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UNAIDS "90-90-90": Fighting HIV Stigma and Discrimination Needed to End HIV as a Global Threat by 2030

Gary Blick* **and Jeannette M. Wraight**

Healthcare Advocates International, LLC, Stratford, CT, USA

***Corresponding authors:** Gary Blick, Healthcare Advocates International, LLC, Stratford, CT, USA, Tel: (203) 609-5602; E-mail: garyblickmd@gmail.com

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Abstract

Thirty-six years after the initial cases of what would become known as AIDS-related conditions were reported, the Human Immunodeficiency Virus (HIV) has infected over 70 million people, killed almost 35 million, and left 36.7 million People Living With HIV (PLWHIV). Realizing that, without the rapid scale-up of ART, the HIV/AIDS epidemic would continue to outrun the global response through the end of 2015, the 2014 UNAIDS "90-90-90 Fast Track Strategy" has laid the groundwork for global development strategy over the subsequent 15 years, including ending the AIDS epidemic by 2030. To accomplish this ambitious goal, the number of new global HIV infections needs to decline to less than 500,000 annually.

The key to achieving the "90-90-90" strategy is the "Test and Treat" strategy adopted by the World Health Organization (WHO), but, to be successful, all HIV-positive marginalized and vulnerable populations will need to be informed, empowered, mobilized, and engaged. There are numerous challenges that realistically must be addressed and enormous barriers that need to be overcome to successfully end HIV as a global health threat. Understanding, fighting, and overcoming HIV stigma and discrimination remains one of the greatest challenges faced.

Keywords: HIV/AIDS; UNAIDS 90-90-90; Stigma and discrimination; Marginalized and vulnerable populations

Introduction

The first cases of homosexual men developing opportunistic infections and cancers, *Pneumocystis carinii* pneumonia and Kaposi's Sarcoma, which would come to be known as Acquired Immunodeficiency Syndrome (AIDS)-defining conditions caused by a novel retroviral infection that would soon become known as HIV, were reported in 1981 [1-4]. Almost thirty-six years later, HIV has infected more than 70 million people globally, AIDS-related conditions have killed almost 35 million people, and 36.7 million people are living with HIV (PLWHIV) [5].

Following the XIII International AIDS Conference held in Durban, South Africa from July 9-14, 2000, the first world AIDS conference ever held on the African continent, 189 United Nations' member states agreed to help people in the world's poorest countries "to achieve a better life by the year 2015". The 8 Millennium Development Goals, or MDGs, were developed to reduce extreme poverty and deprivation, empower women, and ensure environmental sustainability with targets ranging from halving extreme poverty to halting the spread of HIV/AIDS by 2015 [6]. The HIV, reproductive health-related targets were reducing child mortality (Goal 4), improving maternal health (Goal 5), and combating HIV/AIDS, malaria and other diseases (Goal 6). The 8 MDGs expired September 2015 without halting the spread of HIV/AIDS, replaced by 17 Sustainable Development Goals (SDGs) "to end poverty, protect the planet, and ensure prosperity for all" [7].

Concomitantly, UNAIDS and the World Health Organization (WHO) launched the "3 by 5" Initiative in 2003 with an ambitious global target that aimed to get 3 million PLWHIV on Antiretroviral Therapy (ART) by 2005 [8]. Although "3 by 5" fell short of the 3 M target, 1.3 M people accessed ART, tripling the number of people receiving ART and preventing an estimated 250,000-350,000 AIDS-related deaths. "3 by 5" jump-started the global effort to provide widespread treatment access to PLWHIV in low- and middle-income countries.

In 2011, the UN released the "Political Declaration on HIV/AIDS: Intensifying our Efforts to Eliminate HIV/AIDS" [9]. As part of the Declaration, the "15 by 15" target was adopted, that is, 15 million people will be reached, tested for HIV, and started on ART by 2015. This target was successfully reached by March 2015 with 17 million PLWHIV now receiving ART by the end of 2015.

Also in 2011, UNAIDS developed the "Getting to Zero" Initiative with ten interlinking targets and the vision of zero new HIV infections, zero AIDS-related deaths, and, finally, zero HIV/AIDS discrimination by 2015 [10]. UNAIDS' Executive Director, Michel, acknowledged, "Whether they are gay activists in New York, women's groups in African communities, sex workers in India, transgender people in Brazil or people around the globe living with HIV, people with purpose and vision have led the HIV response. Their struggle has evolved into unprecedented national commitment and serves as a beacon of global solidarity." With HIV stigma and discrimination being major barriers to achieving such "Getting to Zero" lofty goals, UNAIDS set forth to address HIV/AIDS discrimination by setting goals of reducing the number of countries with punitive laws and practices around HIV transmission, sex work, drug use or homosexuality that block effective responses reduced by half; eliminating HIV-related restrictions on entry, stay and residence in half of the countries that have such restrictions; addressing HIV-specific needs of young women and girls are in at least half of all national HIV responses; and zero tolerance for gender-based violence.

UNAIDS "90-90-90": 2016-2021

Every aspect of UNAIDS work is guided by the following principles [11]: "Aligned to national stakeholders" priorities; Based on the meaningful and measurable involvement of civil society, especially PLWHIV and populations most at risk of HIV infection; Based on human rights and gender equality; Based on the best available scientific evidence and technical knowledge; Promoting comprehensive responses to AIDS that integrate prevention, treatment, care and support; and Based on the principle of non-discrimination."

During the UNAIDS 37th meeting held in 2014, the Program Coordinating Board adopted the most recent global strategy to end the HIV/AIDS epidemic as "a public health threat" by 2030. Michel notes that "amid a swirl of competing and complex global concerns, we confront a serious new obstacle: the oppressive weight of complacency. This is happening when we know that if we make the right decisions and the right investments now, the end of AIDS can be within our grasp. This moment is, however, fleeting. We have a fragile window of opportunity, measured in months, in which to scale up. If we do not Fast-Track our response, the costs of the epidemic, to national finances and to human lives, will grow into a debt we can never repay. We will fail to reach the sustainable development agenda target of ending the AIDS epidemic. The epidemic will resurge, this time as an orphan disease."

The 2014 UNAIDS 2016-2021 "Fast Track Strategy" is the first in the UN system to align to the SDGs and laid the groundwork for global development strategy over the subsequent 15 years, including ending the AIDS epidemic by 2030. Realizing that without the rapid scale-up of ART, the sober realization was that the HIV/AIDS epidemic would continue to outrun the global response through the end of 2015. To prevent this harsh reality, the number of new HIV infections and AIDS-related deaths would need to decline by 90%.

The "90-90-90" strategy is based in the knowledge that future generations must be protected from acquiring HIV by ending new infections in children and saving the next generation, that young people have easy access to HIV/AIDS-related and Sexual and Reproductive Health and Rights (SRHR) services, and that young people, specifically Adolescent Girls and Young Women (AGYW), must be empowered to prevent acquiring HIV infection by ending Gender-Based Violence (GBV) and promoting healthy gender norms. If the HIV/AIDS epidemic is ever really going to be controlled, civil, political, economic, cultural, and SRHR must be addressed with significant progress made across the entire spectrum. The rights of children, women, adolescent girls and boys and young men and women, Men who have Sex with Men (MSM), people who inject drugs, Commercial Sex Workers (CSW) and their clients, those with disabilities, prisoners, transgender people and migrants must be defended successfully to ensure access to life-saving ART and SRHR. The success of the "90-90-90" strategy is informing, empowering, mobilizing, and engaging marginalized and vulnerable populations who are currently being left behind.

In 2015, the WHO adopted the DHHS Panel on Antiretroviral Guidelines for Adults and Adolescents-A Working Group of the Office of AIDS Research Advisory Council (OARAC) "Test and Treat" Guidelines for the Use of Antiretroviral Agents in HIV-1-Infected Adults and Adolescents [12].

"Test and Treat" guidelines recommend ART for every HIV-infected individual, regardless of their CD4 cell count, in order to reduce HIV-associated morbidity and mortality and to prevent HIV transmission. These recommendations to start ART to reduce morbidity and mortality are based on findings from the START (Strategic Timing of Antiretroviral Therapy) [13] and TEMPRANO [14] large, randomized controlled trials, and the decision to recommend ART to prevent HIV transmission is based largely on the HPTN 052 trial.

The START study was a randomized, open-label "Immediate-Initiation" (CD4>500 cells/mm^3) *vs.* "Deferred-Initiation" (CD4<350 cells/mm^3) ART study conducted by the International Network for Strategic Initiatives in Global HIV Trials (INSIGHT). START enrolled 4685 patients followed for a mean 3.0 years, after which the DSMB halted the study on May 15, 2015 following statistical analyses that demonstrated starting ART at CD4>500 cells/mm^3 reduced AIDS and non-AIDS-defining events without any upper CD4 threshold that was protective against AIDS-related events, despite low overall absolute risk of events [13].

TEMPRANO randomized 2056 patients from Cote d'Ivoire to one of four treatment groups and followed them for 4757 patient-years: deferred ART (ART initiation according to WHO criteria), deferred ART plus 6 months of Isoniazid Preventive Therapy (IPT), early ART (immediate ART initiation), or "immediate" ART plus 6 months of IPT. TEMPRANO demonstrated that immediate ART with 6 months of IPT led to lower rates of severe illness than did deferred ART without IPT, both overall and among patients with CD4>500 cells/mm^3 [14].

HPTN 052 (HIV Prevention Trials Network Study 052: A Randomized Trial to Evaluate the Effectiveness of Antiretroviral Therapy Plus HIV Primary Care *vs.* HIV Primary Care Alone to Prevent the Sexual Transmission of HIV-1 in Serodiscordant Couples) was a two-arm, randomized, controlled, multi-center trial designed to determine whether ART could prevent the sexual transmission of HIV-1 in serodiscordant couples. HPTN 052 enrolled 1,763 HIV serodiscordant couples, the majority of the couples being heterosexual (97%), in four continents, nine countries and thirteen study sites. The HIV-1 positive partner was randomly assigned to either of the two arms: "early arm" (immediate therapy with ART initiated upon enrolment plus HIV primary care), or "delayed arm" (delayed therapy with HIV primary care but ART initiated when two consecutive measurements of a CD4 cell count fell within or below the range of 200-250 cells/mm^3, or when the patient developed an AIDS-defining illness). The 2011 interim review showed an overwhelming 96% risk reduction in the prevention of genetically linked HIV-1 incident transmissions for the "immediate" therapy group with undetectable viral loads [15].

Final results presented at the IAS 2015 conference show a sustained 93% reduction in HIV transmission. There were 8 cases of HIV transmission: four diagnosed soon after ART initiation before the HIV-infected partner was fully virally suppressed, and four were diagnosed when the HIV-infected partner had experienced ART treatment failure [16,17]. These exciting results have resulted in the HIV messaging of "Treatment as Prevention", or TasP.

Based on these findings and a global "Test and Treat" model, the ambitious "90-90-90" goals (Figure 1) were set to test 90% of all individuals living with HIV in the world so that they would know their HIV-positive status [18]. Of those 90% who know their status, if 90% of them are placed on ART and 90% of those on ART achieve a sustained undetectable viral load (or a total 73% of those HIV-seropositive achieve a viral load of less than 200 copies/ml) by 2020, then there would be fewer than 500,000 people newly infected with

HIV, fewer than 500,000 people dying from AIDS-related illnesses, and, ideally, elimination of HIV/AIDS-related stigma and discrimination. If these goals are achieved and sustained, then new HIV infections would be reduced to less than 200,000 by 2030, marking the end of HIV epidemic as a public health threat.

Figure 1: The UNAIDS "90-90-90" initiative [18].

As UNAIDS Executive Director Michel said, "Every five years we have more than doubled the number of people on life-saving treatment. We need to do it just one more time to break the AIDS epidemic and keep it from rebounding" [19].

UNAIDS "90-90-90" in 2016

At the 21st International AIDS Conference held in Durban, South Africa in July 2016, Michel gave an update to the UNAIDS "90-90-90" initiative, stating "The world is uniting around the Fast-Track response. The 90-90-90 targets have mobilized extraordinary global efforts and are achieving results. We have a fragile window of opportunity to achieve 90-90-90 by 2020 and lay the foundation to end the AIDS epidemic by 2030" [20].

So, where are we in achieving "90-90-90" targets globally, as of 2016? Currently, 57% of PLWHIV are aware of their status (70% women, mostly those via prenatal care), while 46% of PLWHIV are on ART, and 38% are virally suppressed. In sub-Saharan Africa, where 69% of all PLWHIV reside, 70% of all Batswana PLWHIV on ART are virally suppressed. In Rwanda, 86% of PLWHIV know their status, 63% are on ART, and 82% are virally suppressed. The PEPFAR-funded programs in Malawi, Swaziland, Lesotho, and Kenya are also on their way to achieving Fast-Track targets [20].

In Asia, Thailand and Cambodia are set to reach Fast-Track targets before 2020. In Latin America where there is the highest regional ART coverage in the world, increasing from 39% in 2012 to 55% in 2015, 83% of Brazil's PLWHIV are aware of their status, and 80% of PLWHIV are on ART. Additionally, Uzbekistan, Burundi, Uganda, and Tanzania have doubled ART coverage from 2012 to 2015 [20].

In September 2016, Sweden became the first country to achieve the UNAIDS "90-90-90" targets [21]. The Swedish InfCare HIV Cohort Study collects demographic and clinical data, viral loads, CD4 counts, and viral sequences via an electronic clinical decision support system. Almost 100% of PLWHIV are in the database, equating to 6946 diagnosed PLWHIV in Sweden by end-December 2015. Using HIV surveillance data reported to the Public Health Agency of Sweden, an estimated 10% of all PLWHIV in Sweden remained undiagnosed. Among those aware of their status, 99.8% were Linked-To-Care (LTC), and 97.1% of those remained in care. On December 31, 2015, 6605 of 6946 patients (95.1%) were on ART. A total of 6395 had been on treatment for at least 6 months, and 6053 of those (94.7%) had an undetectable viral load, computing to 78% of all PLWHIV achieving viral suppression and making Sweden the first country reported to meet all the UNAIDS "90-90-90" goals.

Regions with significant HIV-infected populations that are lagging in achieving Fast-Track targets include West and Central Africa, Eastern Europe, Central Asia, four of seven Sub-Saharan countries, and the United States.

In the U.S., most PLWHIV are not receiving ART [22,23]. Notification of partners of PLWHIV remains the exception, while condom less anal sex has become more frequent among MSM [24]. There also appears to be an increasing number of IVDU [25,26]. New HIV infections has increased among younger MSM, particularly black men. Despite surveillance improving, data-driven targeted interventions are not being rapidly and effectively implemented in most geographic areas.

According to the CDC Continuum of Care (Figure 2), in 2012, of the 87% aware of their HIV status, only an estimated 39% of PLWHIV were retained in care, 36% had been prescribed ART, and 30% had documented viral suppression [27]. There are approximately 45,000 new HIV infections in the U.S. annually, with about 10,000 (22.2%) transmissions from people with undiagnosed HIV infection, 31,000 (68.9) from those with diagnosed infection who were not in care, and 1300 (2.9%) from those prescribed ART but without viral suppression (Figure 3) [27]. Only 51.4% of persons aged 13 to 24 years had not been diagnosed, 26.5% of 25-34 year olds had not been diagnosed, while 98.2% of persons aged 65 years or older had been diagnosed [22].

In the U.S., there have been continually rising new HIV infections primarily in MSM only. From 2010 through 2014, in the U.S. and 6 dependent areas, the largest new HIV infection were in MSM aged 25-34 years, and the number of diagnoses among MSM in this age group increased 27% during this period (the greatest percentage increase among all age groups). The number of new HIV diagnoses among MSM aged 55 years and older increased about 16%, while the number of new diagnoses among MSM aged 13-24 increased 10% [22].

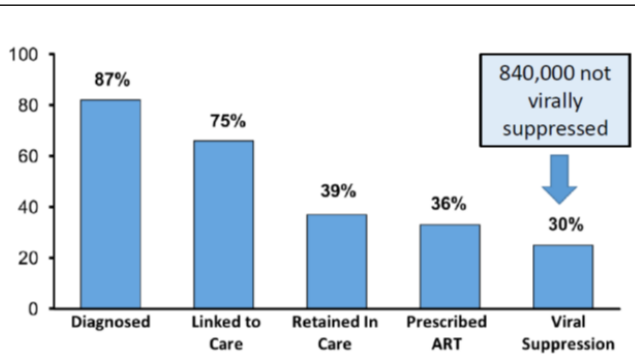

Figure 2: Percentage of HIV-infected people at each stage of the HIV care continuum, United States and Puerto Rico, 2012 [27].

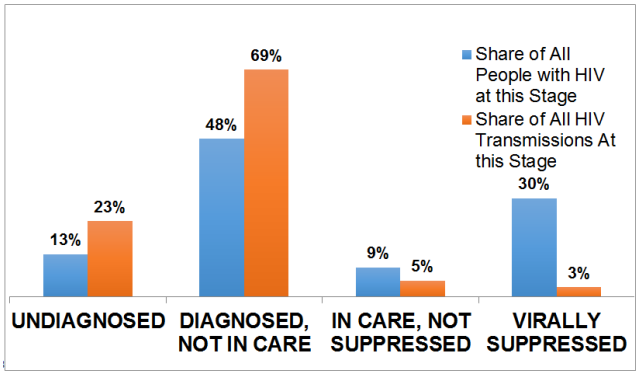

Figure 3: Percentage of people living with HIV and percentage of HIV transmissions at each stage of the care continuum, United States and Puerto Rico, 2012 [27].

Challenges to Achieving "90-90-90"

90% of PLWHIV will know their status

Unless 90% of PLWHIV know their status, "90-90-90" cannot succeed. There is a significant problem with getting men tested for HIV globally. Current UNAIDS estimates that only 57% of PLWHIV are diagnosed, 70% of those tested are women, most often during prenatal care, while on 30% of men have been tested.

There is still a great need to determine the best settings and approaches to reach untested populations. For example, generalized screening campaign, such as national testing days or health fairs, raise awareness, but are less effective for identifying PLWHIV.

Rapid Diagnostic Tests (RDTs), either 20 m or 1 m finger or mouth sampling, have become the standard-of-care for HIV screening tests worldwide. However, there are many difficulties surrounding with the availability of RDTs. Expiring stocks of RDTs are occurring in sites where no HIV-positives are being diagnosed. There is a lack RDTs in areas with higher numbers of PLWHIV. With the latest PEPFAR decision to focus RDT on the highest prevalence areas and "Index" cases, e.g. urban centers, this requires an estimated 50% increase in the volume of RDTs, and this testing strategy largely ignores rural areas where infections rates can be as high as 15-24% in some villages of sub-Saharan countries like Zimbabwe. Availability is affected by substantial increases in RDT by untrained community lay providers, as well as increases in home-based and self-testing becoming more prevalent in the coming years. Lastly, "Last mile delivery" of RDTs to Point of Service (POS) areas where lab testing is limited has been inefficient.

There remains a great need to address personnel shortages for proper HIV Testing and Counselling (HTC), while there remains a need to understand and correct misinformation and re-educate false cultural beliefs. HIV messaging remains the key with very simple concepts: Test and Treat everyone with immediate LTC to avoid Loss-To-Follow-Up (LTFU); TasP as per HPTN 052; strides are being made for Pre-Exposure Prophylaxis (PrEP) to prevent an HIV-negative person from acquiring HIV; HIV/AIDS ≠ Death; and ART is no longer as toxicity as older therapies such as AZT, d4T, and ddI which resulting in lipodystrophy, most commonly presenting as facial and peripheral fat loss. Tenofovir Disproxil Fumarate (TDF) is currently the preferred first-line Nucleotide Reverse Transcriptase Inhibitor (NtRTI), but it carries potential for renal insufficiency and failure and loss of Bone Mineral Density (BMD), with potential to cause osteopenia, osteoporosis, and osteonecrosis.

More novel and innovative approaches are needed to attract and diagnose men, AGYW and marginalized/vulnerable populations (CSW, MSM/TG, OVC, prisoners, disabled, etc.).

Lastly, HIV-related stigma and discrimination remains one of the biggest deterrents to getting HIV tested and coping with one's HIV diagnosis.

90% of PLWHIV will be placed on art

To achieve the second "90", there are significant implementation requirements that will need to be met. By 2020, there will be a doubling of the demand for ART, as 17 million on ART in 2016 needs to increase to 24 million by 2018, and nearly 32 million by 2020. Over 80% of donor-funded antiretroviral agents (ARVs) purchased since 2006 were supplied by Indian generic manufacturers. They have been able to meet demand to-date, expanding capacity as coverage increased from less than 1 million a decade ago to mid-2015's 15.8 M PLWHIV on ART. However, Indian generic manufacturing must grow significantly again to meet the new goals.

With the increased demand for manufacturing of ART, there is an increased need to procure, receive, package, warehouse and distribute ART. Imperial Health Sciences (IHS) is Africa's leading partner in healthcare supply chain. IHS ensures the secure and sustainable supply of quality medicines to the people of Africa with PEPFAR funding. They are involved in procurement, receipt, storage and distribution of pharmaceuticals and other healthcare products, providing warehousing and distribution services for over 30 international and South African manufacturers, delivering to more than 6 thousand hospitals, clinics, pharmacies, doctors, wholesalers and health stores. Based in Gauteng and Capetown SA, IHS operates warehousing operations in Kenya, Ghana, Nigeria and Malawi with downstream distribution partners providing reach into 26 countries pioneering their effective "Hubs into Africa" concept. This means that HIS offers services in East Africa and West Africa, in addition to Southern Africa. Their new expansion focus is "mid-SADC" with Lusaka, Zambia, the distribution hub for this region, and IHS has a global focus.

ART cost remains an issue as it is estimated that an addition $26.2 B will be needed to meet the increase demand through 2020. There is an increased demand for more expensive 2nd- and 3rd-line Protease Inhibitor (PI)-containing ART as increasing Viral Load (VL) monitoring identifies 1st- and 2nd-line treatment failures (defined as PCR>1,000 copies/ml when HIV drug resistance develops). However, with the advent of HIV Integrase Inhibitors (IIs), especially ViiV Healthcare's Dolutegravir (DTG) that has not shown any development of resistance in treatment-treatment-naive patients beginning DTG-based regimens as 1st-line therapy [28]. Aurobindo announced that it is exclusively producing generic DTG for distribution at $44/patient/year [29]. An investigational 3TC/DTG regimen, if proven to be non-inferior to the standard-of-care TDF/3TC/Efavirenz (EFV, a non-nucleoside reverse transcriptase inhibitor, or NNRTI) triple-ART regimen in treatment-naive patients, could reduce PEPFAR ART costs by as much as 82%.

With the increased need to scale-up ART, they will be continued need to address personnel shortages, training, etc. for proper LTC and ART administration.

As mentioned, with increase viral load testing, there has been an increased awareness of 1st- and 2nd-treatment failures and development of HIV Drug Resistance (HIV DR). Hosseinipour et al. reviewed WHO publications, systematic reviews, and relevant abstracts and manuscripts on the topic of HIV DR. In patients initiating 1st-line NNRTI-based therapy in 89 studies involving 13,288 patients, 76%-90% of patients achieve HIV RNA suppression by 12th Month. However, in patients with detectable HIV RNA at 12th month (10-24%), 60% revealed HIV DR while 40% had Wild-Type (WT) without any HIV DR mutations. HIV DR was primarily due to the development of 3TC-related M184V and NNRTI mutations in 60%-72%. Approximately 22% on 2nd-line therapy develop virological failure by 6 months on the regimen [30].

Additionally, a significantly higher frequency of the development of the TDF-associated K65R mutation has been reported after failure of TDF-based 1st-line ART in sub-Saharan Africa, although resistance may vary according to the NNRTI utilized. In Durban SA, 6% experience ART failure, 69.7% with K65R mutation. WHO reports the K65R is more prevalent with 1st-line use of TDF/3TC/Nevirapine (NVP). In Malawi, in 56% of those failing d4T-based ART, the most common pattern was M184V plus NNRTI mutations with ≥ 1 Thymidine analog mutations (TAMs against AZT and d4T). However, 23% of subjects developed K65R or K70E mutations; despite no TDF use [30]. Once again, is this a NVP-related phenomenon and/or a HIV-1 sub-type C phenomenon, as this subtype is most prevalent in sub-Saharan Africa?

90% of those on ART achieve undetectable viral loads

There are significant barriers that must be overcome in order to achieve the 3rd "90". First, there is a scarcity of VL analysers in low- and low-middle income countries. Second, as Global Fund and PEPFAR support the scale-up VL testing as recommended by WHO and UNAIDS, the cost of viral load analyses needs to be addressed even at GF/PEPFAR-mediated reagent costs of $11-50, depending on the income status of the country. Third, there is an urgent need for POC PCR analysers, as Cepheid and Alere lead the development of POC VL analysers. Lastly, as with CD4 analyses if performed without POC analysers, transportation of samples and results to and from rural districts presents unique challenges.

Can "90-90-90" Realistically be Achieved? Fighting HIV Stigma and Discrimination

Although there are many definitions, HIV/AIDS-related stigma refers to prejudice, discounting, discrediting and discrimination directed at persons perceived to have AIDS or HIV, as well as their partners, friends, families and communities. Stigma often reinforces existing social inequalities based on gender, race, ethnicity, class, sexuality and culture, and is directed against many populations disproportionately affected by HIV. Additionally, HIV has compounded the stigma of homosexuality, IVDU, poverty, CSW and racial minority status.

Various forms of stigmatization and discrimination are experienced by people living with HIV and AIDS (PLWHA) globally. It can be expressed as ostracism, rejection and avoidance of PLWHA; discrimination against PLWHA by their families, health care professionals, communities and governments; mandatory HIV testing of individuals without prior informed consent or confidentiality protections; quarantine of persons who are HIV-infected; violence against persons who are perceived to have AIDS, be infected with HIV or belong to "high risk groups; Ministers of Health and governments cutting funding earmarked for delivery of services to marginalized populations, such as MSM and transgender individuals; and criminalization of PLWHA and imprisonment of marginalized groups, again including MSM and transgender individuals.

Some of the forms of stigmatization and/or discrimination experienced by PLWHA globally include blame for being responsible for their HIV status by family members, friends, religious leaders and healthcare workers; various name callings; telling PLWHA that they are no longer useful to anybody; violation of confidentiality; social isolation; restriction of PLWHA's participation in family and/or religious activities; rejection of PLWHA by their spouses, families, and/or friends; dismissal from their place of work; isolation from other patients in healthcare settings; denial of care at health centers; and criminalization of HIV.

The University of Ilorin Teaching Hospital (UITH) in Ilorin Nigeria performed an assessment of stigma and discrimination faced by 300 PLWHA receiving ART in 2012. They performed a quantitative method, interviewer-administered questionnaire in a cross-sectional, descriptive design. All PLWHA who came to clinic were recruited until 300 were recruited. The mean age of PLWHA was 39 years (SD=9.32), range 19-65 years. Demographics included 64.7% females, 62.7% married, and 62.9% from monogamous family settings. Over 47% were not informed before they were HIV tested, 63.3% were not pre-test counselled, 89% received post-test counselling, and 25% claimed they had experienced stigmatization/discrimination [31].

HIV/AIDS stigma toward PLWHA among primary HCW was also evaluated at UITH, Ilorin, Nigeria and published in 2013. All 341 HCW at the primary health care level were surveyed via questionnaire from July to August 2007. The goal was to obtain information on domains of stigma including fear of casual transmission of HIV, shame and blame, discrimination and disclosure. Almost 90% of HCW had unfounded fear of casual transmission of HIV; 89.4% shamed and/or blamed PLWHA, and 97.7% observed discrimination against PLWHA by other HCW, believing it was imperative to disclose a PLWHA's HIV status to HCW [32].

Lastly, HIV/AIDS-related stigma and discrimination against PLWHA was assessed in the general Nigerian Population and published in 2015. Data was extracted from the 2013 Nigeria Demographic and Health Survey conducted by the National Population Commission. Over 56,300 men and women were included, ages 15-49 years, who were permanent residents and visitors of the households. Several questionnaires were used in the survey, some covering questions on HIV/AIDS. Almost 50% claimed they stigmatized and discriminated against PLWHA. Those more likely to stigmatize were younger, men, had lack of formal education, had a poor wealth index, and were married people who were also more likely to blame PLWHA for bringing HIV to their community. Those who were more compassionate to PLWHA were those with higher levels of education and those who were wealthier. However, 70% in the population were willing to care for a relative with AIDS, and this was greater among those with higher levels of education [33].

Measurements of stigma have become standardized. The "People Living with HIV Stigma Index" is a commonly used index to measure

the stigma and discrimination experienced by PLWHIV. It is an initiative developed and implemented by and for PLWHIV and aims to collect info about the experiences of PLWHIV related to stigma, discrimination and human rights (including criminalization of HIV) to help organizations in their advocacy efforts. The User Guide and questionnaire are for managers and implementers of the PLWHIV Stigma Index, e.g. the team leader. PLWHIV conduct interviews that form the basis of index are those who enter the data into computer to ready for analysis, and are those responsible for analysing and reporting on the data. The PLWHIV Stigma Index began in 2008, over 70 countries have completed the study, over 1500 PLWHIV have been trained as interviewers, over 85,000 PLWHIV have been interviewed, and the Index has been translated into 54 languages [34].

Conclusion

We are at a crossroads in the fight to control the HIV epidemic globally. Great strides have been made in delivering ART to almost 16 million PLWHA through the start of 2016. To end HIV as a public health threat by 2030, UNAIDS has developed the Fast-Track "90-90-90" strategy to get 90% of those living with HIV tested, 90% of those tested onto ART, and 90% of those on ART virologically undetectable by 2020, thus decreasing the number of people newly HIV-infected to fewer than 500,000, fewer than 500,000 people dying from AIDS-related illnesses, and, ideally, elimination of HIV/AIDS-related stigma and discrimination. If these goals are achieved and sustained, then new HIV infections would be reduced to less than 200,000 by 2030, marking the end of the HIV epidemic as a public health threat.

Great hurdles need to be overcome to meet these ambitious targets, the greatest being fighting global HIV stigma and discrimination, but also barriers that prevent young people from easily accessing HIV/AIDS-related and SRHR services. Young people, especially AGYW, must be empowered to avoid acquiring HIV infection by ending GBV and promoting healthy gender norms. Civil, political, economic, cultural, and SRHR must be addressed with significant progress made across the entire spectrum. The rights of children, women, AGYW and adolescent boys and young men, MSM, people who inject drugs, CSW and their clients, the disabled, prisoners, transgender people and migrants must be defended successfully to ensure access to life-saving ART and SRHR. If "90-90-90" strategy is to succeed, it is imperative that we inform, empower, mobilize, and engage the world's marginalized and vulnerable populations who are currently being left behind.

UNAIDS partnered with the International Association of Providers of AIDS Care (IAPAC) [35] the United Nations Human Settlements Programme (UN-Habitat), and the City of Paris on World AIDS Day 2014 to launch the Fast-Track Cities Initiative (FTCI) [36]. The FTCI is led by Mayors and city governments from more than 60 high HIV burden cities around the world, 30 on the African continent, and is closely engaged with affected communities, civil society, city health officials, clinical and service providers, and other stakeholders. Together, the global HIV communities and local, regional, national, and international governmental and non-governmental organizations will strive to get 90% of PLWHIV knowing their HIV status, 90% of PLWHIV who know their HIV-positive status on ART, 90% of PLWHIV on ART achieving viral suppression, and, most importantly to the success of the most ambitious initiative ever undertaken, zero HIV discrimination and stigma.

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