Published in final edited form as:

Trop Med Int Health. 2012 October ; 17(10): . doi:10.1111/j.1365-3156.2012.03055.x.

Defining retention and attrition in pre-antiretroviral HIV care: proposals based on experience in Africa

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Abstract

Objective—To propose practical, standardized definitions for reporting retention for pre-ART care.

Method—Definitions footed on three stages: Stage 1, testing HIV-positive to initial ART eligibility assessment; Stage 2, initial assessment to ART eligibility; and Stage 3, ART eligibility to ART initiation. For each stage, negative outcomes include death, loss, or not being retained.

Results—Stage 1 Retention: proportion of patients who complete initial ART eligibility assessment within 3 months of HIV testing, with reporting of cohort outcomes at 3 and 12 months after HIV testing. Patients who end Stage 1 eligible for ART move directly to Stage 3. Stage 2 Retention: proportion of patients who either: complete all possible ART eligibility re-assessments within 6 months of the site's standard visit schedule; or had an assessment within 1 year of the time reported to and were not ART eligible at the last assessment. Retention should be reported at 12-month intervals. Stage 3 Retention: initiating ART (i.e. ARVs dispensed) within 3 months of determining ART eligibility, with reporting at 3 months after eligibility and 3 monthly intervals thereafter.

Conclusion—If pre-ART retention is to improve, consistent terminology is needed for collecting data, measuring and reporting outcomes, and comparing results across programs and countries. The definitions we propose offer a strategy for improving the consistency and comparability of future reports.

Keywords

HIV; retention; attrition; antiretroviral therapy; pre-antiretroviral therapy care; resource limited settings

Introduction

Although some five million patients are currently accessing antiretroviral treatment (ART) globally (WHO/UNAIDS/UNICEF 2010) late presentation for ART, as represented by persistently low CD4 counts at ART initiation, continues to be the norm in many parts of the world (Fox and Rosen 2010, Rosen et al. 2007, Cornell et al. 2010, Nash et al. 2011). This

phenomenon prevails even where widespread HIV testing is available, due in part to failure of patients who are not yet eligible for treatment when diagnosed (Larson et al. 2010b, Larson et al. 2010a, Bassett et al. 2010, Bassett et al. 2009, Losina et al. 2010, Tayler-Smith et al. 2010, Micek et al. 2009) to enroll and remain in pre-ART care and failure to initiate treatment promptly among those who are already ART-eligible at HIV diagnosis (Ingle et al. 2010) In a recent systematic review, we estimated that fewer than a third of patients testing HIV-positive in sub-Saharan Africa remain continuously in pre-ART care until ART initiation (Rosen and Fox 2011).

While our review made clear that patient attrition from pre-ART care is very high, the literature on retention in pre-ART care was difficult to synthesize due to unclear and widely inconsistent definitions of terms and time intervals for reporting on cohort outcomes. We found that follow-up intervals to determine the proportion of a cohort achieving a specific outcome, such as some measure of retention in pre-ART care prior to ART eligibility, ranged from 7 to 1826 days. The outcomes reported included “enrolled in care,” “linked to care,” “still in care at date of data censoring,” “repeat CD4 count one year after initial assessment,” “less than 30 days late for last visit,” and others. Because each analysis measured a different time period or outcome, estimates could not be compared across studies, nor could they be combined to monitor overall progress.

To some extent this lack of consistency is to be expected. Even more than the period after ART initiation, the pre-ART period usually requires tracking patients across multiple sites (e.g. from a testing site to a referral site), is dependent on program-specific schedules for repeated visits, lacks clear start and end points, and requires a long duration of follow-up before patients reach outcomes of interest. In addition, the data needed for measuring pre-ART retention are often not routinely captured by large-scale HIV treatment programs, which to date have focused on patients who have initiated ART.

Some of the difficulty in interpreting studies of pre-ART care arises from a lack of consistent methods by researchers. Our review called for clearly defined terminology, definitions, time intervals, and end points for reporting retention in pre-ART care. Here we examine the challenges in developing clear definitions, propose definitions of attrition and retention in each stage of pre-ART care, and discuss the data required for accurately measuring retention.

Stages of pre-ART care

Most pre-ART care programs in resource-constrained countries are designed to have patients pass through a series of steps between testing positive for HIV and initiating ART. The content of pre-ART care programs varies widely by country and service provider, ranging from simple monitoring of ART eligibility to a full package of health and social services (WHO HIV Department 2011). In some cases no dedicated pre-ART services are offered or there are no formal guidelines for care to be provided during this period. For purposes of consistent measurement in cohorts across countries and service providers, we focus on ART eligibility monitoring as the essential component of pre-ART care. Key concepts related to pre-ART care are defined in Panel 1.

As in our previous review (Rosen and Fox 2011) we divide pre-ART care into three discrete stages of care (Figure 1). Each stage is defined in its own panel (Panels 2–4). We used the literature and field experience to develop practical, standardized, and quantifiable definitions for reporting retention among cohorts of patients for the three stages of pre-ART care. We caution that these definitions are not meant to suggest an ideal interval in which patients should complete a stage (which would always be as quickly as possible); rather, they represent a tradeoff between the desire to transition patients onto ART as soon as they are

eligible and the practical delays that often ensue in the process. Below and in the panel for each stage, we recommend a standard definition for retention in each stage of pre-ART. We also note that in reality there is some cycling between stages as patients who leave on stage may re-engage with the care and appear as a new patient. To improve the clarity of reported estimates, we recommend reporting pre-ART retention to a consistent duration of follow up for all patients in the cohort and avoiding reporting to a date of censoring.

Stage 1 – HIV testing to completion of first ART eligibility assessment

Stage 1 (Panel 2) covers the period from the time a patient receives a positive HIV diagnosis until they complete their first ART eligibility assessment. Patients testing positive must present to an HIV treatment clinic and complete their first ART eligibility assessment. The stage ends when the patient is aware of their ART eligibility status.

Although this stage appears relatively straightforward, published studies report a range of outcomes and time intervals, as illustrated in Panel 2. For example, one study from Mozambique reported the proportion of patients who gave a blood sample and returned for CD4 count results within 60 days (44%) (Micek et al. 2009) while another study from Malawi reported only the proportion of patients returning for CD4 count results within 1 month of providing the blood sample, from among those who gave blood samples (55%) (Tayler-Smith et al. 2010). While each of these results is useful to the program to which it pertains, it is difficult to compare them to one another and draw any conclusions about the relative successes of the programs.

Stage 1 is perhaps the most difficult to monitor with routine data collection systems, as HIV testing is often provided outside clinical facilities (e.g. during testing campaigns or at stand-alone HIV testing facilities). Patients testing HIV-positive at a facility that does not provide care are typically referred to a clinic for pre-ART care. Even when testing occurs at a clinic, testing clients are often not assigned an identification number that allows them to be tracked from testing to clinical care. Estimating retention in Stage 1 requires knowing both the number of patients who test positive for HIV (denominator) and the number of those who reach a referral clinic and complete their first ART eligibility assessment (i.e. provide a blood sample for a CD4 count and return for the results). Since patients testing positive at a stand-alone HIV testing facility may be referred to multiple clinics for pre-ART care, accurate cohort reporting requires a means to track patients from testing to multiple potential referral sites. Another challenge in reporting on Stage 1 is determining how much time to allow between HIV testing and completion of ART eligibility assessment. While ideally this should happen as quickly as possible, allowances must be made for patient delays related to coping with an HIV diagnosis and the logistics of completing a referral, as well for as provider delays related to determining ART eligibility. Finally retention in stage 1 is determined, in part, by the method used to assess ART eligibility. In sites where clinical staging alone is used, determining eligibility requires only one visit, whereas sites using CD4 testing in addition to clinical staging typically require at least 2 visits to complete the stage.

To standardize reporting, for Stage 1 we define retention as the proportion of patients who test HIV-positive during a specific time period (e.g., the first quarter of 2011) who complete an initial ART eligibility assessment within 3 and 12 months of HIV testing. We recommend reporting cohort outcomes at 3 months, then at 1 year. For Stage 1, the definition we propose is thus:

$$\text{Retention} = \frac{\text{\#patients who complete ART eligibility assessment within 3 (or 12) months of HIV test}}{\text{\#patients who test positive for HIV}}$$

In settings in which populations are mobile or where multiple HIV clinics are available, we recommend explicitly excluding from the denominator patients who indicate they plan to have an ART eligibility assessment at a site other than the one where the outcome (numerator) is measured.

Because data for Stage 1 may be generated in different locations (e.g. an HIV testing site and one or more referral sites), a common, unique patient identifier used across sites is the best way to generate accurate estimates of stage 1 retention. The identifier could be a national ID number, a biometric identifier, or a common patient number used across sites, so long as all sites collect the information. Essential information required for reporting on retention in Stage 1 is shown in Panel 2 along with an example of how to calculate retention.

Stage 2 – Completion of first ART eligibility assessment to ART eligibility

Stage 2 covers the period from completion of the first ART eligibility assessment until ART eligibility is established (Panel 3). Patients must remain actively engaged in care, as indicated by returning for scheduled ART eligibility assessments, until they become ART eligible. The stage ends when the patient is aware that he or she has become ART eligible. Patients who end Stage 1 already eligible for ART move directly to Stage 3. Defining retention in Stage 2 is more difficult than in Stages 1 and 3 because the time spent in Stage 2 and the steps required within the stage vary, depending on each individual's disease stage at HIV diagnosis and their ensuing pace of disease progression. Unlike Stages 1 and 3, successful retention in Stage 2 may involve repeating the same step (monitoring visit) multiple times, rather than moving from a single start point to a single end point. Moreover, HIV care programs differ widely in their protocols for patient management in Stage 2. While most national guidelines recommend a maximum of six months between visits, in practice in some clinics patients may be told to return only when they experience symptoms. A universally applicable time period for recognizing loss to care is thus difficult to define. While a program that requires pre-ART care visits every three months, for example, might consider a patient who does not return for six months to be lost, in a program that schedules visits only every six months, no patients could be lost to care in the first six months. The literature reflects, and often amplifies, this variability (Panel 3). One study in South Africa used the proportion of patients who had a repeat CD4 count for ART eligibility assessment within 13 months of the first ART eligibility assessment (45%) to indicate retention in pre-ART care, for example (Lessells et al. 2011) while another study in Ethiopia reported the proportion of patients initiating care or still in care at date of data censoring (70%) (Mulissa et al. 2010). The use of different endpoints by these studies complicates what was already a difficult comparison since the protocols for visits in pre-ART care may have been different between the study sites. Accordingly, the interpretation of retention measures for this stage of care will always need to be made in light of the characteristics of the specific care program in question.

To deal with the variability in visit schedules and the need for an indicator of engagement in care, we define two ways a patient can be considered retained in care over time. Stage 2 retention is the proportion of patients who completed an initial ART eligibility assessment and were not yet ART eligible who either: a) complete all scheduled ART eligibility re-assessments within six months of the site's standard visit schedule; or b) had an assessment within the past year of the assessment period (e.g. 12, 24 months, etc.) and were not ART eligible at that assessment. The first indicator of "engagement in care" (completing all visits on schedule within 6 months) allows a patient to be successful if they attend all scheduled visits, even if they eventually reach eligibility at a low CD4 count. The second indicator (completing at least one eligibility assessment within the 12 months of the assessment period at which the patient was not ART eligible) allows a patient to be successful even if they miss

some visits, as long as they have completed a visit within the year and remain above the ART eligibility threshold when reassessed.

Retention for Stage 2 is then defined as:

$$\text{Retention} = \frac{\text{\#patients who complete all scheduled eligibility assessments within 6 months of schedule or were not ART eligible at last assessment within past year}}{\text{\#patients who complete a first ART eligibility assessment}}$$

The data required to report on Stage 2 are simpler to collect than for Stage 1 as they can typically all be obtained from one site, but longer follow up is needed. The HIV care site's data system must use a unique patient identifier and record the date of all ART eligibility assessments done. See Panel 3 for an example of how to calculate retention in Stage 2.

Stage 3 –ART eligibility to ART initiation

Stage 3 covers the period from first establishing ART eligibility until ART initiation. Retention in Stage 3 is the easiest of the three stages to define and measure as it has a consistent start point (determination of ART eligibility) and end point (ART initiation) and because retention can be defined in terms of time since ART eligibility was established rather than in relation to the most recent visit. Stage 3 starts with the patient learning of his or her eligibility, rather than with the exact point of biological eligibility, because the latter cannot be determined in routine care. A patient must complete any treatment readiness steps required by the site. The stage ends when the patient is prescribed a first dose of ARVs (Panel 4).

The main challenge in defining retention in Stage 3 arises from programmatic variation in what is required of a patient between eligibility and initiation. Programs typically require anywhere from one to four clinic visits for various "treatment readiness" activities, such as adherence counseling. The schedule of required visits varies among countries and between programs and sites within countries.

In our review we found that most reports used the same start and end points (ART eligibility to ART assessment), but there was enough variability in definitions and time intervals to make synthesis difficult (see Panel 4). One report from Mozambique, for example, reported the proportion initiating ART within 90 days of eligibility (31%) (Micek et al. 2009) while another from South Africa reported the proportion of patients initiating treatment within 3 months of the patient's last pre-ART visit (83%) (Bassett et al. 2009). These outcomes cannot be compared, even though their end point is the same.

For Stage 3, we define retention as:

$$\text{Retention} = \frac{\text{\#patients who initiate ART within 3 months of eligibility being established}}{\text{\#patients for whom ART eligibility is established}}$$

Retention in Stage 3 should be reported for a cohort at 3 months after ART eligibility and 3 monthly intervals thereafter. An example of how to calculate retention in Stage 3 is shown in Panel 4.

While this definition aims to be applicable and relevant to as wide a range of programs as possible, it does not directly address the goal of raising average CD4 counts at ART

initiation. For this purpose, the definition could be modified to report the proportion of patients initiating ART above a CD4 count floor that is specific to the program in question.

Conclusions

New guidelines and objectives for HIV care and treatment programs call for large-scale HIV testing aimed at early diagnosis of HIV infection and large-scale ART provision, with thresholds that allow much earlier treatment initiation than in the past (WHO 2010, WHO/UNAIDS/UNICEF 2010). For these goals to be met, patients diagnosed with HIV must be enrolled and retained in pre-ART care. Consistent terminology for studying pre-ART care will facilitate the collection of relevant data, improve measuring and reporting of outcomes, and enhance comparability of results across programs and countries.

The definitions we propose offer a strategy for improving the consistency and comparability of data collected in observational and intervention studies. We aimed to make our definitions and reporting time frames practical within existing, routine reporting systems and reasonable with respect to the amount of data needed, based on the published literature and our own experience. Future empirical analyses of program data sets may allow our definitions to be further refined by determining the time intervals that best predict permanent loss from pre-ART care, as has been done with post-ART loss to care (we hope that the proposed definitions will also spark further discussion and development of consensus approaches, with input from key stakeholders, other researchers, and funding agencies).

The definitions we propose are intended for evaluation of cohorts, not for managing individual patients or for quality improvement of specific programs. A clinician may not regard completion of scheduled visits in Stage 2 within 6 months of the program schedule to be a strict enough criterion for measuring the success of any individual patient. Similarly, some pre-ART programs may not be satisfied with adherence to a visit schedule as a measure of retention, but instead focus on measures of serious morbidity. It is unlikely that any single set of definitions can meet the needs of everyone with an interest in pre-ART care, and ours are aimed at one particular audience.

One of the purposes of defining terms is to deliberately restrict what is included and excluded. Our definitions deliberately exclude two important categories of information. First, there are many reasons why patients are lost from pre-ART care. For some, lack of current illness may be the main driver, while for others stigma or lost income due to long clinic queues may be greater concerns. The definitions we propose do not attempt to distinguish among reasons for loss to care. Second, we deliberately defined pre-ART care to begin after a patient tests HIV-positive. If a large portion of patients only test when they are already seriously ill and treatment eligible, thereby bypassing Stage 2 entirely, pre-ART care programs will fail to prevent a large share of HIV-related morbidity and mortality, and average starting treatment CD4 counts will remain low. In studies included in our review for which the proportion of patients eligible for treatment at HIV testing or enrollment in pre-ART care could be determined: nearly half were already eligible for ART (median [IQR] 49% [34–53%]). Improving pre-ART care will have no impact on patients who were already late presenters for treatment when first diagnosed with HIV.

We believe that more and better reporting on retention in pre-ART care is essential to improve the allocation of limited resources and achieve targets for HIV treatment. To do this, clear definitions of terms, as well as better data collection systems, are essential. By using the standardized definitions proposed here, we and other researchers will be able to provide better information and guidance to policy makers on the extent of pre-ART retention

and loss to care, track changes over time, and develop and test interventions to improve pre-ART programs.

Acknowledgments

This project was supported by a grant from the United States Agency for International Development. Matthew Fox was also supported by the National Institute of Allergy and Infectious Diseases. The content is solely the responsibility of the authors and does not necessarily represent the official views of USAID, the National Institute of Allergy and Infectious Diseases or the National Institutes of Health. The funders had no role in this study.

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Figure 1. Stages of pre-ART HIV care (to be reproduced pending permission from PLoS Medicine)

Source: Rosen S, Fox MP (2011) Retention in HIV Care between Testing and Treatment in Sub-Saharan Africa: A Systematic Review. PLoS Med 8(7): e1001056. doi:10.1371/journal.pmed.1001056. Reproduced with permission from publisher.

Panel 1

Definitions of Key Concepts in pre-ART Care

CONCEPT	DEFINITION
Pre-ART care	All services provided to patients between testing positive for HIV and dispensing of the first dose of ARVs.
Enrollment in pre-ART care	Active (intentional) registration by a patient in any form of pre-ART care, regardless of whether this occurs before or after initial ART eligibility assessment.
ART eligibility assessment	The process of determining if a patient should be referred to or continue in pre-ART care or should initiate ART, typically determined through a CD4 count or on the basis of WHO stage.
Retention	Active engagement in pre-ART care as required by the specific care program over time, which is defined for each stage of pre-ART care below
Loss to care (or attrition)	Discontinuation of active engagement in pre-ART for any reason, including death.

Panel 2

Description and Definitions for Stage 1 of Pre-ART Care

Definition and description of Stage 1

Definition

Period from testing HIV-positive until the completion of initial ART eligibility assessment.

Description

In this stage, patients who test positive must present to an HIV treatment clinic (often through referral from a separate testing site) and complete their first assessment for ART eligibility. The stage ends when the patient is aware of their ART eligibility status and knows what the next step is (i.e. pre-ART care or ART initiation).

Measurement of Stage 1 events as reported in the literature and as proposed

<i>Event</i>	<i>Reported in literature</i>	<i>Proposed</i>
Start point	HIV test; providing sample for CD4 count; enrolling in care	First positive HIV test
Outcomes reported	Providing sample for CD4 count; receiving results of CD4 count	First ART eligibility assessment (patient receives results of CD4 count or clinical evaluation and is referred to pre-ART care or ART)
Time to achieving outcome	7–183 days; 1/3 did not report interval	3 months and 1 year after HIV test
Data required for each patient in cohort	n/a	Date of HIV test, date of a blood draw for CD4 count (where done), date of return to receive CD4 count results or have clinical assessment for ART eligibility

Retention calculation for Stage 1

Retention = # of patients who complete ART eligibility within 3 (12) months of HIV test # patients who test positive for HIV

Example of retention calculation for Stage 1

<i>Parameter or value</i>	<i>Example</i>
Time period for cohort enrollment (HIV test)	January 1–December 31 2009
Earliest date at which a 3 month cohort retention evaluation can be completed (at least 3 months after last patient enrolled)	April 1 2010
# of patients testing HIV-positive during period (a)	1000
# of patents transferring out (requesting referral to external site) (b)	100
# of patients in cohort for evaluation at 3 months (c = a–b)	900 (a–b)
# of eligible patients completing 1st eligibility assessment within 3 months of HIV testing (d)	450
Retention in Stage 1 at three months (R1 = d/c as %)	50% (d/c)

Suppose 4000 patients tested for HIV in 2009 at a clinic providing both testing and care and treatment services. Among these 4000, 1000 tested positive for HIV (20% prevalence). For this cohort of 1000 patients, the program would need to wait until April 2010 to review records to determine what proportion completed an ART eligibility assessment within 3 months of the HIV test. In this example, of the 1000 patients testing HIV positive in 2009, 100 requested referral to another site for further HIV care and treatment and were therefore excluded from the denominator. Among the 900 not referred elsewhere, 450 completed their first ART eligibility assessment within 3 months of HIV testing. Retention in Stage 1 at three months was thus 0.50.

Panel 3

Description and Definitions for Stage 2 of pre-ART Care

Definition and description of Stage 2

<i>Definition</i>	<i>Description</i>
Period from completing the first ART eligibility assessment to ART eligibility for those not eligible for ART at the time of testing HIV-positive.	In this stage, patients must remain actively engaged in care, as indicated by returning for scheduled ART eligibility assessments until eligible for ART. The stage ends when the patient is aware they have become ART eligible.

Measurement of Stage 2 events as reported in the literature and as proposed

<i>Event</i>	<i>Reported in literature</i>	<i>Proposed</i>
Start point	Staging; referral from HIV test; enrollment in care	Referral to pre-ART care after staging
Outcomes reported	Various one-time and repeat events (enrollment in care; linked to or attending care; repeat CD4 count by date of data censoring or within 1 year)	Learning eligibility status within 6 months of all scheduled visit according to the site protocol; or completed at least 1 ART eligibility assessment within one year since the date being reported to
Time to achieving outcome	122–1826 days; 1/3 did not report interval	12-months, then 12 monthly intervals
Data required for each patient in cohort	n/a	Date of completing first ART eligibility assessment, date of all scheduled ART eligibility assessments within the reporting period and the date of attending all ART eligibility visits within the reporting period

Retention calculation for Stage 2

Retention = # of patients who complete all scheduled eligibility assessments within 6 months of schedule or were not ART eligible at the last assessment within past year / # patients who complete a first ART eligibility assessment

Example of retention calculation for Stage 2

<i>Parameter or value</i>	<i>Example</i>
Time period for cohort enrollment (completed 1 st ART eligibility assessment and not eligible for ART at that assessment)	January 1–December 31 2008
Earliest date by which all patients should have completed first six-month follow up visit	July 1 2009
Earliest date at which a 12-month cohort evaluation can be completed	January 1 2010
# patients enrolled in cohort (a)	1,000
# transferred out during the 12 months after entering cohort (b)	50
# of patients remaining in cohort for 12 month assessment (c = a–b)	950
# of patients completing all scheduled monitoring visits within 6 months of schedule (d)	200
# of patients who did not complete all scheduled monitoring visits within 6 months of schedule but whose last ART eligibility assessment within 12 months was above eligibility threshold (e)	100
Total retained at 12 months (f = d+e)	300
Retention in Stage 2 at 12 months (R2 = f/c as %)	31.5%

Suppose 2,000 patients completed their first ART eligibility assessment at the treatment site in 2008. Among these, 1,000 were eligible for ART and 1,000 were not. Among the 1000 not eligible, all patients are scheduled to return to the site after 6 months for a follow up medical exam and ART eligibility assessment. Thus, all patients could have a 12 months of follow up on Jan 1 2010. If 50 subjects transferred out of care over the 12 months then 950 subjects would be eligible for assessment. Suppose 200 patients completed all scheduled monitoring visits within 6 months of the schedule and a further 100 patients didn't complete all scheduled monitoring visits within 6 months of schedule but had their last ART eligibility assessment within 12 months and were not yet eligible for ART at that time. Retention in Stage 2 at 12 months would be $300/950 = 0.315$.

Panel 4 –**Panel 4****Description and Definitions for Stage 3 of pre-ART Care****Definition and description of Stage 3****Definition**

Period from ART eligibility to ART initiation.

Description

In this stage, a patient must complete any treatment readiness steps required by the site (e.g. adherence counseling) and then begin treatment. The stage ends when the patient has been prescribed a first dose of ARVs.

Measurement of Stage 3 events as reported in the literature and as proposed

<i>Event</i>	<i>Reported in literature</i>	<i>Proposed</i>
Start point	Treatment eligibility; first clinic visit; HIV test	Patient learns of treatment eligibility
Outcomes reported	ART initiation by date of data censoring; proportion not initiated	ART initiation within 3 months of learning eligibility
Time to achieving outcome	90–1096 days; 1/2 did not report interval	3 months, then 3-monthly intervals
Data required for each patient in cohort	n/a	Date first becoming ART eligible, date of completion of all ART readiness steps, date of ART initiation

Retention calculation for Stage 3

Retention = # of patients who initiate ART within 3 months of eligibility being established / # patients for whom ART eligibility is established

Example of retention calculation for Stage 3

<i>Parameter or value</i>	<i>Example</i>
Time period for cohort enrollment (ART eligibility established)	January 1–December 31 2009
Earliest date at which 3-month cohort retention evaluation can be completed	April 1 2010
# of patients who became ART eligible during period (a)	500
# of patents transferring out within 3 months of becoming ART eligible (b)	25
# of patients in cohort for evaluation at 3 months (c=a–b))	475
# of eligible patients initiating ART within 3 months of HIV testing (d)	200
Retention in Stage 3 at three months ($R3 = d/c$ as %)	42%

Suppose 500 patients became ART eligible between January and December 2009. A program would need to wait until April 2010 to review records to determine who completed initiated ART. If in April 2011, of the 500 patients becoming ART eligible during 2009, 25 transferred to another site, 475 would be eligible for evaluation. Among the 475 not referred elsewhere 200 initiated ART within 3 months of HIV testing. In this case, retention in Stage 3 at three months is 0.42.