HIV in Europe and Central Asia: progress in 2018 towards meeting the UNAIDS 90-90-90 targets

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In 2018, 52 of 55 European and Central Asian countries reported data against the UNAIDS 90–90–90 targets. Overall, 80% of people living with HIV (PLHIV) were diagnosed, of whom 64% received treatment and 86% were virally suppressed. Subregional outcomes varied: West (87%–91%–93%), Centre (83%–73%–75%) and East (76%–46%–78%). Overall, 43% of all PLHIV were virally suppressed; intensive efforts are needed to meet the 2020 target of 73%.

In 2014, the Joint United National Programme on HIV/AIDS (UNAIDS) established the global 90–90–90 targets. The aim was for 90% of all people living with HIV (PLHIV) to be diagnosed, of whom 64% received treatment and 86% were virally suppressed. The ‘substantive target’ is defined as the percentage of all PLHIV who are virally suppressed, making 73% the target (Figure 1). The global targets include countries reporting at least two consecutive stages but the substantive target only includes countries reporting all four stages of the continuum. Data were presented by WHO European subregion (West, Centre and East) which categorises countries in Europe and Central Asia into three geographic areas by HIV epidemic type [5]. At the (sub)regional level, analyses were undertaken after summing each continuum stage across countries [3]. Data were compared with that previously submitted through the Dublin Declaration survey [3,6,7].

Definitions and analyses

Definitions and analyses

Where necessary, data were supplemented using Global AIDS Monitoring (GAM) indicators collected by UNAIDS. Data were validated by countries between May and November 2018 and updated accordingly.

The Dublin Declaration on Partnership to Fight HIV/AIDS

Between January and March 2018, the European Centre for Disease Prevention and Control (ECDC) disseminated an online survey to the 55 countries of Europe and Central Asia that comprise the World Health Organization (WHO) European Region, to monitor the implementation of the Dublin Declaration on Partnership to Fight HIV/AIDS [2]. Countries provided estimates of the number and proportion of people within a defined four-stage continuum of care for the most recent year available (Box) [3,4].

Countries also specified the year to which the estimates related, data sources and collection methods and uncertainty bounds for each continuum stage.
For countries that provided data for both years (n = 25), performance can be compared between 2016 and 2018 (Figure 2); outcomes improved from 82%–85%–89% to 85%–89%–91% for the global targets, respectively. Overall 69% of all PLHIV were virally suppressed in 2018 compared with 62% in 2016. Improvements in the substantive targets were observed in all subregions (the 1% decline in percentage diagnosed in the Centre subregion is likely due to a revision of the estimate of undiagnosed PLHIV). Viral suppression among all PLHIV was 74% (West), 45% (Centre) and 25% (East) in 2018, compared with 67%, 34% and 16% in 2016, respectively.

The number of people with transmissible levels of virus can be calculated by adding the number of PLHIV estimated to be undiagnosed, diagnosed but untreated and treated but not virally suppressed (for countries providing all four stages. An estimated 57% (1.2 million/2.1 million) PLHIV are presumed to have transmissible levels of virus in 2018. Of which, an estimated 36% were undiagnosed, 51% were diagnosed but untreated and 13% were treated but had unsuppressed viral load (Figure 3). By subregion, 16% of people with presumed transmissible levels of virus lived in the West, 1% in the Centre and 83% in the East. Excluding Russia (which constituted 60% of all PLHIV with transmissible levels of virus in the entire Region) the figures become 41%, 3% and 56%, respectively.

Discussion
There has been substantial progress towards achieving the global UNAIDS targets across Europe and Central Asia and improvements have been recognised across all three WHO subregions. Despite this, only two-fifths of all PLHIV across the Region are estimated to be virally suppressed in 2018. While the West subregion exceeded the 73% substantive target, only around a half (Centre) and a quarter (East) of PLHIV are virally suppressed. The substantial progress between 2016 and 2018 is indicative of the improvements that can be made on a Regional scale in a short amount of time; this should provide reassurance and incentive to other global Regions that still have much work in order to meet the 90–90–90 ambition [8].

Each country should assess its progress against 90–90–90 targets and compare outcomes against Regional performance to drive further improvement. Only 34 of 55 countries provided data on all four continuum stages. Improved data availability is crucial to better monitor the effectiveness of their public health response to HIV. Countries that are unable to monitor the continuum of care need support to develop the infrastructure and data flows to enable them to do so. Improvements in ART access are likely to have positively influenced the outcomes. Four countries recommended ART initiation regardless of CD4+ cell count (‘test and treat’) in 2014, 16 in 2016 and 14 in 2018. Treatment

## Box

**Four-stage continuum of HIV care, global UNAIDS 90-90-90 target and substantive target**

| Stage 1: Estimated number of people living with HIV |
| Stage 2: Number/percentage of stage 1 diagnosed |
| Stage 3: Number/percentage of stage 2 receiving ART |
| Stage 4: Number/percentage of stage 3 with viral load < 200 copies/mL (considered as virally suppressed) |
| - Global UNAIDS 90-90-90 target: |
|  | First 90: Number/percentage of all PLHIV who are diagnosed |
|  | Second 90: Number/percentage of those diagnosed who are treated |
|  | Third 90: Number/percentage of those treated who are virally suppressed |
| - Substantive target: |
|  | Number/percentage of all PLHIV who are virally suppressed. |

ART: antiretroviral therapy; PLHIV: people living with HIV.

Source: Gourlay et al [4]

## Figure 1

The continuum of HIV care as envisaged by the 90–90–90 UNAIDS targets by 2020

| Percentage (%) | Living with HIV | Diagnosed with HIV | On ART | Virally suppressed |
|----------------|----------------|--------------------|--------|-------------------|
| 100%           | 90%            | 90%                | 90%    | 73%               |

ART: antiretroviral therapy; PLHIV: people living with HIV; UNAIDS: Joint United Nations Programme on HIV/AIDS.

Global 90–90–90 target: each stage of the continuum is presented as a percentage of the previous stage of the continuum, with target of 90%–90%-90%.

Substantive target: each stage of the continuum is presented as a percentage of the total number of people living with HIV, with target of 90%–81%-73%.

Numbers of PLHIV are rounded to the nearest hundred and reported only where available.

Graph is adapted from [1].
### Progress against the global 90–90–90 targets reported, European and Central Asian countries, 2018 (n = 52)

| WHO subregion | Country | Total numbers | Global 90–90–90 Targets | Substantive Target |
|---------------|---------|---------------|--------------------------|-------------------|
|               |         | All PLHIV | Diagnosed | Treated | Virally suppressed | % of PLHIV who are diagnosed | % of PLHIV who are receiving ART | % receiving ART who are virally suppressed | % of PLHIV who are virally suppressed |
| West (n=23 countries) | Andorra | NA | 68 | 68 | NA | NA | 100 | NA | NA |
| | Austria | 7,079 | 6,537 | 6,145 | 5,223 | 92 | 94 | 85 | 74 |
| | Belgium | 18,758 | 15,885 | 13,763 | 12,759 | 85 | 87 | 93 | 68 |
| | Denmark | 6,000 | 5,500 | 5,300 | 5,200 | 92 | 96 | 98 | 87 |
| | Finland | 3,880 | 3,401 | NA | NA | 88 | NA | NA | NA |
| | France | 156,600 | 132,400 | 120,700 | 116,600 | 85 | 91 | 97 | 74 |
| | Germany | 86,100 | 74,800 | 68,800 | 65,500 | 87 | 92 | 95 | 76 |
| | Greece | 16,665 | 13,866 | 9,594 | NA | 83 | 69 | NA | NA |
| | Iceland | NA | NA | NA | NA | NA | NA | NA | NA |
| | Ireland | 7,205 | 6,276 | 5,227 | 4,986 | 87 | 83 | 95 | 69 |
| | Israel | 8,039 | 7,448 | 5,087 | NA | 93 | 68 | NA | NA |
| | Italy | 130,000 | 114,400 | 100,000 | 87,000 | 88 | 87 | 87 | 67 |
| | Liechtenstein | NA | NA | NA | NA | NA | NA | NA | NA |
| | Luxembourg | 1,081 | 919 | 812 | 751 | 85 | 88 | 92 | 69 |
| | Malta | 453 | 340 | 340 | 298 | 75 | 100 | 88 | 66 |
| | Monaco | 47 | 47 | 47 | 47 | 100 | 100 | 100 | 100 |
| | The Netherlands | 22,900 | 20,264 | 18,599 | 17,580 | 88 | 92 | 95 | 77 |
| | Norway | NA | NA | NA | NA | NA | NA | NA | NA |
| | Portugal | 38,959 | 35,709 | 31,000 | 28,007 | 92 | 87 | 90 | 72 |
| | Spain | 146,000 | 120,000 | 116,400 | 103,000 | 82 | 97 | 88 | 71 |
| | Sweden | 8,320 | 7,489 | 7,261 | 6,930 | 90 | 97 | 95 | 83 |
| | Switzerland | 16,600 | 15,000 | 14,400 | 13,900 | 90 | 96 | 97 | 84 |
| | United Kingdom | 101,400 | 91,987 | 88,089 | 85,446 | 91 | 96 | 97 | 84 |
| West total* | 776,086 | 672,336 | 611,640 | 553,427 | 87 | 91 | 93 | 74 |
| Centre (n=15 countries) | Albania | 1,300 | 891 | 568 | 312 | 69 | 64 | 55 | 24 |
| | Bulgaria | 2,862 | 2,410 | 1,198 | 689 | 84 | 50 | 58 | 24 |
| | Croatia | 1,533 | 1,077 | 919 | 822 | 70 | 85 | 89 | 54 |
| | Cyprus | NA | NA | NA | NA | NA | NA | NA | NA |
| | Czech Republic | 3,230 | 2,533 | 1,800 | 1,660 | 78 | 71 | 92 | 51 |
| | Hungary | NA | NA | NA | NA | NA | NA | NA | NA |
| | Kosovo* | NA | NA | 15 | NA | NA | NA | NA | NA |
| | The former Yugoslav Republic of Macedonia | 383 | 246 | 198 | 191 | 64 | 80 | 96 | 50 |
| | Montenegro | 437 | 201 | 140 | 121 | 46 | 70 | 86 | 28 |
| | Poland | NA | NA | NA | NA | NA | NA | NA | NA |
| | Romania | 17,000 | 15,009 | 11,570 | 8,409 | 88 | 77 | 73 | 49 |
| | Serbia | 2,700 | 2,441 | 1,724 | NA | 90 | 71 | NA | NA |
| | Slovakia | 995 | 756 | 540 | NA | 76 | 71 | NA | NA |
| | Slovenia | 987 | 670 | 533 | 530 | 68 | 80 | 99 | 54 |
| | Turkey | NA | NA | NA | NA | NA | NA | NA | NA |
| Centre total* | 31,427 | 26,234 | 19,190 | 12,749 | 83 | 73 | 75 | 46 |

**ART:** antiretroviral therapy; **NA:** Not available; **PLHIV:** people living with HIV; **WHO:** World Health Organization.

* Totals reflect sum of values presented. However only countries with data for consecutive stages of the continuum are included in the global 90–90–90 target outcomes and only countries with all four elements are included in substantive target outcome.

* This designation is without prejudice to positions on status, and is in line with UNSC 1244 and the ICJ Opinion on the Kosovo Declaration of Independence.
coverage among the diagnosed population was 89\% for countries implementing 'test and treat' in 2014, 93\% in 2016 and 46\% in 2018. This, together with the significant variation in outcomes across countries and subregions (including those with similar contexts and epidemics) demonstrates the powerful impact of policy implementation. The substantial drop-off between the percentages diagnosed and treated in the East subregion is concerning since it enables preventable deaths, serious illness and onward transmission.

Characterising the population living with transmissible virus provides new insight into the scale and focus of prevention efforts. Almost two-thirds of the 1.2 million people with transmissible virus across the Region are diagnosed. This indicates that the biggest public health impact could be achieved through rapid and sustained scale up of treatment, particularly in the Centre and East subregions. Across the Region, the large undiagnosed population can be addressed by diversifying and augmenting policies offering HIV tests: for indicator conditions, during screenings for other sexually transmitted infections, in community-based settings, as self/home-testing and for partner notification. New European guidance on setting-based approaches for HIV and hepatitis testing can help countries implement more effective testing programmes [9].

It is unclear whether current progress has impacted on HIV transmission. Recent modelling suggests a viral suppression rate of 90\% among all PLHIV must be reached to reduce incidence [10]. This indicates intensive efforts are required before transmission begins to fall. However, the West subregion, which has met the substantive target, has provided a favourable context in which reductions in HIV transmission are apparent among gay and bisexual men in some settings [11-14]. It is likely further declines will be observed when pre-exposure prophylaxis (PrEP) is fully implemented to those most at need.

The 90–90–90 targets remain a powerful tool to assess progress towards HIV elimination and drive standards in care for PLHIV. However, they cannot provide a

| WHO subregion | Country          | All PLHIV | Diagnosed | Treated | Virally suppressed | % of PLHIV who are diagnosed | % of diagnosed PLHIV who are receiving ART | % receiving ART who are virally suppressed | % of PLHIV who are virally suppressed |
|---------------|-----------------|-----------|-----------|---------|-------------------|-------------------------------|------------------------------------------|-----------------------------------------|----------------------------------------|
| East (n=14 countries) | Armenia       | 3,400     | 2,265     | 1,530   | 1,304             | 67                           | 68                                       | 85                                      | 38                                      |
|                | Azerbaijan     | 8,003     | 5,661     | 4,207   | 1,778             | 71                           | 74                                       | 42                                      | 22                                      |
|                | Belarus        | 26,120    | 19,231    | 11,242  | 7,253             | 74                           | 58                                       | 65                                      | 28                                      |
|                | Estonia        | 7,900     | NA        | 4,109   | NA                | NA                           | NA                                       | NA                                      | NA                                      |
|                | Georgia        | 10,500    | 5,090     | 4,144   | 3,383             | 48                           | 81                                       | 82                                      | 32                                      |
|                | Kazakhstan     | 26,000    | 20,841    | 11,482  | 6,338             | 80                           | 55                                       | 55                                      | 24                                      |
|                | Kyrgyzstan     | 8,500     | 5,805     | 3,237   | 1,995             | 68                           | 56                                       | 62                                      | 23                                      |
|                | Latvia         | 2,761     | NA        | NA      | NA                | NA                           | NA                                       | NA                                      | NA                                      |
|                | Lithuania      | 2,601     | 780       | 609     | 94                | 94                           | 30                                       | 78                                      | 22                                      |
|                | Moldova        | 15,132    | 11,887    | 5,162   | 3,324             | 79                           | 43                                       | 64                                      | 22                                      |
|                | Russia         | 998,525   | 808,823   | 319,613 | 27,167            | 81                           | 40                                       | 85                                      | 27                                      |
|                | Tajikistan     | 15,000    | 7,516     | 4,942   | NA                | 50                           | 66                                       | NA                                      | NA                                      |
|                | Ukraine        | 244,000   | 136,378   | 98,237  | 57,010            | 56                           | 72                                       | 58                                      | 23                                      |
|                | Uzbekistan     | NA        | 21,364    | 20,281  | 17,530            | NA                           | 95                                       | 86                                      | NA                                      |
|                | East total*    | 1,365,841 | 1,047,462 | 488,966 | 372,195           | 76                           | 46                                       | 78                                      | 26                                      |
|                | Total (Tables A and B) | 2,173,354 | 1,746,032 | 1,119,796 | 938,171           | 80                           | 64                                       | 86                                      | 43                                      |

* Totals reflect sum of values presented. However only countries with data for consecutive stages of the continuum are included in the global 90–90–90 target outcomes and only countries with all four elements are included in substantive target outcome.

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comprehensive picture of the public health response to HIV. While testing and treatment access are a clear focus, deaths and key interventions such as condom use, PrEP and health promotion are excluded. Results are limited in their representativeness, since only 34 countries provided information for all four stages of the continuum with only 25 providing data for both 2016 and 2018. Furthermore, while continuum methods have been defined, in practice, variations in data availability, sources, timeframes and analysis (such as ability to account for deaths and loss-to-follow-ups) limit direct comparisons. Stage 1 of the continuum is, by necessity, an estimation. It is the part of the continuum that is simultaneously most vulnerable to uncertainty and the most critical since it sets the denominator upon which the 90–90–90 targets are calculated [4]. The estimated number of PLHIV (including number with transmissible virus) underrepresents the true Regional situation since they are presented only where countries report data.
A major limitation is that percentage values mask absolute numbers of PLHIV. We recommend that assessment of the 90–90–90 targets must incorporate the number of PLHIV. The analysis of the estimated number of people living with transmissible levels of virus provides further insights. For instance, the high proportion of people with transmissible virus is exacerbated by the large size of the Russian and Ukrainian epidemic. Furthermore, in the United Kingdom, France and Germany, the proportion of people with transmissible HIV is low but masks significant absolute numbers, which impedes efforts to reduce HIV incidence. It is also important to ascertain outcomes for key populations which are known to experience stark inequalities within and between countries [15].

It is crucial not to rest content with meeting the 90–90–90 targets. Each ‘last 10 percent’ includes people especially marginalised from healthcare services. Beyond the 90–90–90 ambition, intensive efforts in policy and service implementation are vital if the ultimate aim of ‘getting to zero’ is to become reality.

WHO: World Health Organization.

* Countries reporting all four stages of the continuum.

Figure 3
Distribution of people with transmissible levels of virus, by WHO subregion*, and Europe and Central Asia overall, 2018

WHO: World Health Organization.

*This designation is without prejudice to positions on status, and is in line with UNSC 1244 and the ICJ Opinion on the Kosovo Declaration of Independence.

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Conflict of interest
None declared.

Authors’ contributions
AB, RH, YA, AP, AA, TN and VD were all involved in developing the survey questions related to the continuum of care. Country-specific analyses were undertaken by country members of the Dublin Declaration Monitoring Network. European analyses were undertaken by AB and RH under the supervision of AP, YA, VD and TN. AB and RH undertook the main writing of the manuscript which was reviewed and revised by AP, AA, VD, YA, TN and the Dublin Declaration Monitoring Network. All authors reviewed and approved the final draft.

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