

Getting to Zero Begins With Getting to Ten

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Background Statement: The global “90-90-90” targets introduced by UNAIDS in 2014—90% of people living with HIV will know their HIV status; 90% of those will be on antiretroviral treatment; and 90% of those will achieve viral suppression by 2020—have become more than a useful heuristic device, and now are the predominant framework for monitoring progress in the HIV response. Although this allows for important reflection on where HIV treatment gaps and opportunities exist in any particular context and globally, it deflects attention away from other very important aspects of HIV epidemics and their often-disproportionate impact on specific populations. Most significantly, it begs the question, *what about the other 10-10-10?*

Approach: This article takes a critical look at the 90-90-90 targets and what is known about the 10-10-10 left behind to highlight some core issues and attendant questions that should be prioritized if we really intend to “get to zero.”

Findings and Conclusions: These issues include how the targets are measured in the first place, the limitations of focusing the global response only on antiretroviral treatment and only on people already living with HIV, and the need for more, basic social research to address the range of factors underlying disparities in who are and are not reached in the 90-90-90 framework.

Key Words: HIV, global targets, testing and treatment cascade, primary prevention, social science

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INTRODUCTION

In 2014, UNAIDS introduced the “90-90-90” targets for the global HIV/AIDS response: By 2020, 90% of people living with HIV will know their HIV status; 90% of those will be on

antiretroviral treatment (ART); and 90% of those will achieve viral suppression, thereby improving their health and reducing, if not eliminating, their risk of transmitting HIV to others.¹ The ambitious targets, which were based on what is now called the “HIV testing and treatment cascade,”² offer a good heuristic device, with important benefits: they galvanize the AIDS response community and help organize and focus our efforts; renew optimism that significant inroads can be made to substantially mitigate, if not eliminate HIV epidemics; force us to quantify our outcomes; and bring to the forefront shortcomings in current strategies and their implementation. In addition, the fact that progress toward the targets can be displayed in a simple, graphic form (paralleling the HIV testing and treatment cascade) makes them particularly attractive to HIV program managers and policymakers.

Over the past few years, the 90-90-90 targets have evolved to become not just a heuristic device, but, in fact, the predominant framework for characterizing the status of the global HIV response. Although this allows for important reflection on where HIV treatment gaps and opportunities exist in any particular context and globally, it deflects attention away from other very important aspects of HIV epidemics and their often-disproportionate impact on specific populations.

In this article, I highlight some of the limitations of the 90-90-90 targets as a framework for “getting to zero” related to their inconsistent measurement and reporting, leaving behind “10-10-10,” focusing solely on antiretroviral treatment-based strategies, and focusing only on people living with HIV.

Getting to Zero and the 90-90-90 Targets: How Well Are We Doing, and How Do We Know It?

At the end of 2018, 6 countries—Botswana, Cambodia, Denmark, eSwatini, Namibia, and the Netherlands—already had reached the 90–90–90 targets and 7 more countries were on track to do so by 2020.³ But, progress across regions of the globe remains quite variable: Western and Central Europe and North America are approaching global targets; Latin America and Eastern and Southern Africa show high levels of achievement across the targets; but, Eastern Europe and Central Asia, the Middle East and North Africa, and Western and Central Africa clearly are off track.²

Some of this variability may be related to significant gaps and inconsistencies in measuring the targets and associated HIV testing and treatment cascades. Granich et al⁴ conducted a systematic review of publicly available national HIV care cascades, which they refer to as care continua, and found that the continua and the data included in them are constructed and reported differently, and that there is

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no standard approach to determining national criteria. They also found that the data used to measure indicators for each step of the continua are not always robust or complete. Of the 48 out of 53 continua in their analysis that provided details about methods, only 6 countries (accounting for 2% of the global HIV disease burden) could be classified as having “the highest-quality methods conforming to international recommendations.” The authors conclude that documenting and grading these continua methods is somewhat problematic and inconsistent, that it is not certain that various things that are being reported are in fact solid, and that analyzing these outcomes across settings is “like mixing apples and oranges.”

Variation in reporting reflects some confusion about the difference between targets and cascades. For the 90-90-90 framework, the denominators of the second and third targets are derivative from the target before, that is, *of those who are diagnosed*, the proportion who are on treatment, and *of those who are on treatment*, the proportion who have achieved viral suppression. This is different from the testing and treatment cascade framework, in which the denominator of each step always is the *total number of people living with HIV*, regardless of whether they have been diagnosed, accessed treatment, or achieved viral suppression. The latter analysis translates the targets into a less ambitious (and much less catchy) 90-81-73.²

The impact of the choice of denominator is evident when comparing the current state of the global epidemic measured by each. Using the 90-90-90 framework, UNAIDS reports that in 2017, 75% of people living with HIV knew their status, 79% of those who knew their status were on treatment, and 81% of those who were on treatment had achieved viral suppression. Using the testing and treatment cascade framework instead, 75% of all people living with HIV knew their status, but only 59% of all people living with HIV were on treatment, and only 47% of all people living with HIV were virally suppressed.³ The reporting only of the 90-90-90 targets might give a false sense of optimism about the true level of progress in “getting to zero.”

All of this raises researchable questions about what exactly is being measured and how; how that measurement and the reporting of data influence the interpretation of progress; and how that interpretation affects research, program, and policy choices going forward.

The Targets Leave Behind 10-10-10

By definition, targets of 90% leave out the remaining 10%. An obvious first question is why not aim for 100% coverage? Perhaps, the choice of 90% reflects a desire to aim high but recognize the unlikelihood of reaching everyone in the specified timeframe. This kind of choice is characteristic of such aspirational goals. But, it begs the question of who are the other 10-10-10 (or 10-19-27) not reached by or engaged in the pillars of the testing and treatment cascade, and whether they might be the ones most likely to acquire and transmit HIV infection. We know there are geographic and demographic disparities in who is reached/who benefits from HIV and other services in general. It is important to look at how this plays out for each of the 90-90-90 targets.

The first target of knowing one's HIV status, on which the other the other targets depend, turns out to be

where the greatest gap exists.³ The core question is, are certain groups more likely to not know their status than others and, if so, why? At a country level, there is wide variation. In their 2017 review, Granich et al⁴ found care continua from 82 countries in the public domain from 2010 to 2016, together representing 92% of the 2015 global estimate of people living with HIV. Of these, only 4 (Denmark, Kazakhstan, Romania, and Sweden) achieved the first 90 target, and only 18 reached 70%–89%. At a regional level, Western and Central Africa lag in HIV diagnoses because only an estimated 48% of people living with HIV knew their status in 2017.³

Globally, adolescents and young adults are less likely to know their HIV status than older adults.³ In a Population-based HIV Impact Assessments (PHIA) study in Zimbabwe, Malawi, and Zambia conducted by Columbia's ICAP group, 30% of people living with HIV overall were unaware of their HIV+ status, but more than 50% of adolescents and young adults were unaware.⁵ In PEPFAR programs, the missing 10% for the first 90 target include young men and women, but also children who are well, infants, and men who have sex with men (MSM).⁶ In Asia and the Pacific, it is estimated that only 47% of female sex workers living with HIV knew of their diagnosis, and 53% of gay men and other MSM knew of theirs.³ In the United States, the Centers for Disease Control and Prevention (CDC) estimated that in 2014, 15% of all people living with HIV, 17% of gay and bisexual men, 16% of heterosexuals, and 6% of people who inject drugs had undiagnosed infection.⁷ Among gay men and other MSM, who still account for a majority of new HIV infections in the United States, about 20% of blacks, 21% of Hispanic/Latino, and 13% of whites were undiagnosed. Younger gay men were most likely to be undiagnosed, reaching about half in the 13–24 years age group. Geographic location also made a difference: states with the highest number of people living with HIV who were undiagnosed included California, Florida, New York, Texas, and Georgia; and people in the south accounted for the highest percentage (50%) of those undiagnosed.⁸

And, it is not just undiagnosed; it also is late diagnosis, defined as a CD4 T-lymphocyte count <350 cells/mm³ at or within 3 months of diagnosis.^{9,10} The European CDC estimates that about 49% of people living with HIV in Europe are diagnosed late, with variations by country, race/ethnicity, sex/gender, and age.¹⁰ In the United Kingdom, for example, about 43% of people aged 15 years and older who were newly diagnosed in 2017 were diagnosed at a late stage of infection, with the highest rates among black African heterosexual men (69%) and the lowest rates among gay and bisexual men (33%).¹¹ Alarming, of all people newly diagnosed with HIV, 28% globally, 32% in Eastern Europe and Central Asia, and 23% in Western and Central Europe and North America were diagnosed with CD4 counts below the AIDS-defining limit of 200 cells/mm³.¹² In addition to negative health effects for the person living with HIV, lack of or late diagnosis can contribute substantially to transmission of new HIV infections. In the United States, for example, it is estimated that persons unaware of their HIV infection account for approximately 40% of ongoing transmissions.¹³

Looking at what is known about the “missing 10-10-10” for the second target—that 90% of people diagnosed with HIV are on ART—we find similar disparities as exist for knowing one’s HIV status. First, we see vast geographic differences, ranging from about 29% in the Middle East and North Africa to about 85% in Western and Central Europe and North America.³ In this target, too, there are demographic disparities by sex/gender and age. Globally, in 2017, 53% of men aged 15 years or older were on ART, whereas 65% of women in this age group were; and treatment coverage for children (aged 0–14 years) generally was lower than that for adults.³ Others who comprise the 10% or more not covered by ART are key populations—gay men and other MSM, people who inject drugs, and female sex workers—who in many, if not most, contexts are socially marginalized, sometimes criminalized, and therefore, much less likely to access HIV care and treatment services. For example, in South Africa, although approximately 68% of gay men and other MSM living with HIV knew their diagnosis, only 26% of them were receiving ART.³

In some settings, the data about who is accessing treatment are skewed by how individuals report themselves and may mislead about who the “missing 10%” are. For example, although there was a 69% increase in HIV diagnoses among heterosexuals since 2008 in Eastern Europe, that increase was 21% in women, but 107% in men. This suggests that many gay and bisexual men, and perhaps men who inject drugs, are representing themselves as having acquired HIV through heterosexual sex, most likely because of ongoing and institutionalized social and legal bias against homosexuality and drug use.¹⁰ It is reasonable to assume that stigma, discrimination, and criminalization targeted to sexual and gender minorities and people who use drugs is a key explanatory factor for a segment of the “missing 10%” in ART coverage in many other parts of the world as well.

With respect to the third target of viral suppression, there also are geographic and demographic disparities. As mentioned previously, approximately 47% of people living with HIV globally have achieved viral suppression. But, there are significant regional differences, with the proportion being as low as 22% in the Middle East and North Africa and as high as 65% in Western and Central Europe and North America.³ Even in countries with significant treatment scale-up programs, such as those supported by PEPFAR, we see viral suppression differences by age and sex/gender. For example, in Uganda, the proportion of young people aged 15–24 years achieving viral suppression is about 22% lower than that for adults aged 15–64 years⁶; and in San Francisco, younger people and women (cis- and trans-gender) are less likely to achieve viral suppression than older adults and men.¹⁴

It is important to note that data on the 90-90-90 targets typically are reported cross-sectionally and are, therefore, only reflecting what is happening in a given year. We know that the HIV testing and treatment cascade is not really a simple, linear process. Many people move in and out of treatment (including treatment adherence) and viral suppression over time, which can result in high and sustained mortality rates even in the context of nationally reported increases in population-level viral suppression.³

In sum, looking across populations and settings, similar groups of people comprise the 10-10-10 being left out. These include: people living in countries with social and political obstacles to implementing appropriate HIV services programs, young people, heterosexual men and men who do not identify as gay or MSM even if having same-sex relationships, men who do identify as gay or MSM, sex workers, and people who inject drugs. They are left behind because of persistent cultural beliefs and social-structural arrangements that lead to stigma, discrimination, and criminalization of both HIV and people who are most vulnerable to it. It is essential to identify and implement the most effective context-specific strategies for disrupting these arrangements to mitigate or eliminate disparities in HIV treatment access, uptake, and outcomes.

The 90-90-90 Targets Are Focused on Treatment: Treatment is Necessary, But Not Sufficient to Get to Zero

The final 90—achieving viral suppression—is not the end-all, be-all for most HIV-positive people. Rather, in addition to decreased likelihood of transmitting infection, good health and quality of life are paramount, but are not captured by the 90-90-90 paradigm.¹⁵ Although these other outcomes now are referred to as “the fourth 90,”¹⁶ they are not yet being measured and incorporated into the data reported for the testing and treatment cascade or treatment targets. It is possible that for some people, quality of life might involve discontinuation of ART, if they tire of taking medications for the remainder of their lives, as is required at this point.

In addition, treatment scale-up has not produced sufficient declines in HIV incidence globally to reach the 2020 targets.² Since 2010, the annual number of new HIV infections has declined by 16% to 1.8 million. The pace of decline in new HIV infections, however, is far too slow to reach the Fast-Track Target agreed upon by the United Nations General Assembly in 2016: fewer than 500,000 new infections per year by 2020. Regional trends make this clear: the steepest declines between 2010 and 2016 were achieved in Eastern and Southern Africa (29% decline), followed by Asia and the Pacific (13% decline), Western and Central Africa (9% decline), Western and Central Europe and North America (9% decline), the Caribbean (5% decline), and the Middle East and North Africa (4% decline). Trends over the same period in Latin America were stable, and in Eastern Europe and Central Asia, the annual number of new infections climbed by an alarming 60%.

Even in countries with declining HIV incidence overall, certain groups are still seeing stable and high rates, such as young women in South Africa—a country that now has the largest HIV treatment program in the world. The overall rate of new infections there was cut by 44% in the past 5 years; but, there still were 231,000 new infections in 2017, and the incidence rate among young people aged 15–24 years is the highest among all age groups at 1.0%.¹⁷ Moreover, the incidence rate among young women (1.51%) is 3 times the rate among young men (0.49%), and this gender difference

has not changed in many years. In the United States, a country with similarly high access to ART, although overall HIV incidence remained stable between 2012 and 2016, it increased by 12% among Hispanic/Latino gay and bisexual men.¹⁸

A focus on treatment as the primary way to “get to zero” is remiss in not acknowledging what is happening with HIV incidence simultaneously. Some core research questions include: Why is treatment scale-up reducing HIV infections in some places and among some groups, but not others? Might people be accessing treatment, but not taking it consistently over sufficient time to achieve *durable* viral suppression? What other (non-ART) HIV care and prevention strategies are available to people living with HIV to improve their own health and prevent onward transmission?

The 90-90-90 Targets Focus on HIV-Infected People, But HIV-Uninfected People Also Matter; and TasP/Pre-exposure Prophylaxis is Not the Only Prevention Strategy for Them

With their primary focus on HIV treatment, the 90-90-90 targets and the testing and treatment cascade focus only on HIV-infected individuals. But, HIV infection is a relational phenomenon—there is always an HIV-infected person and an HIV-uninfected person in the situation in which transmission occurs. The disparities and gaps in reaching treatment targets make it even clearer that primary prevention for the HIV-uninfected person also matters. It is possible that the individuals who are becoming HIV infected at any point in time are in relationships with the 10-10-10 of people living with HIV who are not reached by diagnosis and treatment services, so they need prevention tools of their own.

Currently, the global HIV/AIDS response community is focusing on using ART for preventing both transmission of HIV, through “treatment as prevention” (TasP), and acquisition, through pre-exposure prophylaxis (PrEP). Although ART for secondary and primary prevention may be necessary, it is not sufficient for “getting to zero.”

In some locales and population groups, such as gay men in the United Kingdom, increased uptake of PrEP alongside increased uptake of treatment seems to be having a significant effect on HIV incidence. In the United Kingdom overall, new HIV diagnoses fell by 17% between 2016 and 2017, and 32% since 2015.¹⁹ Among gay and bisexual men, where PrEP uptake is greatest, there was a 56% reduction in new infections from the peak year of 2012. Similarly, in San Francisco, early HIV detection and immediate linkage to ART, coupled with expanded PrEP uptake, particularly among HIV-negative gay men, resulted in a 60% decrease in new HIV infections between 2007 and 2017.¹⁴

Even with expanded PrEP access, we see similar disparities in its uptake as we do for the testing and treatment cascade. In the United States, characteristics of PrEP users are not reflective of trends in HIV incidence. From 2014 to 2016, the annual number of PrEP users aged 16 years and older increased by 470%—from 13,748 to 78,360—chiefly among men, who were 95.3% of PrEP users.²⁰ But, in 2016, although

black men and women accounted for approximately 40% of persons with PrEP indications, nearly 6 times as many white men and women were prescribed PrEP as were black men and women. This is particularly striking because black/African Americans are 12% of US population, but 44% of new HIV diagnoses.

Low uptake among some groups may reflect a continued lack of awareness of PrEP, provider resistance to informing patients about PrEP, fears about side effects, and concerns about cost, as has been shown in multiple studies with women in the United States.^{21–25} It also may reflect individual and community preferences about pill-taking, historical relationships with biomedicine that militate against taking up something such as PrEP, and sustained commitment to using condoms as part of sexual culture.²⁶

In sum, PrEP is necessary, but not sufficient to “get to zero.” A broader repertoire of primary prevention options, including behavioral strategies, such as condom promotion, and structural interventions, such as cash transfer and harm reduction programs to address what makes people vulnerable to HIV infection, continues to be necessary.²⁷ To monitor progress in this regard, a primary prevention cascade or continuum, similar to the testing and treatment cascade, should be used by program implementers, policy-makers, and researchers to keep a focus on HIV-negative people and to monitor what works (or does not work) for them—not just with respect to PrEP, but also behavioral health, sexual health, and other psychosocial and institutional support services.²⁸

CONCLUSIONS

Although great progress is being made on a global level to increase the proportion of people living with HIV who know their status, have access to appropriate care and treatment, and achieve viral suppression, there is still a long way to go to reach 90-90-90, much less 100-100-100. In the first case, we need greater rigor in the reporting of progress toward the targets, and such reporting should be longitudinal, not cross-sectional, to be sure it accurately reflects what is going on in any setting. In addition, we need to conduct more basic social research to understand the basis and persistence of HIV-associated disparities that affect variable outcomes in the targets across populations and settings, and to inform effective mitigation/elimination strategies. Such research will underscore the fact that scaling up ART for treatment and prevention is not the only solution, and that we really cannot “treat our way out of this epidemic.” Finally, we must recognize that we will not “get to zero” if we focus on 90 and not the remaining 10, and that even “getting to zero” in the way UNAIDS has defined it—zero new HIV infections, zero HIV-related deaths, and zero discrimination²⁹—will not in and of itself “end AIDS.” We will continue to have millions of people living with HIV for decades whose health and well-being should be of sustained concern.

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