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BEHAVIORAL-BIO-MEDICAL INTERFACE (RJ DICLEMENTE AND JL BROWN, SECTION EDITORS)

Interventions Designed to Improve HIV Continuum of Care Outcomes for Persons with HIV in Contact with the Carceral System in the USA

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Abstract

Purpose of Review To describe existing evidence and identify future directions for intervention research related to improving HIV care outcomes for persons with HIV involved in the carceral system in the USA, a population with high unmet HIV care needs.

Recent Findings Few recent intervention studies focus on improving HIV care outcomes for this population. Successful strategies to improve care outcomes include patient navigation, substance use treatment, and incentivizing HIV care outcomes. Technology-supported interventions are underutilized in this population. Notable gaps in the existing literature include intervention research addressing HIV care needs for cisgender and transgender women and those under carceral supervision in the community.

Summary Future research should address existing gaps in the literature and respond to emergent needs including understanding how the changing HIV care delivery environment resulting from the COVID-19 pandemic and the approval of new injectable ART formulation shape HIV care outcomes in this population.

Keywords HIV/AIDS · Carceral system · Prison · Jail · HIV treatment

Introduction

In the USA, the carceral system is far reaching. Each year, more than 2.3 million people are detained in prisons and jails [1]. People cycle in and out of jail settings 10.6 million times annually, reflecting at least 4.9 million unique individuals who are arrested and booked [2]. In addition, a staggering 4.4 million (or 1 in 59) adults are under the surveillance of the carceral system and living in the community (i.e., "community supervised" or people on probation or parole) [3]. The syndemic risks for incarceration and HIV acquisition are strongly correlated as a result of both structural (e.g., healthcare access, community deprivation, racism) and individual-level (e.g., substance use, high-risk behavior) risk factors. Consequently, rates of HIV among adults involved in the carceral system range from three to 15 times the rate in the community [4]: a well-referenced article using data from 2006 estimated that one in seven persons with HIV (PWH) came into contact with detention settings (i.e., jails and prisons) each year [5].

Parallel trends in HIV infections and incarceration highlight the disproportionate impact of structural

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racism on these dual epidemics. In 2018, Black/African Americans and Latinos constituted the majority of prevalent HIV disease—41% (482,900/1,173,200) and 23% (274,100/1,173,200), respectively—with a similar trend for incident HIV infections—42% (15,300/36,400) among Black/African American and 28% (10,300/36,400) among Latinos [6]. Similarly, Black and Latinx Americans are disproportionately represented among people involved with carceral settings: Black men are 6 times and Latinx men are 2.5 times as likely as their White male counterparts to be incarcerated [7]. Individuals involved in the carceral system often report behaviors that increase their risk of HIV acquisition including high rates of lifetime and recent substance use [8]; between 81 and 84% report lifetime substance use and between 63 and 83% test positive for substance use at the time of their arrest [9]. People entering carceral settings experience elevated rates of sexually transmitted infections [10, 11], and other comorbidities (e.g., HCV), and engage in high-risk sexual behaviors including condomless sexual activity, multiple and concurrent sexual partnerships, transactional sex, sexual activity with high-risk sexual partners, and injection drug use (IDU) [12–15]. Furthermore, demographic and sociocultural factors shape risk including stigma and discrimination due to membership in marginalized and historically underserved communities (e.g., transactional sex workers) [16], and racism, poverty, and inadequate access to medical and health services [17–19].

To achieve goals from national initiatives like the *Ending the HIV Epidemic in the US (EtHE)* [20], and the *National HIV/AIDS Strategy (2022–2025)* [21], improving access to HIV care services for individuals involved in the carceral system is a high priority. For many PWH, the carceral system may be a primary point of access to treatment services, given poor access to healthcare services in the community prior to their systems-contact. The time immediately following periods of detention represents a high-risk period for discontinuation of ART and failure to link with community-based HIV providers. Competing social and health-related priorities including securing housing and employment, reinstating health insurance, and managing requirements resulting from their carceral contact (e.g., meeting with a probation or parole officer, attending court appointments, community service) are challenges to seeking out and engaging in HIV-related medical care [22–24]. Therefore, the time following release from a carceral setting, often referred to as "community-reentry," needs to be prioritized for intervention to sustain HIV treatment services. Improving HIV care–related outcomes for individuals involved in the carceral system also has the potential to positively impact community health by reducing transmission in high-risk communities [25, 26].

HIV Care Continuum

The HIV care continuum [27–29] is a public health model representing the progression of HIV care from diagnosis to viral suppression (VS). The continuum begins with an HIV diagnosis. The second step, linkage to care (LTC), is defined as a period of 30 days between diagnosis and treatment initiation [30]. Receipt of care is measured as the percentage of PWH who have had at least one CD4 or viral load (VL) test. Retention in care (RIC) is measured as the percentage of PWH who have had two or more CD4 or VL tests performed ≤ 3 months apart [30]. The final step is achieving and maintaining VS, measured as a VL of < 200 copies/mL [30]. Here, we review recent advances to improve HIV-related outcomes for PWH involved in the carceral system in the USA.

To complete this review, we worked with a health sciences librarian with systematic review experience who performed a search in Medline (Ovid) in November 2021. Concepts that were included in the search were HIV/AIDS, criminal justice/corrections, and continuum of care. A combination of Medical Subject Heading (MeSH) terms and title, abstract, and keywords was used to develop the search. Studies were limited by language and date to those published in English from 2015 to 2021. Additional limits included study methodologies (trials/interventions, evaluation studies, and comparative studies) and geographies to exclude studies that occurred outside of the USA and Canada. For conceptual clarity and to review the most recent (< 5 years) literature, the review was restricted to the USA from 2017 to 2021. The initial list of articles was evaluated by authors (PK, EFD) to ensure relevancy related to study population (e.g., PWH, individuals involved in the carceral system), methodologies, and content (HIV care continuum).

The bulk of the recent literature examining HIV care outcomes among PWH involved in the carceral system centers on individuals reentering the community from detention settings. Within this literature, most research has explored the efficacy of interventions targeting LTC. Given the variation in type of carceral settings, we present a discussion of strategies to address the HIV care continuum outcomes first for PWH leaving detention settings and then evaluate those for PWH under community-based carceral supervision.

HIV Care Outcomes for Adults Released from Detention Settings

HIV Testing

Access to routine HIV screening is critical for timely linkage to care and treatment for PWH. It also serves as an

important intervention point to reduce community transmission [31]. Roughly 22% of PWH are unaware of their HIV diagnosis upon entry to prison or jail [32]. Given the importance of HIV testing in prevention and treatment efforts, in 2006, the Centers for Disease Control and Prevention (CDC) recommended that carceral system facilities perform routine opt-out testing [33]. Despite this recommendation and evidence suggesting high acceptability of opt-out HIV testing [34], the most recent evidence available (published in 2014) suggests that opt-out testing was not routinely implemented in carceral settings in the USA (19% of surveyed prison systems and 35% of surveyed jails) [35]. These findings highlight the missed opportunities for HIV diagnosis and treatment linkage for individuals identified as those living with HIV. With few exceptions, there is a paucity of recent literature exploring HIV testing efforts in detention settings. One notable exception is a study by Hutchinson et al. (2021) that examined the cost effectiveness and public health impact of eliminating routine HIV screening as compared with targeted HIV testing in jails [36]. Results from this study suggest that routine screening identified 74 more new HIV infections over 1 year as compared to targeted HIV testing, resulting in roughly 10 averted HIV transmissions and 45 quality-adjusted life-years saved. Moreover, there were cost-savings associated with routine testing such that the HIV transmissions missed by targeted testing resulted in an additional $3.7 million in additional healthcare-related costs. Results from this study suggest that routine HIV testing in jail settings in high-prevalence locales is a cost-effective and high impact public health approach to averting HIV transmission as compared to targeted testing. This approach could, therefore, be a key component of meeting national HIV prevention goals, like the EtHE. This is particularly important, as Hutchinson et al. (2021) note, because many of the largest jails in the country are located in the EtHE target areas [37]. Further efforts to understand the impact of HIV testing approaches in detention settings are needed to understand if these patterns persist in other locales and types of settings (e.g., prisons).

Case Management and Patient and Peer Navigation

Case management is a collaborative process aimed at improving the experience of care involving assessing, planning, implementing, coordinating, monitoring, and evaluating the services required to meet a client's health needs [38]. Patient navigation helps guide individuals through complex healthcare systems with the goal of improving linkage and engagement in healthcare services (including screening, diagnosis, and treatment-based services) by promoting self-efficacy and enhancing care access [39]. Peer navigation programs are those led by individuals who share key characteristics, circumstances, or qualities with their clients (e.g., ethnicity, subpopulation membership [e.g., carceral system contact]) [40, 41••]. Most intervention studies aimed at improving HIV care outcomes for individuals leaving detention settings have provided case management or navigation (with [42••, 43] and without [41••] case management) services, led in some studies by a peer [41••, 42••]. These strategies have found success for linkage, receipt and retention in HIV care, and VS post-release [41••, 42••, 44•, 45].

Recent systematic reviews found that interventions demonstrating post-release improvements in HIV care outcomes for PWH leaving detention settings include navigation and case management strategies [44•, 46•]. Components that are effective for care engagement include the provision of functional support (e.g., appointment scheduling, attendance support) and creating an environment where participants feel valued. Case management interventions that did not address contextual factors did not demonstrate benefit above standard of care (e.g., social support) [44•]. Peer-led interventions were among those that have been the most successful [41••, 42••]. Peer navigators build trust and reduce stigma and discrimination-related barriers to healthcare engagement, areas of particular importance for individuals involved in the carceral system who have intersecting stigmatized identities and have high levels of medical mistrust [47]. It should be noted, however, that research has yet to examine the mechanisms through which these relationships support care engagement and should be explored in future studies [44•]. The LINK LA intervention exemplifies the success of a peer-led navigation intervention [41••]. This 12-session intervention was initiated pre-release and provided support to set goals and overcome barriers to HIV care engagement and medication adherence. Post-release, navigators accompanied participants to HIV care visits and facilitated patient-provider communication. At 12-month follow-up, a higher proportion of intervention participants achieved VS as compared to the standard of care control (95% *CI*, 1.34–25.9%; $p = 0.03$).

Most of these studies included short follow-up periods (i.e., ≤ 12 months post-release). This is relevant given that RIC following detention decreases over time and case management and navigation interventions are relatively short in length (3 to 6 months) and often target the pre-release and immediate post-release period [48, 49••]. Studies with longer follow-up are needed to better understand intervention effects on RIC over longer periods of time and to identify targets for future interventions—potentially in the form of reengagement of navigation or case management services provided at critical points of care engagement vulnerability.

Substance Use Treatment

Substance use disorders are highly prevalent among PWH and those involved in the carceral system [5, 50, 51]. Opioid use disorder OUD is of particular concern for individuals involved in the carceral system. Among PWH, inadequately treated OUD can interrupt treatment adherence, resulting in loss of VS [52, 53] and can lead to overdose and death [54]. Three medications are available for the treatment of OUD including methadone, buprenorphine, and injectable extended-release naltrexone (XR-NTX). To our knowledge, only one recent study has examined the impact of providing PWH involved in the carceral system treatment for OUD on HIV care outcomes. In a double blind, placebo-controlled trial, Springer et al. (2019) examined whether XR-NTX treatment would improve or maintain VS among PWH with OUD reentering the community from detention settings [55•]. This study resulted in maintained or improved VS among PWH released from detention settings who received XR-NTX as compared to those who received the placebo at 6-month follow-up (30.3% vs 18.5% and 30.3% vs. 27.3, respectively). Evidence also suggests that treatment for other substance use disorders can improve care outcomes for PWH. For example, in a randomized double-blind, placebo-controlled trial, Springer et al. (2018) examined whether XR-NTX would improve or maintain VS (< 200 copies/mL) and maximum VS (< 50 copies/mL) among PWH with an alcohol use disorder who were transitioning to the community from detention [56•]. Participants randomized to XR-NTX (1) exhibited improved VS and maximum VS from baseline to 6 months as compared to the placebo group (e.g., for < 50 copies/mL 31.0 to 56.7%, $p = 0.001$ versus 2.0 to 30.3%, $p = 0.292$, respectively) and (2) were more likely to achieve VS and maximum VS at 6 months than the placebo group (i.e., < 200 copies/mL: 64.2% vs. 42.4%, respectively; $p = 0.041$; < 50 copies/mL: 56.7% vs. 30.3% respectively; $p = 0.015$). Stabilizing substance use is an important component of improving the health and well-being of individuals with substance use disorder [57, 58] and is critical for improving HIV care outcomes for PWH [49••]. Beginning treatment for substance use disorders inside carceral settings and upon release can improve HIV care outcomes for PWH reentering the community. Given the cooccurrence of HIV and substance use disorders among individuals involved in the carceral system, additional research is needed. Future research could explore, for example, the efficacy of packaging the provision of substance use treatment services, including newer long-acting medications, inside carceral settings and during release with other empirically supported intervention strategies (e.g., navigation services), on post-release HIV care outcomes. Additional research is also needed to explore the development of interventions and treatment modalities for substances for which there is no medication treatment available.

Technology-Supported Interventions

Interventions that leverage technology are commonly used for HIV treatment and prevention [59, 60]. Technology-based interventions, including electronic (eHealth) and mobile (mHealth) approaches, incorporate a variety of strategies including text message support (e.g., motivational messages, appointment, or medication reminders) and communication and intervention content delivered via telehealth. The best evidence to date suggests that interventions designed to improve HIV care outcomes for PWH involved in the carceral system should include cell phone provision [46•]. Outside of text messaging, however, few studies leverage technology as an intervention tool to improve HIV care outcomes for this population [48, 61–63]. We highlight two of these studies. Brantley et al. (2018) examined the impact of including a case management video conference (e.g., discharge planning, needs assessment) to standard of care reentry services to improve community LTC [61]. After reentry, clients received assistance with LTC and other services. Intervention participants experienced high rates of linkage (74.3%); however, no statistically significant between-group differences were observed (AOR = 1.2; 95% *CI* 0.6–2.3, $p > 0.05$). The second pilot study examined the effectiveness of the CARE + Corrections intervention to support ART adherence and RIC for recently incarcerated PWH [62]. This intervention included a computerized counseling session assessing HIV risk and care behaviors, provided a risk reduction plan for LTC or ART adherence, and incorporated supportive text messages (e.g., behavioral messaging, medication, and appointment reminders). The intervention did not significantly impact VS. At 6 months, there was an increase in care engagement, but results did not differ by treatment group (*AOR* = 1.18; 95% *CI*: 0.25, 5.53).

Null study findings should be understood in the context of several limitations: relatively small sample sizes limiting the ability to detect intervention effects [61, 64], and not having a true comparison group [61]. They do, however, signal that technology-supported interventions are acceptable and feasible to implement with this population. This was evidenced by systems-participation and engagement to provide technology access to support intervention implementation pre-release, and high-levels of uptake and engagement in technology-delivered content. Notably, intervention content mostly centered on HIV care–related behaviors. Future technology-supported interventions could address other aspects of the reentry experience (e.g., structural violence, housing, food insecurity), incorporate additional intervention targets (e.g., stakeholders within carceral and HIV care settings), and explore additional modalities (e.g., mHealth). Given

the on-going COVID-19 pandemic and its impact on our healthcare delivery systems, the need to empirically examine technology-supported linkage and engagement interventions has been rapidly magnified.

Decarceration and Carceral System Reform

Cyclical carceral contact remains a persistent barrier to community-based HIV care access and engagement [48, 65, 66]. Reincarceration occurs due to a confluence of factors including racism and discrimination in policing, the criminalization of poverty, mental health, substance use and related issues (e.g., homelessness), and strict conditions of community supervision [2, 67–69]. One notable recent contribution has shed light on the nuanced impact that reincarceration has on HIV care engagement. A retrospective cohort study linked prison-based pharmacy and custody databases with community HIV surveillance monitoring and case management databases to examine the impact of reincarceration on RIC outcomes by examining conditions of carceral contact (i.e., length of detention, conditions of release) [49••]. Conditions of release were characterized as unsupervised, conditional release (e.g., parole, transitional housing), or release on bond. Predictors of successful RIC and VS included being treated for HIV while detained, receiving reentry case management services, and early post-release LTC ($\leq$ 14 days). Over the 3-year study period, individuals who experienced reincarceration were more likely to meet RIC criteria (48% versus 34%; $p < 0.001$) but less likely to achieve VS in the community (72% versus 81%; $p = 0.048$) than individuals who were not reincarcerated. Having a short index incarceration with a supervised release was associated with increased RIC and VS over time relative to short and longer incarcerations with unconditional release.

Although there might be a short-term benefit of forced healthcare engagement (during detention) on RIC, these benefits were outweighed by the harm that carceral contact can have for PWH returning to the community, evidenced by the fact that RIC did not result in VS. Findings related to the length of index incarceration suggest that a shorter detention may be less disruptive on an individual's social and healthcare networks, preserving the ability to reconnect to healthcare services post-release. Resources offered during a conditional release may provide PWH with critical support to both mitigate the harm caused by carceral contact (e.g., reintegrating into society, addressing disruptions to health insurance that impact community-based care and prescription access) and to navigate complicated healthcare systems.

Reducing carceral contact via decarceration and other legal reforms (e.g., drug policy) can prevent disruptions to community-based HIV care, thus improving individual health benefits for PWH and community-level health benefits by reducing transmission in high-risk communities [70, 71]. Future research could explore the impact of COVID-19-related decarcertion efforts on HIV care outcomes [72]. The findings from this study also point to the need to combine carceral system reforms with other policy changes designed to improve community-based healthcare environments. For example, reforms aimed at improving health insurance access, access to low-cost and low-barrier health services, and expanding navigation or case management services to identify PWH who are at risk for falling out of care outside of carceral settings—resources that might be unavailable in low-resource community settings.

Monetary Incentives

An emergent area of inquiry has examined utilizing financial incentives to improve HIV outcomes. A secondary analysis of data collected as part of a randomized controlled trial investigated the effects of providing PWH incentives for VS, to examine the impact of this approach among PWH with a history of incarceration [73]. Participants' VLs were monitored frequently, and adults in the incentive group earned $\leq$ $10/day for blood samples with a reduced or undetectable VL. Most participants self-reported a history of incarceration (62%) and there were no significant differences in the effect of incentivizing VS by a participant's incarceration history. Across both intervention groups, however, incentivizing VS increased the percentage of samples with an undetectable VL. Study findings suggest that incentives may be a successful strategy to improve VS outcomes for PHW with a history of incarceration. This study relied on self-reported history of incarceration and did not collect data on detention conditions (e.g., incarceration length, length of time since detention). Future research could explore whether and how detention characteristics (verified via criminal legal system administrative data) may impact how incentives can support VS. Given challenges to long-term maintenance of VS for this population, future research should explore whether and how incentives can support achieving this HIV outcome.

Interventions for Cisgender and Transgender Women

Few recent studies have focused on understanding HIV care outcomes for cisgender or transgender women, and we were unable to identify any recent intervention studies tailored to improve HIV outcomes for these groups [74, 75]. Rates of carceral system involvement among cisgender women have increased significantly over the past four decades (i.e., > 800% increase since 1980) [76]. While information on carceral contact among transgender people is limited, data from a national survey suggests that 1 in 6 transgender people has been incarcerated (among Black transgender adults, 47% experienced detention) [77]. Transgender and

cisgender women, particularly those from racial and ethnic minority groups, are disproportionately represented among PWH [78, 79].

Cisgender women involved in the carceral system experience a confluence of factors shaping their HIV risk and care engagement (e.g., substance use disorders) including those shaped by their gender (e.g., using injection equipment after men during IDU, interpersonal violence) [47]. In an analysis of baseline data from the CARE + Corrections study, women were less likely than both transgender women and cisgender men to achieve VS in the community [65]. One recent study examined HIV care outcomes among transgender women involved in the carceral system as compared to cisgender men and found no significant difference in their use of ART, ART adherence, or VS [80]. There were, however, notable differences in HIV transmission behaviors between the groups; transgender women were more likely than cisgender males to engage in condomless and transactional sex and to have ≥ 1 sexual partner, and the proportion of transgender women who reported using crack/cocaine was more than twice as high as cisgender men.

Despite the increased vulnerability and unique risk profiles experienced by transgender and cisgender women, these two groups have not received sufficient attention to improve HIV outcomes, an area that necessitates increased attention, funding, and research. In addition to incorporating known efficacious intervention components (e.g., navigation, substance use treatment), interventions for these groups may be strengthened by addressing gender-based power imbalances, intersectional stigma (e.g., based on an individual's gender-identity, HIV serostatus, carceral history, race/ethnicity), risk for and exposure to interpersonal violence, and other barriers to healthcare unique to each of these groups [71, 81, 82].

HIV Care Outcomes for Adults Under Carceral Supervision in the Community

Although individuals under community supervision represent the largest segment of adults involved in the carceral system and have demographic and risk profiles that mirror those who experience detention [83], they are less frequently the focus of HIV-related research. To our knowledge, few recent studies explore HIV testing interventions among this population of carceral system-involved adults. One exception is work published by Lichtenstein (2021) that describes the implementation of an on-site voluntary program for HIV and hepatitis C services at a parole office in Alabama [84]. An evaluation of the program suggests that there was high acceptability from system partners (e.g., the probation and parole office) and individuals under community corrections for HIV testing in this setting, contributing to a larger body of evidence suggesting that individuals offered HIV testing on-site at community-based carceral settings are more likely to engage in testing than those that have to travel to off-site HIV-testing locales [85]. Only one recent study explored improving HIV care outcomes among individuals under carceral supervision in the community [86]. Crable et al. (2021) investigated the efficacy of an adaptation of Project Bridge, a case management intervention that is efficacious for increasing rate of HIV treatment engagement, ART receipt, and adherence for individuals leaving detention settings [87], to improve these outcomes for adults on probation and parole. Case management included an individualized treatment plan, and on-going post-release support for 1 year. Notably, study participants were living with HIV for an average of 14 years. There were no statistically significant differences in HIV care outcomes between individuals enrolled in Project Bridge or the standard of care. This study lends further evidence that HIV treatment is an on-going challenge for PWA involved in the carceral system. Similar to other studies [62], participation in the research, regardless of intervention arm, increased HIV care outcomes (i.e., participants were 5.6 times more likely to receive HIV care, 5.8 times more likely to receive ART prescription, and 4 times more likely to report medication adherence at each follow-up). These results suggest participants' on-going contact with research staff (e.g., appointment reminders) may support care engagement. Therefore, less intensive services may be sufficient to initiate HIV care engagement for PWH under community supervision who have been aware of their HIV status for a longer length of time. Another study conducted with a slightly different population (individuals in the community with recent carceral contact [past 5 years]) lends additional support for the implementation of less intensive HIV care–related interventions [88]. Future research should examine whether there are differences in the types of supports necessary (including brief interventions) to engage PWH with current or recent carceral contact in care relative to the length of time they are knowingly living with HIV, and the length of time since they have been released from detention.

Discussion

Despite the importance of interventions tailored to this PWH involved in the carceral system, there is a dearth of recent work in this area. Research to date suggests that to be maximally effective, interventions should incorporate patient navigation (with or without case management services) and treatment for substance use and provide incentives for HIV care outcomes. There are several

opportunities for future intervention research including developing and testing those that leverage technology, and those that are tailored to the type and conditions of carceral contact experienced by PWH. There are also obvious gaps in the existing evidence base that deserve future exploration. Specifically, interventions designed to address the unique HIV care needs of cis- and transgender women, and individuals under community-based carceral supervision, are desperately needed. Finally, decarceration and other reforms to the criminal legal system can positively impact community-based HIV care engagement for PWH involved in the carceral system by reducing disruptions to care and should continue to be advocated for as an important public health intervention.

Revisiting the HIV care continuum may guide the development and testing of innovative interventions for this population. While cascades are a common approach to measuring engagement and outcomes and can assist with developing, testing, and allocating resources for programs and policies, the linearity of the HIV care continuum does not reflect HIV care access or engagement for this population who have frequent disruptions, stops, and starts to their care. A model that may be more appropriate is one that reflects recurrent healthcare access and engagement. Recently, a cyclical iteration of the HIV care cascade was proposed that includes the four linear stages in the existing continuum but acknowledges and expects disengagement and disruptions to care by offering a structure that includes paths of disengagement and reengagement aligned with each linear stage [89]. We modified this cyclical HIV care continuum by incorporating where and how carceral contact can represent intercepts of HIV care entry and exit (Fig. 1). Future research examining this modified cyclical cascade for populations involved in the carceral system is warranted and will require data harmonization between carceral and community-based systems of care [48, 49••].

The COVID-19 pandemic has fundamentally shifted our healthcare delivery systems, including for PWH. In multiple descriptive analyses, PWH have experienced substantial reductions in care cascade outcomes following shelter-in-place restrictions on clinic and social services [90–93]. In one large urban HIV clinic, the period following these restrictions was associated with a 33% reduction in VS compared to the period before then; Black/African American race, homelessness, and age < 35 were associated with worse VS reductions [94]. Seismic shifts in HIV care delivery (e.g., telephone visits, home delivery of medications, administrative changes to minimize insurance gaps) and social service provision (e.g., improved access to housing, proactive outreach models using community health workers) have been implemented that may exacerbate, mitigate, or create new challenges to care access [94–96]. Additional intervention research is needed to understand and address the impact of these shifts on HIV outcomes among PWH with carceral system involvement.

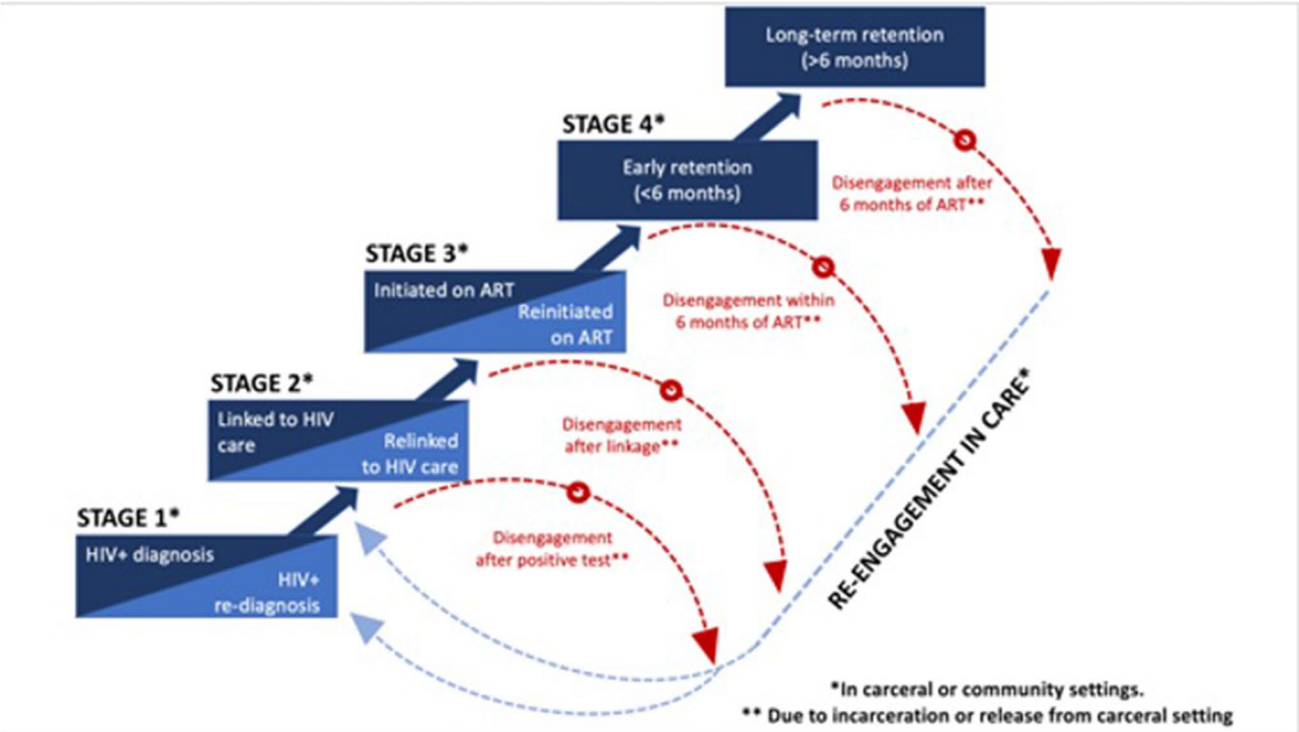

Fig. 1 A modified cyclical cascade of HIV care acknowledging carceral contact as both an entry and exit point

Lastly, the emergence of new ART formulation necessitates research exploring best implementation practices for PWH involved in the carceral system. In January 2021, the Food and Drug Administration approved the first injectable, complete regimen (cabotegravir/rilpivirine) for ART [97]. This treatment option brings with it a reduced number of dosing days (from daily with oral treatment to 6–12 days per year with injectable treatment) which may shape HIV care outcomes for this population. There are several considerations necessary for designing and implementing future interventions to integrate access to injectable ART for individuals involved in the carceral system. Future research may focus on (1) determining the acceptability and feasibility of ART administration from the perspectives of PWH who are involved in the carceral system, stakeholders in the carceral system, medical personnel, and other relevant administrators; (2) training clinicians in carceral settings or those who work with individuals who have had carceral contact, to assess and identify best practices for medication administration; and (3) establishing protocols and standards for injectable ART implementation or linkage as part of pre-release planning and post-release support [98].

Conclusions

To meet the goals of the *National HIV/AIDS Strategy (2022–2025)*, it is critical to improve HIV care cascade outcomes for PWH involved in the carceral system [21]. In this review, we highlight several emergent, empirically supported strategies to improve HIV care outcomes for this population who have high unmet HIV care needs. We also identify underutilized strategies that have demonstrated efficacy for improving HIV outcomes in other populations and suggest future areas of intervention research responsive to existing gaps in the literature and those resulting from recent biomedical advances and emergent public health crises.

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Declarations

Conflict of Interest The authors declare no competing interests.

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