Monitoring achievement of the latest UNAIDS HIV 90-90-90 target: A need for standardization of the HIV continuum of care

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Background

- In July of 2014, the Joint United Nations Programme on HIV/AIDS (UNAIDS) proposed an ambitious 90-90-90 target, calling for 90% of HIV-infected individuals to be diagnosed, 90% of them to be on antiretroviral therapy (ART), and 90% of them to achieve sustained virologic suppression, globally.
- Achieving these targets by 2020 would decrease the burden of HIV/AIDS by 90% compared to 2010 levels by the year 2030. However, to meet these targets standardized and continuous global monitoring of HIV care outputs should become a priority.
- The HIV continuum of care provides a framework for quantifying attrition as HIV-infected individuals move along a series of HIV-care related steps, from being HIV diagnosed to achieving sustained suppression. The continuum has become a key programmatic monitoring tool, employed by numerous settings worldwide.
- The lack of standardization of continuum step definitions makes comparisons across jurisdictions difficult, if not inappropriate.

Methods

- Here, we compared and contrasted continuum step definitions and outputs of four continuums from the USA; British Columbia (BC), Canada; France; and Denmark to argue for a standardization in continuum step definitions (Table 1). We also propose a structure and definitions of a continuum to monitor the UNAIDS 90-90-90 target.

Results

A scan of these four continuums demonstrates numerous differences in step definitions used for everything from the denominator to suppression:

- The denominator for the USA, BC, and France continuums is the estimated HIV-positive population. While for the Danish continuum it is the number of HIV-diagnosed cases; this results in an overestimate of the proportion of individuals retained throughout the Danish continuum.
- Linkage and retention in care definitions varied across all continuums. France was the only continuum not to distinguish between linkage and retention, instead showing a step called 'in care'.
- The USA and Danish continuums defined 'on ART' as any ART record within the year of interest. Alternatively, BC and France captured long-term use of ART within the calendar year. Only BC reported on ART adherence.
- Denmark had the most liberal definition of suppression, the latest viral load (VL)<500 copies/mL. In contrast, BC had the most conservative definition of ≥2 VLs<50 copies/mL over a period of ≥3 months within a calendar year. France defined suppression as a VL<50 copies/mL within a calendar year. Finally, the USA defined suppression as a VL≤200 copies/mL at the last available test.
- The proportion suppressed was 25%, 35%, and 52% amongst the estimated HIV-infected population for the USA, BC, and France, respectively; and, 70% amongst those HIV-diagnosed for Denmark.

Table 1. Summary of definitions and outputs from four HIV continuums of care which used data from the USA, Denmark, France and British Columbia (Canada).

	USA (2009)[1]	Denmark (2010)[2]	France (2010)[3]	British Columbia (BC), Canada (2011)[4]
Estimated HIV Positive Population	Estimated infected population from National HIV Surveillance System data.	Not included.	Estimated infected population back-calculated from HIV surveillance data.	Obtained BC HIV prevalence estimates from the Public Health Agency of Canada.
Diagnosed	The number of HIV diagnoses was obtained from National HIV Surveillance System data.	HIV diagnoses obtained from the annlual national HIV surveillance reports 1995-2010.	HIV-infected individuals in care: data from the French health insurance scheme on the number of individuals having long-term disease agreement for HIV.*	The first instance of any one of: • a confirmed HIV-positive test • detectable VL (>50 copies/mL) • an HIV-related MSP billing or hospital admission • a reported AIDS-defining illness • ARV dispensation
Proportion diagnosed of the estimated HIV-positive population	82%	100%**	81%	71%
Linked to Care	Having ≥1 CD4 or VL test result within three months after diagnosis.	The number of individuals enrolled in the Danish HIV Cohort Study diagnosed from 1995 to 2010.	• The authors showed a stage called "in care" and did not differentiate between linked and retained. • Defined as all individuals enrolled in the French health insurance scheme as having long-term disease agreement for HIV.	The first instance of an HIV-related service (VL, CD4, ART prescription) following HIV diagnosis: (i) Among those with a confirmed HIV test; Among those without a confirmed HIV test: ≥ 30 days following the derived HIV diagnosis date.
Proportion linked to care of the estimated HIV-positive population	66%	95%**		67%
Retained in Care	Having ≥1 medical care visit between January and April 2009.	Having either visited an HIV care center and/or having a VL or CD4 count within 13 months before July 1st, 2010.		(i) HIV-related physician visits OR diagnostic tests (CD4 or VL) ≥3 months apart within 2011 OR (ii) >2 ART drug dispensations ≥3 months apart, within 2011.
Proportion retained in care of the estimated HIV-positive population	37%	88%**	74%	57%
ART Indicated	Not included.	Not included.	Not included.	Defined as meeting the primary or secondary IAS-USA initiation criteria within 2011.
Proportion ART indicated of the estimated HIV-positive population	N/A	N/A	N/A	53%
On ART	Medical record documentation of any ART prescription in the past 12 months.	The number on ART.	On cART for greater than 6 months.	Having >2 ARV drug dispensations ≥3 months apart, within 2011.
Proportion on ART of the estimated HIV-positive population	33%	73%**	60%	51%
ART Adherent	Not included.	Not included.	Not included.	Having >80% adherence in the calendar year or from the point of ARV initiation for those beginning therapy within 2011.
Proportion ART adherent of the estimated HIV-positive population	N/A	N/A	N/A	44%
Virologic Suppression	Medical record documentation of the most recent VL as ≤200 copies/mL.	VL <500 copies/mL at the last measurement.	VL <50 copies/mL.	VL<50 copies/mL over a period ≥3 months in duration within 2011.
Proportion virally suppressed of the estimated HIV-positive population	25%	70%**	52%	35%

*All HIV-infected individuals newly enrolled in care in France are eligible for long-term disease agreement for HIV. **All proportions for Denmark are of the diagnosed population.
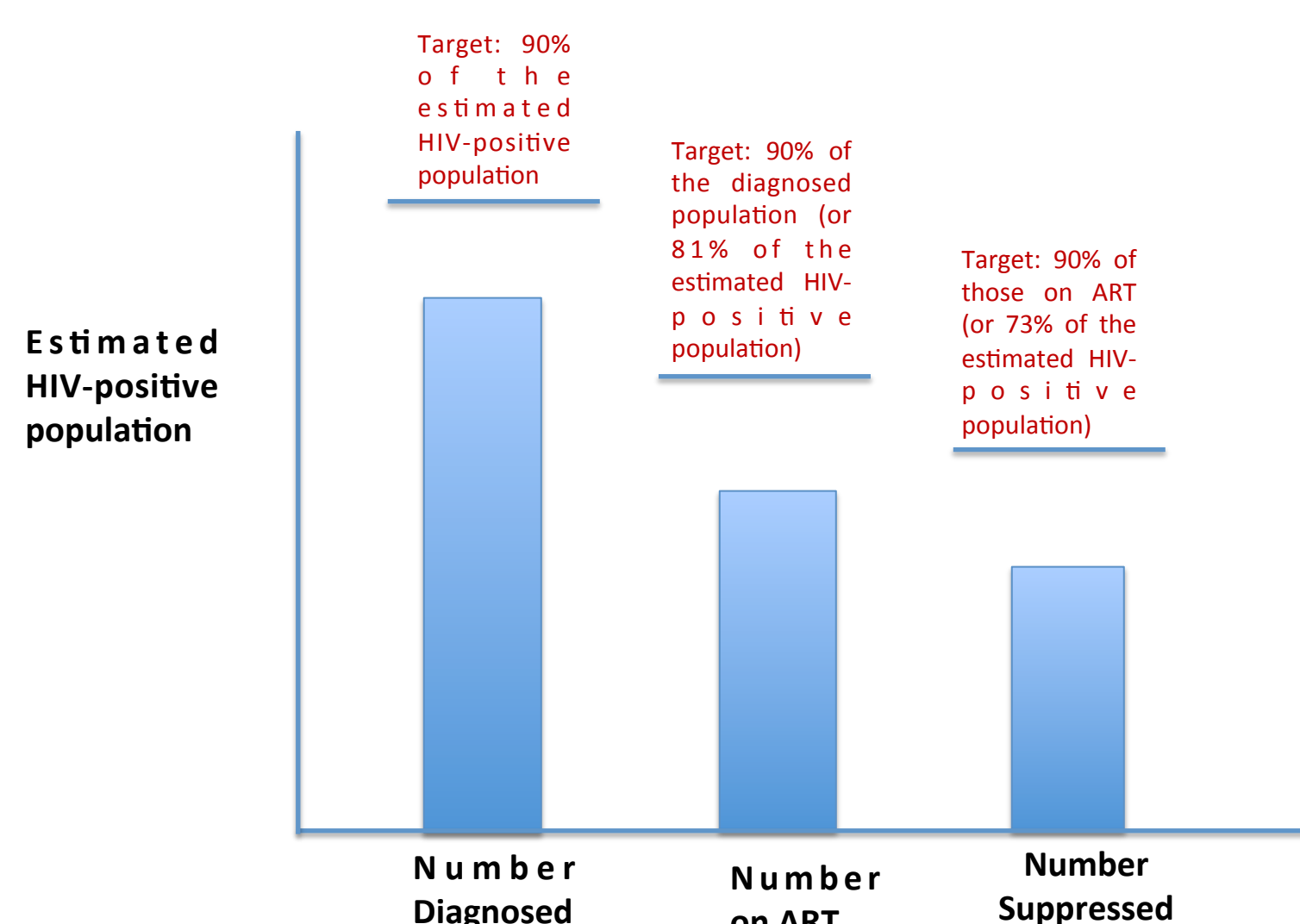
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Figure 1. Suggested Standardized HIV Care Continuum for Global Monitoring of the UNAIDS 90-90-90 Target

Target: 90% of the estimated HIV-positive population

Target: 90% of the diagnosed population (or 81% of the estimated HIV-positive population)

Target: 90% of those on ART (or 73% of the estimated HIV-positive population)

Estimated HIV-positive population

Number Diagnosed | Number on ART | Number Suppressed

A Standardized Cascade

- Cross-continuum comparisons are problematic because of the varying definitions used regarding the definition of suppression.
- Continuum comparisons across different settings can only be confidently made through standardized continuum universal development guidelines.
- A simpler continuum model that focuses on the UNAIDS 90-90-90 target could be comprised of three steps: Step 1: the number of individuals diagnosed with HIV as a proportion of the estimated HIV-infected population; Step 2: the number of HIV-diagnosed individuals on ART (≥1 ART prescription in a calendar year), and Step 3: the number suppressed among those on ART (last VL<200 copies/mL in a given year).
- Further consensus is needed regarding the specific methodology to estimate each of these stages in a given jurisdiction.
- Certainly, further continuum steps could be added to address the needs of any future research and surveillance efforts of individual settings.

Conclusion

A concerted global effort to standardize and harmonize continuum definitions should begin immediately to facilitate the global monitoring of the UN 90-90-90 target, identify specific areas requiring novel or enhanced public health interventions which will optimize patient outcomes, and facilitate direct comparisons of continuums between jurisdictions.

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