



# Reaching the 90–90–90 UNAIDS treatment target for people who inject drugs receiving integrated clinical care at a drug-use outpatient treatment facility

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## Abstract

**Background** People who inject drugs (PWID) experience more gaps at each stage of the HIV care continuum than others living with HIV. The study aimed to describe the effectiveness of an integrated care model to reach the UNAIDS 90–90–90 target.

**Methods** This cross-sectional study included PWID who met the criteria for DSM-5 substance use disorder. They received a multidisciplinary comprehensive program, including medical HIV care, substance use treatment, and psychosocial support, at a drug-use treatment outpatient facility during 2019. The percentage of patients reaching the 90–90–90 UNAIDS target was the main study variable.

**Results** Two hundred and twenty-one PWID were monitored at the facility during a median follow-up of 98 months (IQR: 61–143). Current HIV status was established in all PWID, of whom 84/221 (38.0%) tested HIV-positive. All the 84 patients (100%) received antiretroviral therapy, and 76(90.5%) had RNA HIV-1 < 20 copies/ml during a median of 74 months (IQR: 36–115). The UNAIDS goals were: 84/84 (100%) for the HIV testing, 84/84 (100%) for patients on antiretroviral therapy, and 76/84 (90.5%) for viral suppression.

**Conclusions** Integrated clinical care provided at a drug-use treatment facility is a useful strategy to sustain a long-term HIV care continuum among PWID.

**Keywords** HIV care cascade · Integrated care · Substance use disorder · Drugs

## Introduction

The HIV care continuum, also referred to as the HIV treatment cascade, is a model that outlines the sequential stages of medical care for people living with HIV. It extends from initial diagnosis to the goal of viral suppression, and indicates the proportion of individuals engaged at each stage (MacCarthy et al. 2015, Kay et al. 2016).

In 2014, with the aim of dramatically reducing global HIV transmission and morbidity, the Joint United Nations Program on HIV and AIDS (UNAIDS) set an ambitious target known as the 90–90–90. As the title indicates, the aim is that by 2020 90% of all HIV positive individuals will have been diagnosed, 90% of all those diagnosed will be on treatment, and 90% of those linked to care virally suppressed (UNAIDS 2014). Such a ‘treatment as prevention’ approach has been emphasized following recent evidence demonstrating the reduced risk of transmission from virally suppressed individuals (Montaner 2011). Whilst progress has been made towards the UNAIDS 90–90–90 goals (Granich et al. 2017; Marsh et al. 2019), disparities remain among key populations, especially for people who inject drugs (PWID) and experience more gaps at each stage of the HIV care continuum (Risher et al. 2015; Hakim et al. 2018). Such differences are particularly prevalent in low- and middle-income countries in eastern Europe and Asia where PWID represent the largest proportion of the HIV-infected population (Granich et al. 2017; Marsh et al. 2019).

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Traditionally, PWID have faced substantial structural and interpersonal barriers when accessing HIV prevention and care services. These obstacles often stem from the negative influences of illicit drug policies, as well as issues within medical systems, including lack of education for physicians about drug abuse (Wood et al. 2008; DeBeck et al. 2017). A person-centered continuum of care, tailored to the needs of PWID, can potentially mitigate the effects of individual structural vulnerabilities regarding HIV assistance. This can be achieved through integrated models that provide multiple services addressing co-occurring needs (e.g., HIV, mental health, hepatitis C) within one facility (Meyer et al. 2013, Sterling et al. 2011, UNAIDS 2016, Haldane et al. 2017, Oldfield et al. 2019). International organizations therefore recommend the incorporation of HIV care and substance use disorder (SUD) treatment in order to improve the success of both conditions.

Such a proposal signifies an interdisciplinary, comprehensive, team-based, coordinated-care approach which includes health care, SUD treatment, harm reduction services, and access to housing and financial support (Meyer et al. 2013, Sterling et al. 2011, UNAIDS 2016, Haldane et al. 2017, Oldfield et al. 2019). Evidence regarding the optimal method of service integration is, however, lacking as it depends on the setting, local health laws, and provider training in both HIV disease and SUD treatment.

The HIV epidemic in Spain was first mainly driven by heroin injectors. However, following the introduction of harm-reduction programs, particularly opioid agonist therapy offered primarily in public facilities, it later switched to men having sex with men (De La Fuente et al. 2003; Torrens et al. 2013). Nevertheless, analyzing HIV care cascade outcomes in public facilities may be of considerable utility for countries where HIV epidemics are currently fueled by injecting drug use.

The aim of the present study was therefore to describe the effectiveness of an integrated care model in an outpatient drug-use treatment facility. The model included multidisciplinary medical care, SUD treatment, and psychosocial support with the objective of reaching the 90–90–90 target among PWID.

## Methods

This cross-sectional study included PWID who met the criteria for DSM-5 (APA) substance use disorder and received medical care at the CAS (Centro de Atención y Seguimiento a las Drogodependencias; Center for the Attention and Monitoring of Drug Addiction)-Barceloneta in Barcelona, Spain, during 2019.

CAS-Barceloneta is a free-of-charge, outpatient, substance-use treatment facility located in the district with the highest

prevalence of HIV infection among PWID. Individuals come voluntarily to the center requesting substance-use treatment; they are either self-referred or referred by their primary care physician/medical specialist. The multidisciplinary health team includes two psychiatrists, a physician, a social worker, a psychologist, and four specially trained nurses. According to individual characteristics, this team designs the most suitable drug-abuse treatment modality for each case (detoxification, methadone or buprenorphine maintenance, naltrexone maintenance, inpatient detoxification referral, residential treatment). The subjects are monitored on a regular basis during multidisciplinary sessions where the medical and psychosocial issues of each individual are discussed. The physician is a specialist in internal medicine and takes care of the subjects' health problems, in particular HIV-1 infection, tuberculosis prophylaxis or treatment, and hepatitis C co-infection. He decides when to initiate antiretroviral therapy and assesses the patients' monitoring. The nurses dispense methadone, perform blood extractions, supervise urine substance screening tests, and are responsible for the needle-syringe exchange program and harm reduction courses. They also review the side-effects of medication, identify adherence problems, provide instruction on compliance, and coordinate medical appointments and follow-up of cases. On the day of outpatient admission, routine laboratory testing is performed. It includes biochemistry, blood analysis, and serologic tests for HIV, hepatitis A, B, and C, and syphilis. These are repeated annually for subjects who test negative. Antiretroviral therapy is free-of-charge, dispensed monthly, and self-administered or under directly-observed treatment at the center, depending on the agreement reached between patient and physician. More details on the functioning of CAS-Barceloneta have been published elsewhere (Vallecillo et al. 2016).

Following the UNAIDS Global AIDS Monitoring Guidelines, HIV testing was measured by determining the number of people diagnosed with HIV divided by the total number of those living with it. Linkage to care was measured by dividing the number of people on antiretroviral therapy by the number of those living with HIV. Viral suppression was measured by the number of people achieving viral suppression divided by the number of those living with HIV (MacCarthy et al. 2015; UNAIDS 2019). Viral suppression was established as having viral levels of HIV-1 RNA < 20 copies/ml. Non-structured antiretroviral therapy treatment interruption was defined as a non-medically supervised interruption of antiretroviral treatment of at least 30 consecutive days following initiation. It was identified through pharmacy dispensation records indicating that a participant had not collected any antiretroviral therapy for 30 days or longer after the end of the prescription refill date (Vallecillo et al. 2016). Substance use was defined as current or former according to the results of urine toxicological tests. Substance and psychiatric disorders were diagnosed following DSM-5 by a psychiatrist.

Descriptive statistics were expressed as median and range for the quantitative variables, and absolute frequencies and percentages for the qualitative variables. Qualitative variables were compared by Chi-square or Fisher exact test, as appropriate, and quantitative variables by Student's *t*-test. Multivariate logistic regression analysis was used to assess variables associated with RNA-VIH-1 suppression. Variables included in the univariate analysis were: age, gender, origin, psychiatric comorbidity, substance use disorder, and current drug use. Variables used for the multivariate analysis were those found to be significant in the univariate one ( $p < 0.05$ ).

## Results

Two hundred and twenty-one PWID patients were monitored at the facility. Current HIV infection status was established in all subjects, of whom 84/221 (38.0%) tested HIV-positive.

**Table 1** Clinical and social characteristics of people who inject drugs living with HIV infection at an outpatient drug-use treatment facility

Characteristics	Total $N = 86$ : $n$ (%)
Age <sup>a</sup> (years)	49 (45–52)
Men	53 (63.1)
Spanish	72 (85.4)
Homeless	16 (19.1)
Unemployment	74 (88.1)
Incarceration	50 (59.5)
Psychiatric disorders	
Depressive	29 (34.5)
Psychotic	11 (13.1)
Drug use disorder	
Opioid	78 (92.8)
Cocaine	55 (65.5)
Alcohol	11 (13.1)
Current drug use	67 (79.8)
Opioid agonist therapy	78 (92.8)
AIDS	21 (25.)
Hepatitis C infection	29 (34.5)
CD4 lymphocyte	555 (406–762)
RNA HIV-1 < 20 copies/ml	76 (90.5)
Time <sup>a</sup> on RNA VIH < 20 copies/ml (months)	74 (36–115)
NSI	
1	18 (21.4)
2	8 (9.5)
3	2 (2.4)

<sup>a</sup> Data presented as median and interquartile range (25–75)

Abbreviations: AIDS: acquired immunodeficiency syndrome; HIV: human immunodeficiency virus; NSI: non-structured antiretroviral therapy interruptions

The clinical characteristics of PWID living with HIV are shown in Table 1. They received clinical care during a median follow-up of 98 months (IQR: 61–143). Poly-substance use was diagnosed in 65/84 (77.3%) of the patients and former substance use was observed in 67 (79.8%). Psychiatric disorders were diagnosed in 40 (47.6%) of them.

All the 84 patients (100%) received antiretroviral therapy: integrase inhibitors in 39 (76.4%), non-nucleoside reverse transcriptase inhibitors in 25 (31.0%), protease inhibitors in 11 (13.1%), and integrase plus protease inhibitors in eight (9.5%). Median CD4 lymphocyte count was 555 (406–762) cells/mm<sup>3</sup> and 76/84 (90.5%) had RNA HIV-1 < 20 copies/ml during a median of 74 (36–115) months.

Directly-observed treatment was used in 19/84 (22.6%) of the patients. In the multivariate analyses, age (O.R.: 0.84; I.C.95%: 0.71–0.98;  $p = 0.03$ ), female gender (O.R.: 10.7; I.C.95%: 1.13–102.1;  $p = 0.04$ ), and current drug use (O.R.: 57.5; I.C.95%: 3.51–939.6;  $p < 0.01$ ) were associated with non-suppression of RNA HIV-1. Non-structured treatment interruptions of antiretroviral therapy were reported in 28/84 (33.3%) of the patients, and were fewer in those with suppressed RNA HIV-1 20/76 (26.35%) compared to non-suppressed 8/8 (100%) ( $p < 0.01$ ). The 90–90–90 UNAIDS targets were: 84/84 (100%) for HIV testing, 74/84 (90%) for patients on antiretroviral therapy, and 76/84 (90.5%) for viral suppression.

## Discussion

### Main findings of the study

The results achieved in this study, through integrated and multidisciplinary care in an outpatient substance-use treatment facility, reached the 90–90–90 target set by UNAIDS for people living with HIV. In addition, patients showed a high CD4 lymphocyte count and maintained RNA VIH-1 suppression for a considerable time.

### What is already known about this topic

Although major improvements in HIV testing and antiretroviral therapy have been achieved, overall care cascade outcomes for PWID are suboptimal (Risher et al. 2015; Granich et al. 2017; Hakim et al. 2018; Marsh et al. 2019). This is particularly true for rates of viral suppression, which range from 20% in low- and middle-income countries to 50% in developed ones (Bradley et al. 2014, Lourenço et al. 2014, Nosyk et al. 2014, Lesko et al. 2017, Mazhnaya et al. 2018, Prabhu et al. 2020).

One of the major aspects when addressing HIV clinical care among PWID is providing SUD treatment. This is due to the fact that SUD and HIV infection are overlapping

epidemics that interact negatively with each other. SUD treatment leads to decreased drug use and improved quality of life and social functioning (Connery 2015, Sarvet and Hasin 2016), all of which facilitate engagement with HIV care and enhance antiretroviral therapy success (Spire et al. 2007; Roux et al. 2008; Low et al. 2016; Nosyk et al. 2015). Retention in SUD treatment is, however, a critical factor for favorable outcomes: longer retention times are associated with lower relapse and increased levels of social rehabilitation among PWID, facilitating HIV care. Conversely, relapsing periods in substance use are linked to low adherence and interruption of antiretroviral therapy (Timko et al. 2016).

In this regard, sustained retention in the program and low current drug use could justify the successful results of the study. Even though injection patterns in HIV are dynamic, and some patients may relapse despite having been previously abstinent, in our study only about one fifth of patients were current substance users, a result lower than the 40–60% described 1 year after an episode of community/hospital-based substance/ alcohol treatment (Witkiewitz and Marlatt 2004, Timko et al. 2016).

Another interesting finding of the study was that the median age of people living with HIV who inject drugs was over 40 years. This demographic change has been observed in North American and European populations, particularly in those Western European countries that experienced the first heroin epidemics in the 1980s and 1990s (Rajaratnam et al. 2009; EMCDD 2017). The aging of PWID cohorts is a consequence of the declining number of PWID entering treatment, while the average age of those retained in treatment is increasing (Rajaratnam et al. 2009, EMCDD 2017). Nevertheless, aging plus the effects of long-term heavy drug use and HIV infection contribute to a range of issues, including deteriorating physical and mental health, highlighting the need for integrated clinical care for PWID (EMCDD 2017).

Antiretroviral therapy was found to be less successful in women. Overall, they have significantly lower antiretroviral adherence rates than men irrespective of drug-use history (Lourenço et al. 2014; Metsch et al. 2015; Gormley et al. 2019). Moreover, women who use substances continue to face challenges that increase their vulnerability to HIV and other comorbidities due to high rates of gender-based violence, human rights violations, incarceration, and institutional and societal stigmatization (McHugh et al. 2018). Gender differences thus underscore a critical need for special attention for women by creating policies and implementing additional measures to improve clinical care and HIV success.

### Limitations of the study

The limitations of the study include the lack of a drug-use treatment facility control in which patients were referred to infectious units for HIV care, and the cross-sectional design.

As the results demonstrate, one fourth of the patients with suppressed RNA had experienced a previous non-structured interruption of antiretroviral therapy, a finding that highlights the importance of analyzing changes over time, through a longitudinal population-based continuum incorporating the proportion of person-time categories and loss to follow-up and mortality, in order to analyze the 90–90–90 target.

In addition, estimation of the first 90 goal was hindered by the lack of consistency in the methods used to determine HIV prevalence, and the proportion of individuals diagnosed with it. Reliable reporting on the number of subjects with an HIV diagnosis needs population-based HIV surveillance (MacCarthy et al. 2015; Kay et al. 2016). It is, however, often determined by the quantity of tests performed and the positive results obtained. The denominator of the present study represented subjects who voluntarily accessed the center. They were probably concerned for their own medical health, and thus more motivated to start clinical care for SUD treatment, which could have led to an intrinsic selection bias.

Nevertheless, the study showed a high uptake of regular testing for those included in the integrated program. Annual HIV testing was carried out for those who initially tested negative; thus, all new infections were diagnosed. Furthermore, the low prevalence of HIV infection reported in this study concurs with local data. It reflects the steady decrease, associated with the development of harm reduction programs in Spain, in the number of new HIV cases in SUD individuals (Folch et al. 2018).

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### Compliance with ethical standards

Ethical approval was obtained from the local ethics committee of the hospital (CEIC 2019/8779). All information collected from this study was kept strictly confidential. All study procedures were in accordance with the ethics committee standards.

**Conflict of interest** None of the authors declare any conflict of interest or has any financial disclosure.

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