

HIV treatment, antiretroviral adherence and AIDS mortality in people who inject drugs: a scoping review

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Background: People who inject drugs (PWID) are a key population for the prevention and care of HIV infection. **Methods:** This scoping review covers recent (post-2010) systematic reviews on engagement of PWID in sequential stages of HIV care from uptake, to achieving viral suppression, and to avoiding AIDS-related mortality. **Results:** We found that data on engagement of PWID into antiretroviral therapy (ART) were particularly scarce, but generally indicated very low engagement in ART. Studies of adherence and achieving viral suppression showed varying results, with PWID sometimes doing as well as other patient groups. The severity of social, medical and psychiatric disability in this population poses significant treatment challenges and leads to a marked gap in AIDS mortality between PWID and other population groups. **Conclusions:** Given the multi-level barriers, it will be difficult to reach current targets (UNAIDS fast-track targets of 95–95–95) for ART for PWID in many locations. We suggest giving priority to reducing the likelihood that HIV seropositive PWID will transmit HIV to others and reducing morbidity and mortality from HIV infection and from other comorbidities.

Introduction

Recent medical advances have raised the prospect of eliminating human immunodeficiency virus (HIV) transmission. This hope is based on encouraging research findings suggesting that timely identification of HIV-infected people, and the provision of effective treatment, contribute to significantly improved survival,¹ and the potential elimination of the risk of sexual HIV transmission.²

World production and consumption of illicit drugs have increased significantly in recent decades, and the increase in their global use is greater than natural population growth.³ Injection drug use occurs in most countries, and infection with HIV and hepatitis C virus (HCV) is prevalent in many populations of people who inject drugs (PWID). Globally, about 20% of PWID are living with HIV infection (ranging from 1% in Australasia to 36% in Latin America).⁴ In selected sites and countries, the HIV prevalence among PWID are approaching or exceeding 50% (Estonia, Argentina, Brazil, Mauritius, Mozambique and Libya).⁵ Over the past decade, new HIV outbreaks have been reported among PWID in many countries (Canada, Greece, Ireland, Israel, Luxembourg, Romania, Scotland and USA).⁶

A comprehensive package of interventions for the prevention, treatment and care of HIV among PWID consist of nine interventions proven effective in reducing HIV transmission among this population.⁷ With four of these—needle/syringe service programmes (NSP), medications for opioid use disorder (MOUD), HIV testing and counselling and antiretroviral therapy (ART)—being emphasized as the most effective in reducing the spread of HIV. At the population level, treatment as prevention strategy is based on the evidence, that ART-induced, sustained HIV undetectability eliminates the possibility of (sexual) HIV transmission.⁴ Equally important is the effect of ART at an individual level—ART being the crucial intervention in terms of improving longevity,⁸ preventing opportunistic infections⁹ and cancers in people living with HIV (PLWH).¹⁰

The HIV care cascade, a mapping tool of critical stages along the continuum of HIV care, has evolved into international AIDS policy

tool that frames both policy and research.¹¹ This review focuses on published studies on engagement in ART, achieving viral suppression, and reducing rates of preventable AIDS-related mortality among PWID, summarizing and discussing the current knowledge, as well as current gaps and future directions for research. We use an extended framework of continuum of care, beginning with ART linkage and ending with AIDS mortality.

Methods

This is a scoping review on engagement of PWID in sequential stages of HIV care from uptake, to achieving viral suppression, and to avoid AIDS-related mortality. As with scoping reviews, our aim was to identify areas of consistent findings, gaps in knowledge and needed next steps for research, practice and policymaking.

Search strategy and selection criteria

To give an overview of the available evidence on HIV treatment and adherence among PWID, we restricted our research to systematic reviews, and to gather evidence from highly effective ART-era reviews published after 2010 (the original studies in those systematic reviews may have been conducted at any time point including pre-2010). Published literature was searched using PUBMED, the Cochrane Database of Systematic Reviews and the Synthesized HIV/AIDS Research Evidence database up to 24 March 2021 (see [Supplementary figure S1](#)). We used keywords relating to the four principal topics that included HIV, ART, ART adherence and injection drug use (see the full electronic search strategy in PubMed in [Supplementary page S2](#)). The results were restricted to English language and human studies.

Eligibility criteria for the articles retrieved included: systematic and scoping reviews, including studies on, or being restricted to, PWID; evaluation of ART uptake, ART adherence or HIV viral load; and AIDS mortality. Studies were excluded if they focussed on HIV testing; on prisoners/jail population; barriers to engagement

or adherence; or were assessing the effects of interventions to enhance linkage or adherence. We believe that each of these topics is worth a separate review.

For study selection, two reviewers independently screened the titles and abstracts of each article to exclude records that clearly did not meet the inclusion criteria. A similar process was followed in reviewing the full text of each article to determine eligibility.

Consistent with scoping review guidelines, we did not complete a formal risk of bias assessment.¹² Critical appraisal of evidence sources was conducted, and limitations of the included studies discussed by the study team.

Our data abstraction form included the following: regions/countries that the review was covering; reviews source data collection period; target population(s); number of studies or proportion of studies on PWID; and ART uptake or ART adherence or HIV viral load or AIDS mortality findings.

Table 1 summaries key characteristics of included systematic reviews. We included systematic reviews and scoping reviews, and restricted our analysis to qualitative synthesis. Our narrative synthesis explores the relationship and findings both within and between the included reviews.

Extended framework of continuum of care

Until now, the continuum of care construct has been used to describe the benchmark stages along the HIV care pathway from testing and diagnosis to viral suppression.¹³ Very few studies have taken a step further to incorporate mortality as an endpoint along the HIV care pathway.¹⁴ While the level of plasma HIV RNA (viral load) is clearly a reasonable surrogate endpoint,¹⁵ the ultimate goal of care is to avoid premature deaths. In this review, we extend the cascade beyond linkage and adherence to ART to include AIDS mortality. We use AIDS mortality (and not all-cause mortality) as being more sensitive and specific to HIV care.¹⁶

Results

Linkage to care

A recent systematic review focusing on high-income countries in the era of highly active therapy (post-2003), estimated that about three-quarters (77%) of individuals with newly diagnosed HIV infection have timely linkage to HIV care (within 3 months of a positive HIV test) across all studies. None of the original studies included in the review was solely based on data related to PWID. Almost half (21/43) of the included studies included data on PWID.¹⁷ Injecting drug use (IDU) was significantly associated with delayed linkage, with a risk of up to two times greater compared to non-PWID. Furthermore, mental illness and having hepatitis B or C were also associated with delayed entry into HIV care.¹⁷

A systematic review assessing prompt linkage to care, and factors affecting linkage among PLWHA, based on data from 22 studies covering 19 countries from the WHO European Region, estimated that 71% of people with newly diagnosed HIV were linked to care within 3 months.¹⁸ Acquiring HIV through IDU was one of the factors associated with delayed, or lack of, linkage to care included in the multiple studies.

Two global reviews assessed coverage of interventions to prevent and manage HIV among PWID (using both data collected from programmes serving PWID and from surveys of PWID). The first was by Mathers et al. (2010),¹⁹ covering the period 2004–10, and the second by Larney et al. (2017),⁵ for the period 2010–17. For the period 2004–10, global coverage with ART among PWID was estimated at 4%.¹⁹ The estimated coverage varied from 89% in Western Europe, 22% in Australasia, 2–4% in East/Southeast Asia, to $\leq 1\%$ in Eastern Europe, South Asia and Sub-Saharan Africa.¹⁹ Mathers et al. point out that these estimates are intended to serve as a guide for comparable measures of coverage across regions. Both reviews

concluded that very few data (in comparison to data on MOUD and NSP) were available to estimate ART uptake coverage among HIV-positive PWID. Larney et al.⁵ did not provide a global estimate for ART coverage among PWID, and highlighted that data on ART uptake among PWID were not available for most (162/179) countries. They discuss that while no formal policy restrictions preventing ART access to PWID were identified, several of the reviewed publications reported that PWID have poor access to ART due to discrimination and fear of criminal justice sanctions. In those countries with survey data on ART access, it ranged from 5% of HIV-positive PWID receiving ART in Malaysia up to 67% in USA. For the countries with both programme (i.e. national estimates from programmes serving PWID) and survey data (i.e. samples of PWID), coverage based on programme data was markedly lower than that based on survey data (12% vs. 25% in Ukraine and 12% vs. 67% in USA). Importantly, where data were available, coverage was typically low in comparison with suggested targets.⁵

ART adherence

A systematic review of compiled data on ART adherence among people who use drugs (PWUD) from studies published through 2008 estimated an overall adherence rate of 60%.²⁰ The authors concluded that adherence observed among PWUD is similar to levels identified by studies conducted among PLWHA who do not use drugs. For example, a pooled analysis of North American studies [from a similar period, and excluding data from men who have sex with men (MSM), the homeless and PWUD] indicated an estimate of 55%.²¹

In the original studies (from 2006 to 2012) included in a recent systematic review focusing on adherence intervention needs of PWID from North America, mean ART adherence among PWID not on MOUD was 70% (range 28–85%).²² In a systematic review of studies conducted in Eastern Europe and East Asia, adherence levels ranged from 33% to 97% (mean of 72%).²³

In their scoping review synthesizing data from 21 countries from Europe, America, Asia and Africa, Glick et al. (2020),²⁴ found adherence among female PWID to be between 27% and 95%. Substance use, co-morbid psychiatric disorders and side effects emerged as the primary ART uptake and adherence barriers in this population.

Measuring treatment adherence is a complex subject (a dynamic human behaviour, and a diversity of imperfect available measures). Viral load is one of the most reliable measures of adherence (or effectiveness) of ART. (Though there may be a substantial time lag between poor adherence and failure to maintain viral suppression.) In a systematic review by Werb et al.,²⁵ which compiled data from studies of 10 413 participants (from high-income countries), including 23% who were PWID, the rates of virologic failure and loss to follow-up were similar for PWID and other HIV-positive population subgroups.

Many physicians withhold ART therapy from PWID living with HIV because of fears of non-adherence and consequent development of antiretroviral resistance.²⁶ The reviews looking at the development of such resistance,²⁵ or the prevalence of pre-treatment HIV drug resistance, indicated that this was no higher among PWID than among PLWHA in general populations.^{27,28} In the global systematic review, the pooled prevalence estimate of pre-treatment HIV drug resistance was high among MSM (13%), sex workers (17%) and people in prison (18%), and considerably lower among PWID (7%).²⁷ In light of the evidence, withholding ART from PWID cannot be justified, and all HIV-positive PWID should be offered ART, with adherence support as needed.

In a systematic review, Bazzi et al. (2019)²² focussed literature on adherence to (ART) medications by PWID from North America. Their synthesis highlighted three aspects relevant for ART adherence among PWID. First, predisposing factors (patient-level barriers to adherence) included younger age, female sex and structural vulnerability (e.g. incarceration and homelessness). Enabling resources (i.e. facilitators) that could be leveraged or promoted by interventions

Table 1 Summary of the post-2010 systematic reviews on engagement of PWID in sequential stages of HIV care from uptake to AIDS mortality

HIV care continuum stage	Design	Author (reference)	Source data collection period	Target population	Number of studies or % of PWID	Countries covered	Main results. Definitions of outcomes. ^a Comments
ART uptake (timely)	Meta-analysis	Perelman (2018) ¹⁷	2003–16	PLWHA	21/43 studies included PWID	Western Europe (France, Italy, Poland, Spain, UK); North America (USA, Canada)	Age (young people), PWID, people with low socioeconomic status, or at a less advanced stage of disease, with mental illness, and having hepatitis B or C experienced lower proportions of timely linkage. Definition: linkage was defined (i) linkage to care, defined as linkage on the basis of access to HIV consultations; and (ii) linkage to care as a quantitative measure of linkage on the basis of results from laboratory analyses (CD4 and viral load)
	Meta-analysis	Croxford (2018) ¹⁸	2006–17	PLWHA	24	WHO European region Western Europe (Belgium, Denmark, France, Greece, Ireland, Italy, the Netherlands, Spain, UK); Eastern Europe (Armenia, Estonia, Georgia, Latvia, Lithuania, Moldova, Russia and Ukraine); Central Europe (Poland, Turkey)	Delayed/not linking to care was associated with acquiring HIV through heterosexual contact or injecting drug use, being of younger age at diagnosis, having lower levels of education, being or feeling well at diagnosis and being diagnosed outside an STI clinic. Definition of delayed linkage: 'Either delayed entry into HIV care at one month or three months or never having accessed care'
ART initiation at any point (uptake prevalence)	Global review	Mathers (2010) ¹⁹	2004–10	PWID	Programme data (mainly)	Global review	4% of PWID on ART (range ≤1–89%); very few data on ART (in comparison to data on MOUD, NSP) for HIV+ PWID Definition: number of PWID clients on ART in specific time period
	Global review	Larney (2017) ⁵	2010–17	PWID	Programme data (mainly)	Global review	No estimate on ART coverage among PWID; data on ART access among PWID were not available for most (162/179) countries Definition: number of PWID receiving ART per 100 HIV-positive PWID (low: <25; moderate: 25 to <74; high: ≥75)
ART adherence	Meta-analysis	Malta (2010) ²⁰	1996–2010	People who use drugs (PWUD)	38 (56.7% PWID out of 14 960 PWUD)	Western Europe (Italy, Spain, France, Scotland, Ireland); North America (USA, Canada)	60% (52–68%) pooled adherence prevalence Definition: thresholds for adherence were considered as greater than or equal to the cut off levels used on each study (range 75–100%), and the raw proportion of DUs recorded as optimally adherent by each study was used to pool the overall proportion
	Meta-analysis	Feelemyer (2015) ²³	2000–12	PWID (current and history of)	15 studies	Eastern Europe (Estonia, Russia); Asia (China, India, Indonesia, Vietnam)	71.9% (58.8–85.1%) mean weighted adherence Definition: adherence was calculated for each study (in all: 90% adherence to medications during the ART adherence assessment period), with study categorization done based on measurement of ART adherence by the primary authors
	Systematic review	Bazzi (2019) ²²	2006–16	PWID	20 studies	USA, Canada	Patient-level barriers to adherence: younger age, female sex and structural vulnerability (e.g. incarceration, homelessness);

(continued)

Table 1 Continued

HIV care continuum stage	Design	Author (reference)	Source data collection period	Target population	Number of studies or % of PWID	Countries covered	Main results. Definitions of outcomes. ^a Comments
	Scoping review	Glick (2020) ²⁴	1996–2018	HIV-positive female PWUD	86 studies ^b	Western Europe (Spain, France, Belgium, Denmark, Germany, Italy, the Netherlands, Sweden, UK); Central/eastern Europe (Poland, Russia, Ukraine); North America (USA, Canada); Asia (China, India); South America (Puerto Rico, Argentina, Brazil, Peru); Africa (French Guinea)	Enabling resources (i.e. facilitators): self-efficacy, substance use treatment, high-quality patient–provider relationships; Competing needs: poor physical health, mental health comorbidities, engagement in transactional sex Substance use, co-morbid psychiatric disorders and side effects emerged as the primary ART uptake and adherence barriers Definition: thresholds for adherence were considered as greater than or equal to the cut off levels used on each study (range 75–100%)
Virological failure	Meta-analysis	Werb (2010) ²⁵	2010	PLWHA	12 studies (23% PWID out of 10 413 PLWHA)	Western Europe (Spain, Switzerland, UK, the Netherlands, Greece); Central Europe (Poland); North America (USA, Canada); Asia (Taiwan)	Rates of virological failure and loss to follow-up were similar for PWID and non-PWID subgroups Definition not provided
Development of antiretroviral resistance	Meta-analysis	Werb (2010) ²⁵	2010	PLWHA	12 studies (23% PWID out of 10 413 PLWHA)	Western Europe (Spain, Switzerland, UK, the Netherlands, Greece); Central Europe (Poland); North America (USA, Canada); Asia (Taiwan)	Resistance to ART among PWID compared to non-PWID—OR 1.04 (95% CI 0.74–1.45) Definition not provided
Transmitted HIV drug resistance (TDR)	Meta-analysis	Macdonald (2020) ²⁷	1997–2019	PLWHA	218 studies (118 on PWID)	Global review	Prevalence of pre-treatment drug resistance (PDR) 7.0% (95% CI 5.0–10.0) PDR among PWID compared to the general population—OR 1.11 (95% CI 0.86–1.44) Definition: pre-treatment drug resistance prevalence of $\geq 10\%$ in any group and for any drug class was defined as 'high'. Drug resistance was reported according to the definition used by study authors

(continued)

Table 1 Continued

HIV care continuum stage	Design	Author (reference)	Source data collection period	Target population	Number of studies or % of PWID	Countries covered	Main results. Definitions of outcomes. ^a Comments
	Meta-analysis	Pham (2014) ²⁸	1999–2013	PLWHA	212 studies (7.7% PWID out of 84 595 PLWHA)	Global review	<4.8% in low, and <8.3% in high-income countries, prevalence of transmitted HIV drug resistance (TDR); TDR prevalence was lower among PWID than that in heterosexuals and in MSM Definitions: infection with TDR had to be confirmed by genotypic assays in an antiretroviral-naïve adult cohort and the sample size of successful genotyping must be >30 for the overall study and 10 for subpopulations classified by HIV transmission modes
AIDS mortality	Meta-analysis	Mathers (2013) ³⁰	1980–2012	PWID	67 studies (20 studies by PWID HIV status)	Western Europe (Italy, Austria, Norway, UK, Spain, Sweden, Germany, Denmark, the Netherlands); Central/eastern Europe (Bulgaria, Croatia, Latvia, Romania, Czech, Poland); North America (USA, Canada) South America (Brazil) Asia (Bangladesh, China, India) Iran Australia	2.55 per 100 PY pooled estimate of AIDS-related mortality; mortality from causes other than AIDS, was 1.63 (1.28–2.08) times higher among HIV+ than among HIV–PWID

a: Definitions of outcomes as provided by the reviews authors.

b: 21/86 studies targeting PWID; 18/86 studies did not specify the types of substance included in their study, giving general descriptors, such as ‘illegal drug use’, ‘injection drug use’ or ‘non-injection drug use’.

included self-efficacy, substance use treatment and high-quality patient–provider relationships. Finally, competing needs that require specific intervention strategies or adaptations included markers of poor physical health, mental health comorbidities (e.g. depression) and engaging in transactional sex.²²

AIDS mortality among PWID

By 2020, AIDS-related deaths had declined by 60% since the peak in 2004.²⁹ A systematic review published in 2013 on mortality among PWID found that all-cause mortality was three times higher among HIV-positive than HIV-negative subjects (all-cause mortality ratio: 3.15), and that much of this elevated mortality could be attributed to AIDS-related complications. The pooled estimate of AIDS-related mortality was 2.55 per 100 person-years.³⁰ Whilst a more recent review could not be identified, data from original studies suggest that the contribution of AIDS to mortality among PWID is decreasing and that drug use-related causes (e.g. overdose) are increasing.³¹ However, there remains a marked gap in AIDS mortality between PWID and other population groups.

Discussion

We are at a pivotal time in the global HIV response since many people believe that the HIV pandemic is over thanks to advances in HIV treatment. Yet, the HIV pandemic continues to grow as defined by the number of PLWH.³²

Linkage with ART care, and adherence to ART, are key predictors of survival for PLWH. Among PWID living with HIV, the leading cause of death remains AIDS-related causes,^{32–34} and this significantly exceeds the rate of AIDS deaths among PLWHA who do not inject drugs. These findings from systematic reviews, are in agreement with the data from a large cohort study from UK following HIV-infected subjects (88 994 individuals, 448 839 person-years of follow-up), based on matching surveillance to mortality data from a vital statistics register (though not limited to follow-up subjects from clinical or harm reduction settings) found that AIDS mortality among PWID (116 per 10 000 person-years) was substantially higher than mortality among MSM (43 per 10 000 person-years) or people infected heterosexually (men 86 and women 46 per 10 000 person-years).³³ Consequently, despite advances in the diagnosis and management of HIV infection, many PWID living with HIV still do not have optimal care outcomes. This is in contrast to the great success in preventing HIV transmission among PWID. Combined prevention, when implemented on a public health scale, including NSP, MOUD programmes and ART at a level of treatment as prevention, have reduced HIV incidence due to the sharing of drug injection equipment to ‘ending the HIV epidemic’ levels— $<1/100$ person-years at risk.³⁵ This has occurred in both high and middle-income settings.^{36,37} We see this as an interesting paradox in the ‘combined prevention and care for HIV among PWID’ that warrants careful consideration.

Re-engaging and transitions in HIV care for PWID

The standard concept for cascade of care moves from left to right from HIV testing, to linkage to ART, to retention in ART, to viral suppression. However, HIV-positive PWID not only progress from left to right in the cascade, but often move from right to left, e.g. leave ART, or lose viral suppression while remaining in ART. A study from Baltimore (USA) depicts frequent transitions, between a state of viral suppression (<400 copies/ml), viral rebound, loss-to-contact and death among PWID living with HIV.³⁸ While participating in the study, subjects had a mean of five transitions each. This type of episodic treatment also characterizes PWID experience in treatment for substance use disorders. Interestingly, a new dynamic (accounting for exiting the cascade for a period of time) and

bidirectional (regressing to an earlier stage) cascade of HIV care has been recently suggested.³⁹

An additional component to the cascade of care for PWID—death from AIDS-related causes

Achieving viral suppression is an inadequate endpoint, even ‘durable’ viral suppression (usually defined as two consecutive 6-month periods at viral suppression) is not particularly meaningful. Rather, maintaining viral suppression and/or length of time spent at viral suppression should be the focus at both individual and population levels. Treatment adherence and viral suppression are both surrogate markers for the real outcomes of interest (i.e. longevity and the prevention of AIDS-related cancers and opportunistic infections). We, therefore propose an extension of the traditional HIV care cascade¹³ to include AIDS mortality as a critical measure to include into future studies, and standard measure of the extent to which a health care system is providing ART to HIV-positive PWID. Further, we acknowledge that for PWID, comorbidities accompanying HIV infection (drug abuse disorder, co-infections, such as HCV and HBV) substantially contribute to mortality. Deaths from end stage liver disease and overdoses pose valid endpoints for a patient centred HIV care continuum.

Knowledge Gaps in HIV care and treatment specific to PWID populations

It is also important to highlight knowledge gaps identified in the process of undertaking this review. There is a relative paucity of systematic reviews focusing on PWID; especially those assessing important prevention and care targets (ART linkage, ART adherence and ART outcomes) and temporal trends in these states. Further, apart from global reviews,^{5,19,27,28} most studies include data mostly for only high-income countries in North America and Western Europe. Published global reviews rely heavily on programme-level data.^{5,19} The authors of such reviews conclude that for high-risk groups, and specifically for PWID, data for HIV testing, ART and condom distribution programmes are less likely to be systematically and routinely collected and reported than harm reduction data on NSP and MOUD.⁵ In addition, when programme-level data are obtained, they seem to underestimate coverage of HIV testing and ART among PWID.⁵ Systematic reviews across all levels of the ART cascade are needed to monitor PWID access to ART and care outcomes. Eliminating HIV transmission among PWID may depend upon PWID receiving ART, but also on their receiving additional HIV prevention and harm reduction services. Synthesis of the evidence on combined prevention and care (ART+NSP+MOUD+naloxone) for other than ART and MOUD⁴⁰ is missing. Consideration of temporary disruptions, re-linkage and transitions in care experienced by many PWID on ART therapy, should lead to important additional research on factors that generate movement in both directions. Finally, yet importantly, we call for both more research in reducing stigmatization at the various levels and for organizations that provide health services to PWID to take a more active role in reducing stigmatization.

Limitations

We acknowledge that our review of reviews necessarily missed data on this topic from non-review papers in the past several years. Also, the great variation among the studies reviewed here, the variety of methods and measures used, and the variations in the quality of the evidence across the individual data also cautions against generalization. However, it is clear that the severity of social, medical and psychiatric disability in this population poses significant treatment challenges.

Conclusions

There are significant knowledge gaps in terms of proportion of HIV-positive PWID who are engaged in ART and the changes of ART coverage over time. Successfully addressing many of the different barriers is likely to require considerable resources and considerable time.

For immediate priorities, we would suggest utilizing combinations of interventions focussed on the likelihood that HIV-positive PWID will transmit HIV to others, reducing morbidity and mortality among HIV-positive PWID, and a stigma reduction component to each of the interventions, as worldwide stigma is among major barriers to the health and prevention services utilization by PWID.

Supplementary data

Supplementary data are available at *EURPUB* online.

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Disclaimer

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Conflicts of interest: None declared.

Data availability

The data associated with this systematic review can be found in the primary manuscripts and reference citations.

Key points

- Data on engagement of PWID into ART were scarce, but generally indicated very low engagement in ART.
- There is a marked gap in AIDS mortality between PWID and other population groups.
- We propose to include AIDS mortality as a critical measure into future studies, and standard measure of the extent to which a health care system is providing ART to HIV-positive PWID.

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