Facility based testing data that are reported in aggregate cannot distinguish repeat testers in different time periods. Managers may need to adjust their testing coverage estimates based on the average number of times a person may get tested for HIV over a given period.

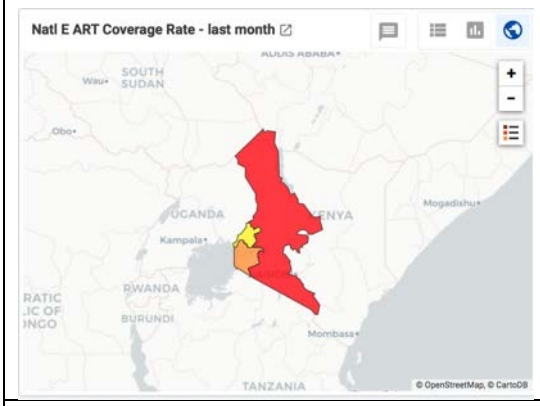
CURRENTLY ON ART AND RETENTION ON ART MAPS

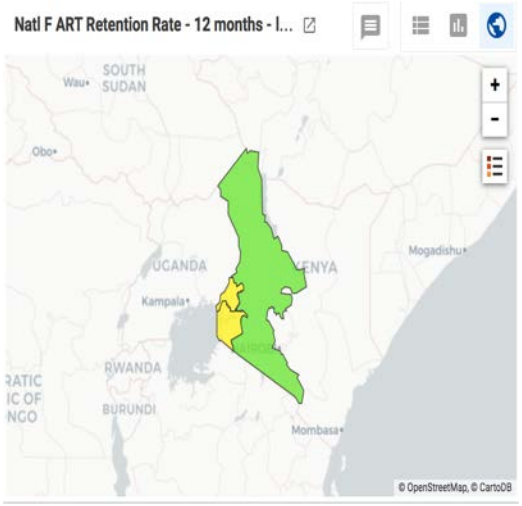
Purpose

Summarizes the size and quality of ART service provision by SNU across the country

Analysis

E. ART coverage map by SNU1		
	Indicators Needed	**How do Managers Use It**
	• ART coverage rate	Identifies underperforming areas on ART coverage, assuming estimates for PLHIV are reliable. Managers can reference broader ART performance in parallel table (D)

	**Person, Place, Time Disaggregation** All SNU1 Last month(relative to date dashboard generated)	**Alternate Views** Generated by sex or age
Targets – Currently targets are shown through the color coding of areas (>90%, 75-89%, <75%, etc.). The lowest level of coverage can be indicated in the red color highlighting where performance is low. These targets are set at an absolute level.		

F: Map of ART retention – 12 months by SNU1		
	**Indicators Needed** • ART retention rate – 12 months	**How do Managers Use It** Identifies districts where ART retention at 12 months is lower than expected and where viral load suppression may be jeopardized. Managers can reference broader ART performance in parallel table (D). Countries with good VL testing utilization/access can substitute % VL suppression indicator for ART retention – 12 months
	Person, Place, Time Disaggregation	**Alternate Views**
	All SNU1 Last 12 months (relative to date dashboard generated)	Countries may be able to superimpose facility level retention rates through spot maps. Useful to generate for fixed periods corresponding to planning/budget cycle or for more recent time periods (e.g. last 3 months). to look for changes in retention.
Targets – Currently targets are shown through the color coding of areas (>90%, 75-89%, <75%, etc.). The lowest level of coverage can be indicated in the red color highlighting where performance is low. These targets are set at an absolute level.		

Considerations/issues for interpretation

- Color-coded maps provide an important tool for managers to quickly identify geographic areas performing well and poorly

- Use of the ART coverage indicator in maps is limited to the level of granularity for which estimates of PLHIV are available in a country.
- Maps can highlight performance at multiple sub-national levels simultaneously using a combination of choropleth and spot maps.

The map of current ART coverage shows which SNUs have done a good or poor job in diagnosing and linking PLHIV to ART. Unlike most other indicators used in these dashboards, the current number on ART refers to the cumulative number of patients on ART at a specific point in time (i.e. by the end of the month for which it is generated). It is not meaningful when summed over different periods of time, such as a quarter, a year, or multiple years. When the indicator is "calculated over a period of time," the HMIS should be taking an average value across the time period. Calculating the coverage rate requires estimates of PLHIV for different SNUs, e.g. District estimates from Spectrum, be available and imported into the HMIS. In addition to being critical program performance data, ART coverage at SNU levels help program managers to define relative geographic and sociodemographic gaps in service access which may be addressed by operational and financial adjustments.

The map of ART retention is designed to show ART retention rates at two SNU levels simultaneously (i.e. SNU2 and facility level). The figure can summarize what parts of the country have high retention and which are underperforming. It can also identify specific facilities which disproportionately contribute to the SNU2 retention rate. For example, a low performing facility will have a very different marker color (red) than the background color of the SNU2 that is performing well (green).

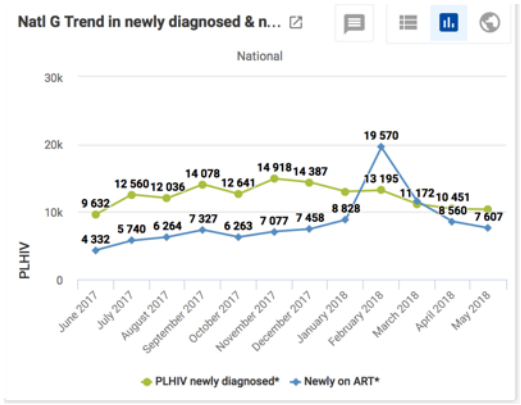
CASE FINDING, LINKAGE AND ART QUALITY TRENDS

Purpose

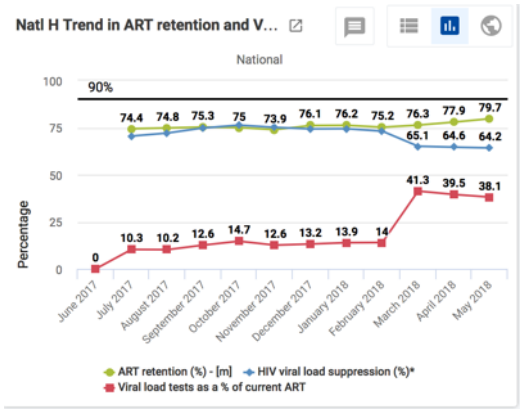
Shows changes in performance for case finding, linkage to treatment and ART retention/ VL suppression over time. Identifies unusual activity or interruption in service.

Analysis

G: Trend in newly diagnosed and new on ART



Indicators Needed	How do Managers Use It
• PLHIV newly diagnosed • Newly on ART	Shows whether case finding and new ART enrolment are steady and the month-to month pattern of linkage to treatment.
Person, Place, Time Disaggregation	**Alternate Views**
All National Monthly	Generated by gender, age, key populations, service delivery modes (e.g. PMTCT, TB), or specific sub-national units, especially those identified as underperforming through maps or tables. Time periods can be calculated to show values by quarterly performance for fixed periods corresponding to budget or planning cycles.

<table>
<tr><th colspan="3">H: Trend in ART retention and VL suppression</th></tr>
<tr><td rowspan="3"> 
</td><td>Indicators Needed</td><td>How do Managers Use It</td></tr>
<tr><td>ART retention rate– 12 months
HIV viral load suppression rate
VL testing coverage rate – annualized</td><td>Shows whether ART retention and VL suppression rates remain high or fall below expected thresholds. 90% Target line is shown to identify gap in performance. VL testing coverage rate line indicates whether % VL suppression is likely to be generalizable to all ART patients.
90% Target line is shown to identify gap in performance for ART retention -12 months and VL suppression rates.</td></tr>
<tr><td>Person, Place, Time Disaggregation</td><td>Alternate Views</td></tr>
<tr><td>All
National
Monthly</td><td>Generated by sex, age, key populations, or for specific sub-national units, especially those identified as underperforming through maps or tables.
Time periods can be calculated to show values by quarterly performance for fixed periods corresponding to budget or planning cycles.</td></tr>
<tr><td colspan="3">Targets: In this figure the assumption is that both retention and VL suppression should be at 90%.</td></tr>
</table>

Considerations/issues for interpretation

- Trend analysis helps managers identify anomalies in performance or reporting that can trigger timely investigation or intervention.
- Specific areas of poor performance can be identified by observing divergence in trends between indicators which are expected to track together, such as ART retention and VL suppression.

These two figures provide useful side-by-side comparison of indicators that are expected to have a relationship to each other. In well-functioning programmes, trends in newly on ART should shadow trends in newly diagnosed, especially in countries with a “treat all” policy in place. Large deviations between the lines or cross-overs (i.e. where the number newly on ART is much larger than the newly diagnosed) should have programmatic explanations that are incorporated as notes into the figure to aid interpretation. For example, in Figure G, the number newly on ART exceeds the number of cases diagnosed in August 2018. This occurred due to concerted campaign in August to reduce the list of patients waiting to enroll in ART as this country completed its transition to implementing a “treat-all” programme.

Similarly, at any level, programmes with consistently low crude linkage should have a clear explanation (e.g. inadequate ART service coverage within the SNU), or prompt management follow-up to ascertain the root causes and solutions to improve linkage. Similarly, ART retention and VL suppression should

follow similar trends. However, when discrepancies between these two lines are identified, managers and analysts must further investigate whether the issue is related to data quality, low levels of VL testing coverage or a substantive issue with non-adherence or drug resistance.

Another useful aspect of trend analysis that builds on score-card type ranking is to determine whether areas that are underperforming against targets show a consistent underachievement, or whether a recent programmatic event or barrier occurred. Facilities or geographic areas which are able to bounce back from underperformance in a single reporting period indicates a functioning system that can identify problems and respond independently. Consistent lags or declining levels of performance suggest that local managers are unable to diagnose and respond on their own. In this way trend analysis provides insight into whether supervisory intervention is needed and what type of follow up may be effective.

5. Data limitations

The key advantage of using HMIS data over survey or special study data to measure programme performance is that these data are systematically captured for all patients receiving services resulting in an comprehensive view of services provided. A common limitation of HMIS data based on aggregate reporting is the tendency for data to be collected in a cross-sectional manner. Especially when used for cascade analysis, the important insights gained by a longitudinal view of patient experience are not easily displayed using routine facility-based HMIS data [NB: in many settings, health facilities will have HIV electronic medical records or reporting systems which contain individual-level, longitudinal data, however the data reported into the HMIS are usually aggregate]. The unlinked nature of cross-sectional data makes interpretation of some figures complex, especially in settings where patients access services at different facilities over time. The figures recommended in the main dashboard presented in this document attempt to represent the most useful ways to display the data which are typically available (based on global and national core indicator standards) and given the most common limitations of most HMIS used by HIV programmes. To account for these limitations in data interpretation country-level analysts and managers must contextualize expectations of performance in terms of how services are actually provided and choose the appropriate level of disaggregation used for the standard charts they adopt.

6. References

- Consolidated strategic information guidelines for HIV in the health sector. WHO, Global Task Force on Impact Measurement, Geneva, May 2015
- Indicator Guidance Sheet for HIV. The Global Fund, Geneva, updated regularly and accessed from http://www.theglobalfund.org/en/me/documents/indicatorguidance/
- http://www.who.int/hiv/pub/guidelines/person-centred-hiv-monitoring-guidelines/en/

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