



Sláinte Ghnéis &
Clár um Thoirchis Ghéarchéime
Sexual Health &
Crisis Pregnancy Programme

Continuum of HIV Care, Ireland 2017

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on behalf of the Continuum of HIV Care Steering Group

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July 2018

Acknowledgements

We would like to sincerely thank all the staff who have contributed to the data collection, in particular Dr Almida Lynam (GUIDE Clinic, St James's Hospital), Dr Aoife Cotter and Dr Willard Tinago (Mater Misericordiae University Hospital), Dr Eileen Sweeney (Cork University Hospital), Dr Sam Mc Conkey and Mr Paul Hollywood (Beaumont Hospital), Ms Joanne Moran (National Virus Reference Laboratory, Ms Nicola Boyle (University Hospital Galway), Dr Sarah O'Connell and Ms Josephine Clancy (University Hospital Limerick), Ms Amanda Walsh (Our Lady's Children's Hospital, Crumlin), Dr Eoin Feeney and Ms Louise Corey (St. Vincent's University Hospital).

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1. Background

1.1 Antiretroviral therapy (ART) in Ireland

International guidelines recommend that ART is offered to all people living with HIV regardless of immunological status (CD4 count),^{i ii iii iv} given the known benefits of early initiation of ART for people living with HIV and the protective effect of effective ART in preventing onward HIV transmission.^{v vi vii viii ix}

Over the last decade in Ireland a number of studies and audits suggest that the majority of people living with HIV attending services are in receipt of ART.

In 2010, a national study of six adult HIV outpatient services found that of 3202 patients accessing care, 80% were on ART of whom 87% had evidence of viral suppression (HIV-RNA levels <50cpm¹).^x Individual clinic audits carried out between 2014 and 2016, indicated that between 92 and 100% of patients retained in care were on ART with viral suppression rates of >=90%.^{xi xii}

In June 2016, a cross-sectional study of healthcare professionals involved in the provision of HIV and STI care in Ireland was undertaken. Respondents prescribing ART indicated that on average 90% (range 70-100) of their HIV patients were in receipt of ART. Furthermore, 95% of respondents agreed that Ireland should adopt a policy of offering ART to all HIV-infected individuals and 92% of respondents indicated they agreed (19%) or strongly agreed (72%) with the statement “In general, I recommend antiretroviral therapy for HIV-infected patients irrespective of CD4 count” and 86% reported that they “always” or “often” recommended initiation of ART in HIV-infected patients with CD4+ >500 cells/mm.^{xiii}

In July 2017, the HSE Sexual Health and Crisis Pregnancy Programme published the national position on antiretroviral treatment^{xiv} which states that “all people living with HIV attending HIV services in Ireland are offered antiretroviral therapy and informed of the benefits of antiretroviral therapy in improving their personal health and reducing HIV infectiousness”.

1.2 The Continuum of HIV Care Framework

The continuum of HIV care is a conceptual framework that enables countries to monitor the effectiveness of key areas of their HIV programme. The continuum provides a snapshot of the critical stages in care among people living with HIV (PLHIV) and identifies the areas that require improvement.^{xv}

¹ Copies per millilitre

The continuum of HIV care is helpful in assessing progress against the UNAIDS 90-90-90 targets for 2020: 90% of all PLHIV know their status; 90% of those diagnosed are receiving ART; and 90% of those on ART are virally suppressed (Figure 1). When these three targets have been achieved, at least 73% of all PLHIV in a given population will be virally suppressed.^{xvi}

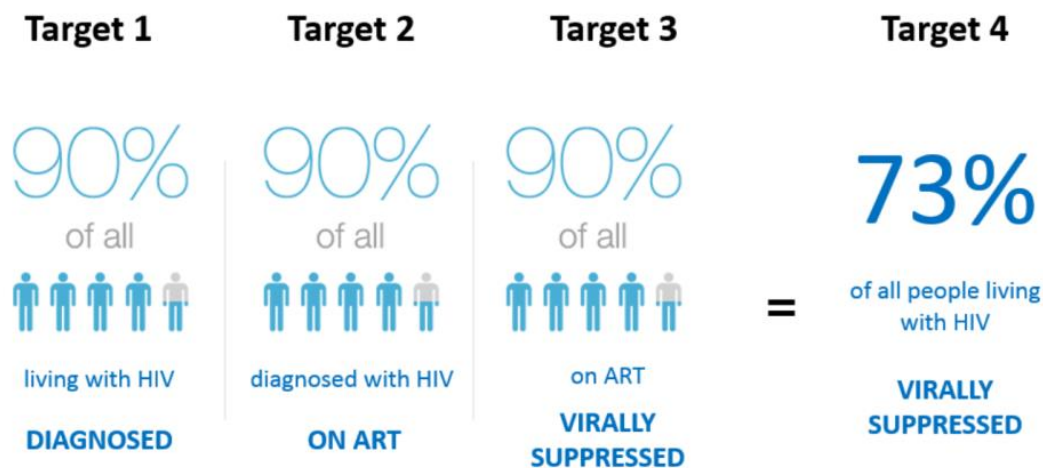


Figure 1: UNAIDS 90-90-90 targets

In 2017, the European Centre for Disease Prevention and Control (ECDC) recommended monitoring a four-stage continuum for Europe: the estimated number of PLHIV in the population; those diagnosed; those on treatment and those virally suppressed.^{xv} ECDC recommended a standardised way forward for monitoring the continuum of HIV care in Europe and developed standardised definitions for monitoring this four-stage continuum.^{xvii}

1.3 Reporting obligations

Ireland has an obligation to report on the continuum of HIV care as part of our national reporting on the HIV epidemic to ECDC under the ‘Dublin Declaration’,^{xviii} and to the UN General Assembly via UNAIDS/WHO in line with the ‘Political Declaration on HIV and AIDS: On the Fast-Track to Accelerate the Fight against HIV and to End the AIDS Epidemic by 2030’.^{xix}

2. Monitoring the Continuum of HIV Care for Ireland

In 2017, a national steering group (Appendix 1) was established to support the monitoring of the continuum of HIV care in Ireland, with HSE, clinical, laboratory, public health, and surveillance representation.

The ECDC standardised definitions for monitoring the four-stage continuum were adapted for Ireland and agreed by the steering group (Appendix 2).

It was agreed that the UNAIDS Spectrum modelling software would be used to estimate the first 2 stages of the continuum i.e. the estimated number of people living with HIV, the number and proportion undiagnosed and the number diagnosed with HIV. The Health Protection Surveillance Centre (HPSC) has worked with UNAIDS to develop the modelling estimates.

It was agreed that a national audit of HIV treatment would be used to monitor the third and fourth stages i.e. the number on ART and the number virally suppressed.

3. Results

3.1 Modelling Estimates

This is the first time that Ireland has used national modelling estimates for stages 1 and 2 of the HIV continuum. UNAIDS and partners have developed software, Spectrum, to assist countries to map their HIV epidemic (<http://www.epidem.org/>). To develop the estimates for Ireland, HPSC provided HIV case reporting data and other data including, the number of adults and children on ART and the number of women accessing services for the prevention of mother-to-child transmission (PMTCT). UNAIDS also used vital registration data (deaths) from the Central Statistics Office (CSO). The data were used by UNAIDS to model incidence curves and to generate the number living with HIV (diagnosed and undiagnosed). The results of the modelling outputs from Spectrum were discussed and modified in an iterative process between HPSC and UNAIDS so that the best fit models could be obtained. Spectrum also calculates confidence intervals (CI) around each estimate which define the range within which the true value of the estimate lies. The UNAIDS SPECTRUM estimates, including the 95% confidence intervals of the estimates, for Ireland for 2017 can be seen in Table 1.

	Estimate, (95% CI)
Population in Ireland living with HIV	7,205 (6,456 – 8,056)
Proportion living with undiagnosed HIV	12.9%
Number living with undiagnosed HIV	929 (833 – 1,039)
Number diagnosed with HIV	6,276 (5,623 – 7,017)

Table 1. UNAIDS SPECTRUM modelling estimates, Ireland 2017

The quality and accuracy of the Spectrum estimates depend on the quality and accuracy of the data used for the models and UNAIDS' models are regularly updated in response to new information. Over time, more and better data from countries will steadily reduce uncertainty. In addition, improvements are incorporated into the modelling software based on the latest available scientific

and statistical methods. It is noteworthy that modelling is particularly sensitive to inward and outward migration which is of particular relevance in Ireland where a large proportion of people newly diagnosed with HIV in Ireland are not born in Ireland and there is considerable inward and outward migration of HIV positive people and this can affect the estimates.

3.2 HIV treatment audit

The first nationally coordinated audit of those who attended HIV treatment services in 2017 was carried out in early 2018. This measured the number attending HIV services in 2017, the number who were on ART and the number who were virally suppressed. All HIV services^{xx} participated in the audit in line with the agreed standardised definitions.

The results of the HIV treatment audit can be seen in Figure 2.

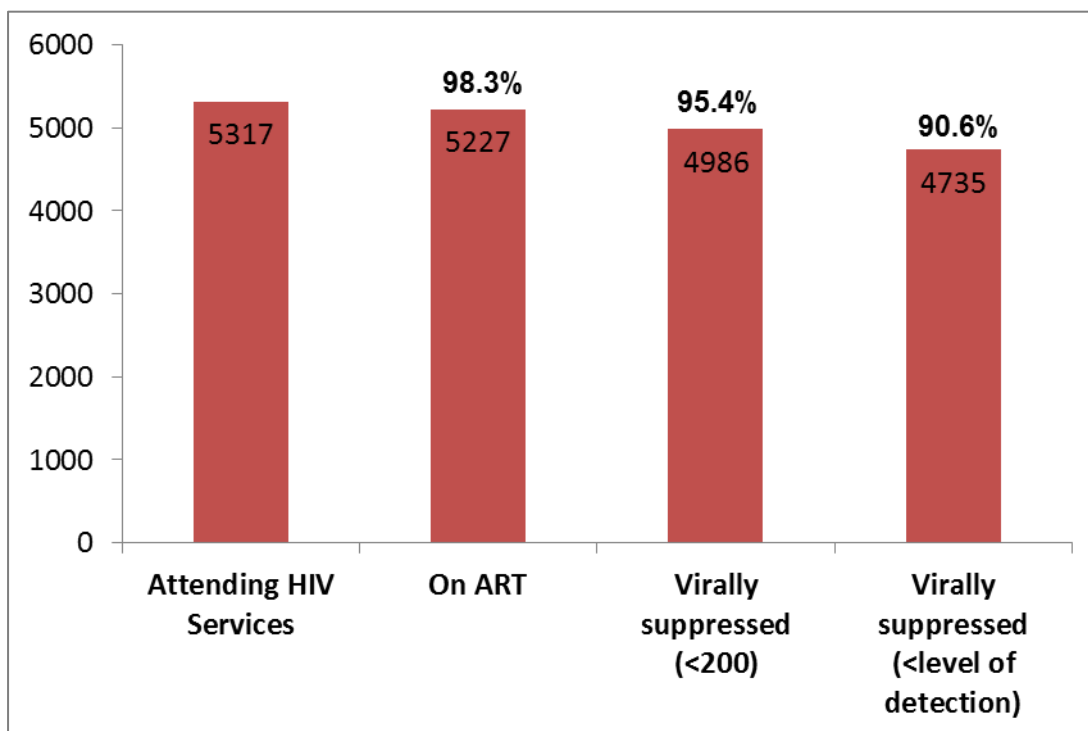


Figure 2: HIV treatment audit 2017

The clinical audit found that 5,317 individuals attended a HIV treatment service in Ireland in 2017. Of these, 98.3% were on ART, of whom 95.4% were virally suppressed to <200cpm and 90.6% were virally suppressed to below the level of detection of the assay.

3.3 Continuum of HIV Care

The results of the 4-stage continuum of HIV Care, combining the modelling estimates for stages 1 and 2 with the HIV treatment audit results for stages 3 and 4, are shown in Figure 3.

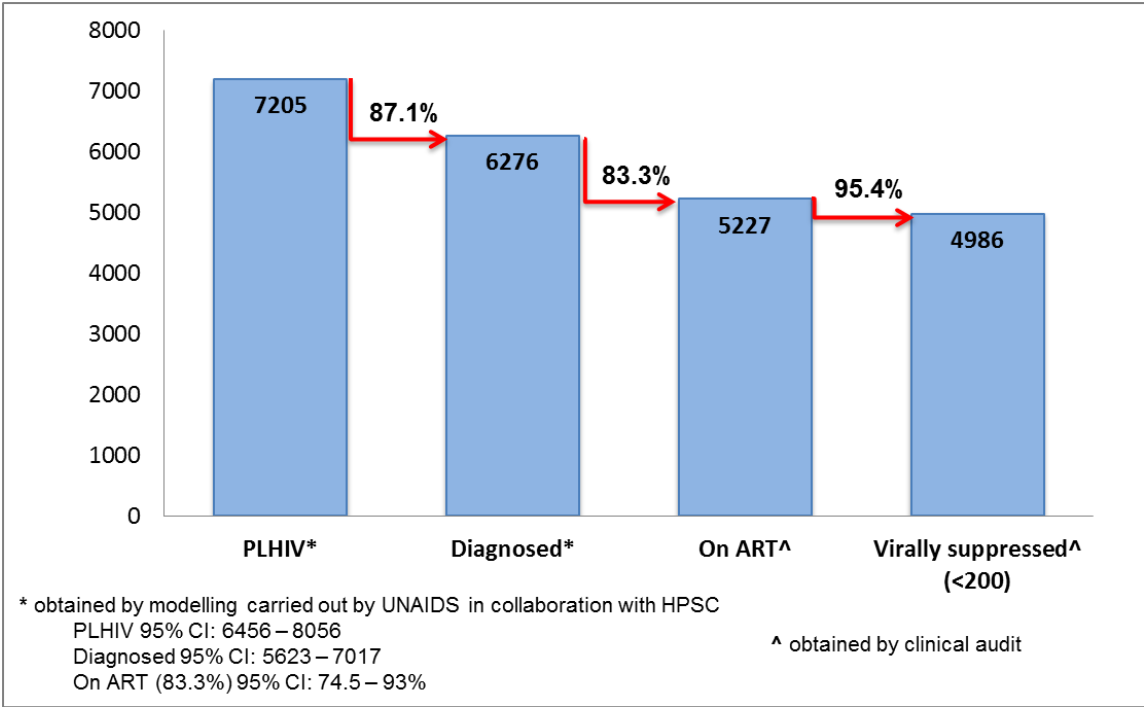


Figure 3: 4-Stage Continuum of HIV Care results, 2017

Of the estimated 7,205 (95% CI: 6,456 - 8,056) people living with HIV, an estimated 87.1% have been diagnosed. Of the estimated 6,276 (95% CI: 5,623 - 7,017) people diagnosed with HIV, an estimated 83.3% (95%CI: 74.5% - 93.0%) are on ART. Of the 5,227 people on ART, 95.4% are virally suppressed to <200cpm.

The number attending HIV services has been included in a 5-stage continuum of HIV care (Figure 4), to provide more detail on additional stages of the continuum.

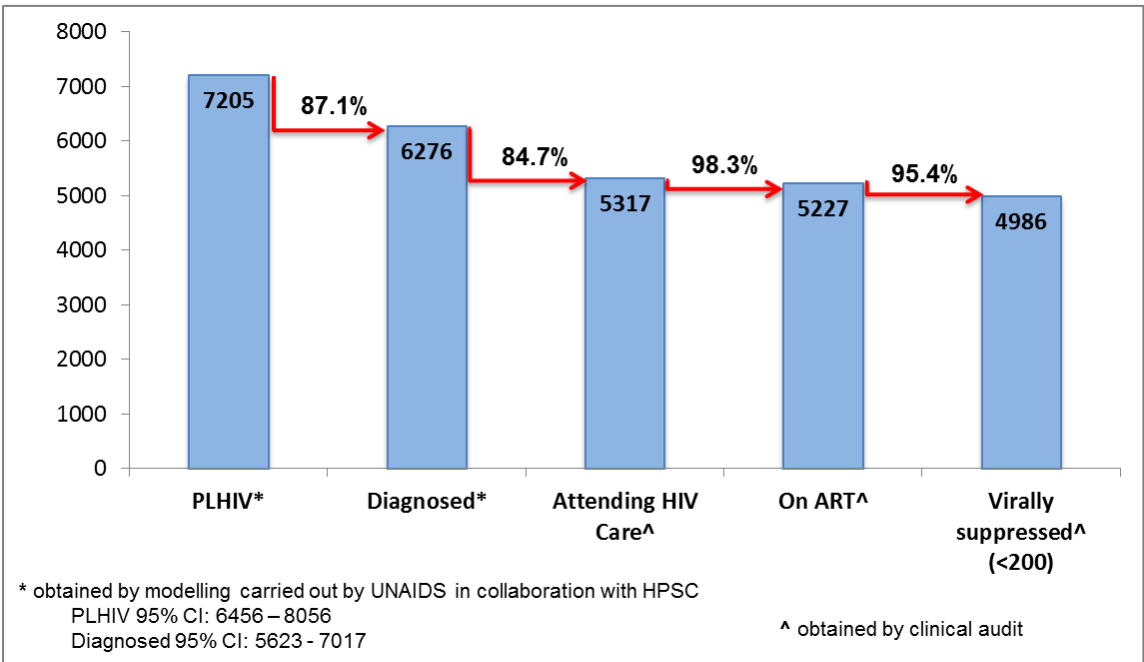


Figure 4: 5-Stage Continuum of HIV Care results, 2017

Of the estimated 6,276 (95% CI: 5,623 - 7,017) people diagnosed with HIV, an estimated 84.7% are attending HIV services. From the HIV treatment audit, 98.3% of those attending HIV services are on ART.

4. Discussion

A national approach

This was the first time that a national approach to monitoring the HIV continuum of care in Ireland was taken. Having nationally agreed definitions enabled standardised monitoring of the HIV continuum across Ireland. The standardised definitions were found to be feasible and can be used by HIV services to monitor their HIV treatment service on an on-going basis.

Modelling estimates

This year, HIV surveillance data from HPSC and vital registration data from the CSO were used by UNAIDS to model HIV incidence curves, and the numbers living with HIV (diagnosed and undiagnosed). The inputs were modified in an iterative process between HPSC and UNAIDS so that the best fit to the data could be obtained. The SPECTRUM modelling tool is being improved on an on-going basis and UNAIDS are currently working to determine how the model can better account for in and out migration, which is very relevant in an Irish context. HPSC and partners will continue to work with UNAIDS to refine the modelling estimates for Ireland.

Clinical audit

The clinical audit allowed accurate data on ART and viral suppression to be collected in those attending HIV services. It was agreed for the first audit to collect data for all people attending HIV services, as the priority was to assess if use of the standard definitions were feasible for Ireland. It is hoped for future audits to collect data for individual population groups, e.g. by mode of transmission, age and sex.

90 - 90 - 90 targets

In relation to the UNAIDS 90 90 90 targets, Ireland is below the target for the first two '90s' and further work is required to understand and address the reasons for this. Ireland has achieved the third '90'.

The first 90: the undiagnosed fraction

In order to reach the first 90% target, the undiagnosed fraction needs to be reduced. This can be achieved by improving knowledge and awareness of HIV and the benefits of testing in the population and amongst health care professionals, and by addressing barriers to HIV testing, such as HIV

stigma^{xxi}. Current HIV testing initiatives, for example community based peer led HIV testing, need to continue and strengthen particularly in relation to targeting populations at risk. New HIV testing initiatives, for example HIV self-testing, need to be considered. Monitoring frameworks for HIV testing initiatives are currently in development. These are central to understanding who to test, where and how, and will ensure that testing programmes are reaching the right people.

The second 90: engagement and retention in care

An estimated 83.3% of people diagnosed with HIV are on ART, with upper and lower bounds of the 95% confidence intervals being 74.5% and 93.0%. When those attending HIV services are added to make a 5-stage continuum of HIV care (Figure 4), it is evident that the drop off mostly relates to engagement and retention in care. Although the confidence intervals of the estimates need to be taken into consideration, more work needs to be done to better understand and address barriers to engagement and retention in care, to understand if this is more relevant to specific population groups, and to explore further the contribution of migration both inward and outward, to these figures.

The third 90: those virally suppressed

The HIV treatment audit demonstrated that those who are attending HIV services in Ireland are doing very well, with 98.3% of those who attended HIV services in 2017 on ART. Ireland is above the 90% target for viral suppression, with 95.4% being virally suppressed to <200cpm (ECDC measure of viral suppression), and 90.6% being suppressed to below the level of detection of the assay (in Ireland <40 or <20 cpm, depending on the assay being used).

Comparison across Europe

Ireland is above the EU/EEA average for the 90-90-90 targets, when compared to the ECDC Continuum of HIV Care provisional data 2018.^{xxii}

- Ireland estimated proportion of all PLHIV who know their status is 87.1%, compared to regional average of 80%
- Ireland estimated proportion of those diagnosed receiving ART is 83.3%, compared to regional average of 64%
- Ireland proportion of people on treatment achieving viral suppression (<200cpm) is 95.4%, compared to the regional average of 85%.

The ECDC 2018 Continuum of HIV Care provisional data is validated unpublished data. This is based on the latest available data reported by countries, ranging from 2014-2017.

5. Conclusion

Monitoring the continuum of HIV care in Ireland was found to be feasible and provides valuable information for action in the HIV response.

Of the 90-90-90 targets, Ireland has achieved the third '90', with 95.4% of those on ART being virally suppressed (<200cpm). To achieve the first two '90' targets, more work is required to reduce the proportion of undiagnosed cases and improve engagement and retention in care.

Future work will involve further refinement of the modelling, in particular to account for in and out migration, and analysis by individual population groups.

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Appendix 1. Steering Group

	Name	Location
1.	Fiona Lyons	HSE Sexual Health and Crisis Pregnancy Programme & GUIDE Clinic, St. James's Hospital, Dublin
2.	Caroline Hurley	HSE Sexual Health and Crisis Pregnancy Programme
3.	Derval Igoe	Health Protection Surveillance Centre (HPSC)
4.	Kate O'Donnell	Health Protection Surveillance Centre (HPSC)
5.	Fionnuala Cooney	Department of Public Health HSE-East
6.	Orla Ennis	Department of Public Health HSE-East
7.	Cillian De Gascun	National Virus Reference Laboratory (NVRL)
8.	Joanne Moran	National Virus Reference Laboratory (NVRL)
9.	Helen Tuite	HIV Clinic, University Hospital Galway
10.	Eileen Sweeney	ID/HIV Clinic, Cork University Hospital
11.	Almida Lynam	GUIDE Clinic, St. James's Hospital, Dublin
12.	Aoife Cotter	ID/HIV Clinic, Mater Misericordiae University Hospital, Dublin
13.	Willard Tinago	ID/HIV Clinic, Mater Misericordiae University Hospital, Dublin
14.	Eoin Feeney	ID Clinic, St. Vincent's Hospital, Dublin
15.	Samuel McConkey	ID Clinic, Beaumont Hospital
16.	Sarah O'Connell	HIV Clinic, University Hospital Limerick
17.	Karina Butler	Rainbow Clinic, OLCHC & Temple Street Children's Hospitals
18.	Patrick Gavin	Rainbow Clinic, OLCHC & Temple Street Children's Hospitals

Appendix 2. Standardised Definitions for Monitoring a four-stage Continuum of HIV Care in Ireland

Stage	Definition	Numerator	Denominator	Notes
1) Number of people living with HIV (PLHIV)	Total number of PLHIV in the country by the end of the given year YYYY.	Estimated number of PLHIV, diagnosed and undiagnosed, including those who in-migrated and excluding those who out-migrated or died by the end of the given year YYYY.	N/A	Back-calculation modelling approach using routine HIV surveillance data, e.g. ECDC HIV Modelling Tool or Spectrum. Challenges include accounting for in-migration, out-migration, deaths and incomplete surveillance data.
2a) Diagnosed	Number diagnosed with HIV. Expressed as a number and proportion of PLHIV (see denominator definition).	Number ever diagnosed with HIV by the end of the given year YYYY, including those who in-migrated and excluding those who out-migrated or died by the end of the year YYYY.	Total number of PLHIV (as defined for stage 1)	Ideally, the number diagnosed should not be restricted to those in care. Where it is not possible to include all diagnoses since the beginning of the epidemic (e.g. due to limited years of surveillance), the diagnosed population may be estimated, e.g. using modelling, or triangulating with other data sources. Mortality and migration should be estimated where these data are unavailable and linkage to migration/death records is not feasible.
2b) Attending HIV services (proxy for diagnosed)	Number of PLHIV attending HIV services. Expressed as a number and proportion of PLHIV (see denominator definition).	Number of diagnosed individuals attending HIV services/seen for HIV care in the given year YYYY.	Total number of PLHIV (as defined for stage 1)	This will include those who attended outpatient HIV services who in-migrated during the year YYYY, and will exclude all those who have out-migrated or died during the year YYYY, where this information is known or available. This will exclude those diagnosed with HIV (such as in-patients), who have not yet attended a specialist HIV clinic.
3) On ART	Number who are taking ART in the given year YYYY. Expressed as a number and proportion of those attending HIV services, and as a proportion of all PLHIV (see denominator definitions).	Number with at least one record of ART (prescribed or, ideally, dispensed) in the year YYYY. ART is defined as any ART regimen since diagnosis, regardless of the number of antiretroviral drugs.	1) Number diagnosed with HIV (as defined for stage 2a) 2) Number attending HIV services (as defined for stage 2b) 3) Total number of PLHIV (as defined for stage 1)	Ideally the same data source is used as for stage 2b. Those with missing ART information are assumed to be untreated.
4) Virally-suppressed	Number virally-suppressed. Expressed as a number, as a proportion of those on ART, and as a proportion of all PLHIV (see denominator definitions).	Number on ART whose most recent HIV RNA measurement in the given year YYYY was <200 copies/mL, and below the limit of quantitation** of the assay. Those who in-migrated by end of YYYY are included and those who out-migrated or died by end of YYYY are excluded.	1) Number on ART (as defined for stage 3) 2) Total number of PLHIV (as defined for stage 1)	Ideally the same data source is used as for stage 3. Those with missing viral load measurements in the year YYYY are assumed to be unsuppressed. Below the limit of quantitation** of the assay is defined as follows: <ul style="list-style-type: none"> • Abbott RealTime HIV-1 assay, limit of detection 40c/mL • Roche AMPLIPREP-TAQMAN assay, limit of detection 20c/mL.

*Adapted from ECDC Recommendations for monitoring a four-stage HIV continuum of care in Europe

(http://journals.lww.com/aidsonline/Fulltext/2017/09240/Towards_standardized_definitions_for_monitoring.2.aspx)

**Some individuals might have detectable RNA below the limit of quantitation; however, these individuals should be considered virally suppressed