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Linking criminal justice-involved individuals to HIV, Hepatitis C, and opioid use disorder prevention and treatment services upon release to the community: Progress, gaps, and future directions

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Abstract

Improving HIV and Hepatitis C Virus (HCV) management among people involved in the criminal justice (CJ) system who use drugs, in particular those with opioid use disorder (OUD), requires effective approaches to screening, linkage, and adherence to integrated prevention and treatment services across correctional and community agencies and providers. This manuscript reviews the literature to explore gaps in HIV, Hepatitis C, and OUD prevention, treatment, and delivery cascades of care for persons involved in the CJ system. Specifically, we compare two models of linkage to prevention and treatment services: Peer/Patient Navigation (PN) wherein the PN links CJ-involved individuals to community-based infectious disease (ID) and substance use prevention and treatment services, and Mobile Health Units (MHU) wherein individuals are linked to a MHU within their community that provides integrated ID and substance use prevention and treatment services. The most notable finding is a gap in the literature, with few to no comparisons of models linking individuals recently released from the CJ system to integrated HIV, Hepatitis C, and OUD prevention and treatment and other harm reduction services. Further, few published studies address the geographical distinctions that affect service implementation and their effects on these substance use, ID and harm reduction care cascades. This manuscript makes specific recommendations to fill this gap through a detailed evaluation of PN and MHU linkage models to co-located and integrated HIV, Hepatitis C, and OUD prevention and treatment services across different communities within the U.S.

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Declarations of Interest

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Keywords

HIV; Hepatitis C; Opioid use disorder; Medication for opioid use disorder; Mobile Health Unit; Patient/Peer Navigation

Background

Improving HIV and Hepatitis C Virus (HCV) management in the United States among people involved in the criminal justice (CJ) system who use drugs, in particular those with opioid use disorder (OUD), requires effective approaches to screening, linkage, and adherence to integrated prevention and treatment services across correctional and community agencies and providers. Reentry represents a critical opportunity to link these individuals to a broad spectrum of service providers, including community-based organizations (CBOs), clinics that provide medications for HIV prevention and treatment [e.g., pre-exposure prophylaxis (PrEP) and antiretroviral therapy (ART)], medical providers who prescribe medications for OUD (MOUD), and behavioral health providers to provide effective interventions to help mitigate HIV and OUD risk behaviors. However, little is known about the ability of current delivery models to improve linkage and receipt of these services for CJ-involved populations.

CJ-involved individuals represent a highly vulnerable, underserved population. An estimated 1430,800 people were under state or federal jurisdiction in the U.S. at the end of 2019 (Carson et al., 2020). CJ-involved individuals experience higher rates of OUD and other substance use disorders (SUDs) and associated infectious diseases (ID) than those in the general population (Hennessey et al., 2019; Rich, Beckwith, & Macmadu, 2016; Zaller & Brinkley-Rubinstein, 2018). One-third of all persons who use opioids pass through the criminal justice system (CJS) annually (J. Rich, Wakeman, & Dickman, 2011), yet few are appropriately screened for OUD or eligibility for MOUD (e.g., buprenorphine, methadone and extended-release naltrexone (XR-NTX)) while incarcerated or at time of release (Wakeman & Rich, 2015). After reentry into the community, opioid-related overdoses are the leading cause of death (Binswanger et al., 2007; Binswanger, Mueller, & Stern, 2013; Joudrey et al., 2019). Rates of opioid-related overdoses in the thirty days after release from the CJS without MOUD exceed rates among non-CJ-involved individuals by more than 10 times, with the greatest risk in the first month post-release (Binswanger et al., 2013, 2007; Joudrey et al., 2019; Merrall et al., 2010).

The high rates of direct harm from opioid overdose post-release are mirrored by substantial increases in HIV and HCV among CJ-involved individuals. One in seven persons with HIV (PWH) in the U.S. pass through the CJ system annually (Meyer, Chen, & Springer, 2011), and CJ-involved individuals are at heightened risk of acquiring HIV due to SUD, including opioid use and injection of stimulants (Spaulding et al., 2009; Springer, Spaulding, Meyer, & Altice, 2011). An estimated 22% of persons incarcerated are unaware of their HIV diagnosis upon entry to prison or jail (Iroh, Mayo, & Nijhawan, 2015). Due to rapid turnover, jails do not typically screen for HIV. Although HIV prevalence is higher in correctional facilities than in the general population (Dolan, Kite, Black, Aceijas, &

Stimson, 2007; Iroh et al., 2015) and ART provision within the CJ system is on par with the community (Springer, Friedland, Doros, Pesanti, & Altice, 2007), retention on ART after release typically is low (Meyer et al., 2014; Meyer, Cepeda, & Wu, 2014; Springer et al., 2004). Further, few CJ-involved individuals or persons in the community who inject drugs are prescribed PrEP (Brinkley-Rubinstein et al., 2019; Kuo et al., 2016). Despite evidence that HCV prevalence is higher among those with OUD and CJ-involvement (Seval, Wurcel, Gunderson, Grimshaw, & Springer, 2020), few are diagnosed or treated during incarceration (Lafferty et al., 2018; JD Rich et al., 2016) or linked to services after release. Between 2010 and 2016, only 18 U.S. prison systems conducted routine HCV screening (Spaulding, Anderson, Khan, Taborda-Vidarte, & Phillips, 2017). A study including 23 of the 50 largest U.S. jails showed none conducted opt-out Hepatitis C testing (Beckwith et al., 2015).

MOUD, particularly opioid agonists methadone and buprenorphine, are highly effective treatment medications (Green et al., 2018; Krupitsky et al., 2011; Lee et al., 2016, 2018; Morgan, Schackman, Weinstein, Walley, & Linas, 2019; Rosenthal et al., 2020; Tanum et al., 2017; Weiss, Potter, & Fiellin, 2011). MOUD reduces risk behaviors for acquiring and transmitting HIV and HCV (MacArthur et al., 2012; Rosenthal et al., 2020; Zou, Ling, & Zhang, 2015). Further, MOUD (XR-NTX or buprenorphine), when offered to PWH with OUD either prior to or at time of release from prison or jail, increases the likelihood of achieving and maintaining viral suppression 6 months after release to the community (Springer et al., 2018; Springer, Qui, Saber-Tehrani, & Altice, 2012), however more research is needed in assessing the impact of XR-NTX in achieving reductions in mortality. MOUD also improves adherence to direct-acting antivirals (DAAs) for treatment of HCV to achieve sustained viral response (SVR) (Akiyama et al., 2020; Rosenthal et al., 2020) and reduce re-infection (Akiyama et al., 2019; Backmund, Meyer, & Edlin, 2004; Dore et al., 2016). Despite the evidence for these interventions (A. Williams et al., 2018), few settings provide MOUD, PrEP or HCV treatment during incarceration or at time of release (Friedmann et al., 2012; Nunn et al., 2009; Rich et al., 2005).

Expedited linkage to HIV and HCV prevention and treatment, harm reduction services, and MOUD have the potential to improve health outcomes of CJ-involved individuals, particularly with integration of HIV/HCV prevention and treatment and SUD service cascades. We compare two models of linkage to treatment and prevention services: Patient/Peer Navigation (PN) wherein CJ-involved individuals are linked to community-based ID and substance use services; and Mobile Health Units (MHU) wherein individuals are referred to a MHU within their community that provides integrated ID and substance use treatment and prevention services. PN involves an individualized approach to navigating a complex and fragmented healthcare and social service system by addressing barriers to access to care and linking individuals to a diverse array of needed services. MHUs, on the other hand, represent a systematically different approach by provided integrated services in “one-stop shopping” model in a location close to the patient. The comparison of the interventions of PN and MHUs, specifically, examines two different structural approaches to patient-centered and integrated care for vulnerable populations. This manuscript reviews the literature, discusses gaps in delivery of HIV, HCV, and OUD prevention and treatment services to criminal justice (CJ)-involved persons in the community, and discusses potential ways to evaluate these linkage care models more effectively.

Methods

A brief review was conducted of key studies involving interventions with PNs or MHUs that focused on linkage to HIV, HCV or OUD services and were relevant to U.S. criminal justice involved populations. Data were summarized within the manuscript and in Tables 1 and 2 for each study including author, date of publication, study design, population, intervention, measures and reported study outcomes.

Evidence for models of linkage

Peer and patient navigation systems (PNs)—Peer and patient navigation are slightly different models; Patient Navigators are professionally trained community members, while Peer Navigators are professionally trained and share lived experiences with the CJ population (Cunningham et al., 2018). The term Peer Navigator refers to a wide range of trained individuals, such as Patient Navigators and Peer Recovery coaches. PN may improve outcomes through various mechanisms, such as by providing patient education, addressing barriers to care, providing psychosocial support, conducing outreach, disseminating community resources and participating in patient advocacy (Rohan, McDougall, & Townsend, 2018). Table 1 assesses existing research evaluating PN effectiveness on HIV, OUD, HCV and other outcomes (e.g., mental health). PNs are successful in improving mental and physical health and quality of life for non-CJ-involved individuals (Corrigan et al., 2017). They are effective in supporting linkage to and engagement in SUD treatment for individuals with SUD and mental health comorbidities (Eddie et al., 2019). Additionally, peer recovery coaches decreased time to MOUD initiation for individuals discharged from the Emergency Department after a non-fatal opioid overdose (Samuels et al., 2018). Current treatment models use PN to assist patients receiving SUD treatment to maintain treatment, recovery, and prevent relapse (Eddie et al., 2019). The success of the PN model has been reproduced within CJ-specific environments, with studies showing that PN improves linkage to primary care (Jordan et al., 2013), HIV care (Myers et al., 2018; Westergaard et al., 2019; Wohl et al., 2016), retention in HIV care (Cunningham et al., 2018), ART uptake and adherence (Teixeria, Jordan, Zaller, Shah, & Venters, 2015), and viral suppression (Wohl et al., 2016) (Teixeria et al., 2015) upon release from the CJ system. For non CJ-involved individuals, PN has been shown to decrease time to PrEP initiation (Spinelli et al., 2018), increase HCV treatment initiation (Ford, Johnson, Desai, Rude, & Laraque, 2016; Trooskin et al., 2015), and improve retention in HCV treatment (Trooskin et al., 2015) and SVR (Ford et al., 2016). PN improves HIV outcomes for vulnerable populations in both traditional environments and CJ-specific ones; yet based on our review, limited research has addressed the effect of PN on OUD, HCV outcomes, and PrEP uptake among CJ-involved individuals as they enter the community (Table 1). Notably, studies using the patient navigation model using navigators without shared lived experiences did not show improved HIV outcomes (Giordano et al., 2016; Metsch et al., 2017).

Mobile health units (MHUs)—MHUs have demonstrated the potential to serve as a cost-effective delivery model of healthcare services to underserved populations (Liebman, Lamberti, & Altice, 2002; Robinowitz, Smith, Serio-Chapman, Chaulk, & Johnson, 2014; Yu, Hill, Ricks, Bennet, & Oriol, 2017). MHUs' outreach capabilities within underserved

communities expand healthcare access to individuals not typically served by traditional healthcare systems, and help overcome structural barriers such as transportation and health system complexity (Hill, Ricks, & Yu, 2016; Malone et al., 2020; Yu et al., 2017). They are patient-centric (i.e., convenient locations, familiar environment, informal setting, community and culturally competent staff) (Carmack, Bouchelle, Bennet, & Oriol, 2017; Yu et al., 2017), and provide comprehensive medical services in areas familiar to hard-to-reach populations. MHUs are also effective at building trusting relationships with the communities they serve (Yu et al., 2017), and offer overall cost-savings by initiating early clinical care, helping patients self-manage their conditions, and avoiding hospital visits (Yu et al., 2017).

MHUs have been used in studies to link high risk individuals to OUD, HIV, and HCV prevention and treatment services as described in Table 2, with only one focused specifically on a CJ-involved population. A demonstration study by Regis, et al. provided undomiciled individuals with an elevated risk of opioid overdose the opportunity to use a MHU, placed in “hotspots” where overdoses commonly occurred, to easily access harm reduction services, addiction treatment, and other medical care (Regis et al., 2020). Another study demonstrated the role of MHUs in the distribution of naloxone, overdose education and prevention services for high-risk CJ-involved individuals, as well as linkage to general health care (Maxwell, Bigg, Stanczykiewicz, & Carlberg-Racich, 2006). MHUs have been used to help vulnerable populations receive better access to MOUD rather than going to traditional methadone clinics (Krawczyk et al., 2019). PWH who had OUD and were living more than four blocks from a methadone clinic were twice as likely to receive HIV treatment if they received directly administered ART on a MHU (Maru et al., 2007). This delivery care model has also improved HCV outcomes, helping individuals access needed medical care including screening, prevention, and treatment (Gibson, Ghosh, Morano, & Altice, 2014).

Discussion

Barriers of linkage care models

A growing body of evidence suggests PNs and MHUs are effective models to link underserved populations, including CJ-involved persons, with ID and SUD prevention and treatment services in the community. Barriers, which include stigma, geographical differences, social determinants of health (e.g., housing instability, insurance), and COVID-19, impact these linkage care models and should be considered when testing their effectiveness. As it is not clear how such barriers might impact PN or MHU service delivery models of care, it is important to take them into consideration when determining which model of care would provide optimal linkage for CJ-involved persons to community-based treatment and prevention services.

Stigma

HIV-related stigma is a significant barrier to access to treatment and prevention services and can stem from gender, sexual orientation, race, ethnicity, poverty, substance use, mental illness, and or a combination of these factors (Flickinger et al., 2018). Physical and mental health also contribute to the stigma for PWH and is a barrier to seeking treatment (Flickinger et al., 2018; Hoffman et al., 2019). These patterns are similar for individuals with OUD.

Stigma towards OUD treatment is often cited as a reason to decline initiating MOUD (Bagley, Hadland, Carney, & Saitz, 2017). PWID, who have a disproportionately high prevalence of chronic HCV, often do not receive DAAs because of lack of awareness of treatment options and stigma related to HCV treatment (N. Williams et al., 2019). While it is evident that HIV, OUD, and HCV cascades of care are impacted by disease-related stigma, no research to our knowledge has addressed stigma-related barriers to MHU and PN use. Given the intersectional stigma that individuals involved in the CJ system face when released to the community and the difficulties in linkage to care, parsing out these differences is critical.

MHUs and PN may mitigate stigma differently. In addition to HIV and OUD care, some MHUs offer integrated services, such as primary care, which may reduce disease-related stigma, while others offer only SUD services. Qualitative studies show that those who access MHUs believe integrated services provide socially acceptable reasons to seek HIV treatment (Sterling, Valkanoff, Hinman, & Weisner, 2012). Studies with adolescents suggest that the integration of substance use care into general medical services may decrease the stigma-related barriers to seeking treatment (Sterling et al., 2012). Stigma associated with PN models of linkage have not been thoroughly described in the literature, although some evidence support that PNs (Pitpitan, Mittal, & Smith, 2020) and MHUs (Krawczyk et al., 2019) are acceptable to patients and can provide destigmatized care, particularly if the treatment services are integrated. The unique life experiences of PNs that are similar to their clientele may help overcome stigma-related reluctance to seek and enter care (Bauman et al., 2013).

Geographical differences

Non-comparator studies evaluating the effectiveness of MHUs and PN programs in the U.S. typically do not address the potential effects of geographical and regional differences. This represents a gap in the literature, as implementing MHU and PN models of linkage will inevitably vary across regions depending on the legality of SSPs, methods of naloxone distribution, Medicaid expansion policies, and the adoption of the Ryan White HIV/AIDS program (RWHAP). In order to collect generalizable data, studies comparing models of linkage should address these geographical differences. Geographical differences address the complexity of care required within and across different communities (i.e. what works in one community may not always work in another).

Harm reduction measures (SSP legality and naloxone distribution) are important factors in establishing effectiveness of MHU and PN models. The number of new HCV cases is largely attributable to injection drug use, having increased 3.5-fold from 2010 to 2016 in the U.S. (CDC, 2016). While the CDC has indicated that SSPs are a critical component of HIV and HCV prevention programs, coverage is inconsistent. While these programs are not explicitly illegal in the U.S., federal and state distribution and drug paraphernalia laws impact their establishment and expansion. SSPs are operated across 39 states including DC as of 2018, with five states operating 46% of all domestic SSPs (Foundation, 2018). Their inconsistent adoption potentially leaves communities of CJ-involved populations underserved. Further, naloxone distribution varies domestically as state-level naloxone laws and their provisions

determine the implementation of overdose education and naloxone distribution (OEND) programs. In 2014, only 8% of states had implemented OEND programs; states with a naloxone law or a law within one of the provisions (third party, standing order, possession, prescriber immunity, dispenser immunity, or layperson dispensing) had increased odds of implementing such programs (Lambdin, Davis, Wheeler, Tueller, & Kral, 2018). State-level laws regarding naloxone distribution may alter the effectiveness of MHUs and PN, specifically in their ability to mitigate high overdose rates, particularly for CJ-involved individuals who are at high-risk post-release. MHUs have been shown to expand education and distribution of naloxone (Maxwell et al., 2006), but this effect may be blunted in jurisdictions with limited naloxone distribution.

Similarly, insurance coverage may affect MHU and PN implementation. The Medicaid expansion policy ensuring that people below a certain level of household income are covered by insurance has the potential to minimize gaps in care for CJ-involved individuals given that many are uninsured at time of release. The expansion policy has been instituted in 36 states including DC, and by mid-2021, Oklahoma and Missouri will join the list (Foundation, 2020). For states with the Medicaid expansion policy, individuals can qualify solely based on a household income that is below 133% of the federal poverty level (Foundation, 2020). Additionally, the Health Resources and Services Administration's RWHAP is an expanded source of federal public funding (Kay, Batey, & Mugavaro, 2018). The RWHAP improves access to care by enabling and coordinating services falling outside direct medical treatment including transportation services, mental health care, and case management, to vulnerable CJ-involved individuals with HIV/HCV/OUD. Studies suggest that facilities receiving RWHAP funding have a higher quality of HIV care (Sullivan et al., 2008), which may alter the feasibility of implementation, effectiveness, and quality of care of MHUs and PN. As a result, access to insurance for CJ-involved individuals upon release is inconsistent and the feasibility implementing MHUs and PN may change based on such provisions. MHUs and PN can help mitigate such gaps in linking individuals to insurance coverage and access to critical health services.

Social determinants of health and structural racism

Social determinants of health are significant barriers to linking CJ-involved individuals to effective medical care, including gender discrimination, racism, and socioeconomic inequalities, and may be exacerbated by geographical differences in harm reduction and insurance coverage (Binswanger, Redmond, Steiner, & Hicks, 2011; Iguchi et al., 2002). For example, women leaving the CJS often have difficulty obtaining medical services (Smith, Mays, & Ramaswamy, 2019) and may face additional structural barriers including childcare and cost of treatment (Rosen, Tolman, & Warner, 2004), making their overall transition to the community particularly arduous (Sugarman, Bachhuber, Wennerstrom, Bruno, & Springgate, 2020). When re-entering the community, there are fewer services and resources available to assist women with CJ-involvement in getting the medical care they need compared to those for men. Poverty and unemployment, psychiatric illnesses, and homelessness, all unfortunately common in those involved with the CJS, magnify disparities in linkage to care (Corrigan, Pickett, Batia, & Michaels, 2014; Priester et al., 2016). Evidence also suggests people of color often have difficulty accessing mental health and

primary care services due to poverty and structural racism (Lanouette, Folsom, Sciolla, & Jeste, 2009) and experience reduced quality of care (Chin, Walters, Cook, & Huang, 2007). For example, residents of urban areas have access to fewer treatment services (Ompad, Galea, Caiaffa, & Wvlahov, 2007). The true effectiveness of MHUs and PN therefore depends on the ability to address structural and institutional barriers.

COVID-19

COVID-19 has further fractured critical cascades of care for CJ-involved persons. There has been a significant increase in opioid overdoses across the U.S. during the COVID-19 pandemic (CDC, 2020), with disparities magnified for CJ-involved individuals (Hawks, Woolhandler, & McCormick, 2020). Overcrowding and difficulty achieving physical distancing has caused the rapid spread of COVID-19 in prisons and jails (Akiyama, Spaulding, & Rich, 2020). Specifically, correctional officers and staff who leave and return to the facility pose risks for incarcerated individuals. The increasing average age and rates of chronic comorbidities among incarcerated populations put them at greater risk of morbidity and mortality from COVID-19 (Maruschak, Berzofsky, & Unangst, 2016). To mitigate the spread of COVID-19, many incarcerated individuals have been released early, reducing the amount of time to connect them to MOUD, ART, PrEP, HCV treatment, and other critical services within their communities. Connecting early-release individuals to housing, insurance, and food stamp programs is more difficult on short notice as well. MHUs and PN can facilitate transitions and continuity in care made more difficult by the COVID-19 pandemic upon release from the CJ-system. MHUs also provide critical services in less densely populated spaces, reducing the risk of COVID-19 exposure compared to conventional medical facilities.

Taken together, the growing body of literature suggests these models of linkage are an innovative way of increasing treatment uptake and accessibility, and decrease physical and mental health disparities for vulnerable populations marginalized by geographical, stigma-related, and structural barriers (Liebman et al., 2002; Maheswaran, Thulare, Stanistreet, Tanser, & Newell, 2012; Ruiz, Vazquez, & Vazquez, 1973; Sarnquist et al., 2010).

Future directions

To date, no studies to our knowledge have compared the full treatment and prevention of HIV, HCV and OUD care cascade outcomes of these two approaches or the cost-effectiveness of implementation for those being released from prison or jail. The effectiveness of MHUs or PNs on linkage to infectious disease and SUD prevention and treatment services for CJ-involved persons as they reenter the community relies upon integration into the larger socio-political sphere within which they operate. Understanding barriers to these linkage models is necessary to optimize care, uptake, and efficacy. Given the number of variables influencing HIV/HCV/OUD linkage models of care for recently incarcerated individuals (e.g., stigma, SSP legality, OEND implementation, Medicaid expansion policies, RWHAP use, and socioeconomic factors), studies comparing MHU versus PN programs must first conduct needs-assessments in their communities to provide a more nuanced understanding of the barriers to care, patient and community stakeholder

perspectives, and acceptability/uptake of services unique to the individual communities. In particular, this assessment can identify barriers or gaps in the conventional health care service continuum that the MHU and PN model may be able to fill for CJ-involved populations. A comparison of PNs and MHUs should be conducted to evaluate improvement in **HIV-related measures (e.g.,**: viral suppression for PWH, PrEP adherence for those without HIV, and injection and sex-related risk behaviors); **HCV Measures** (e.g., HCV testing receipt, linkage to DAAs, SVR, reinfection after cure); and **OUD and SUD-related measures** (e.g., OUD/ SUD diagnoses, severity of SUD, MOUD prescription receipt and retention, opioid and stimulant use, overdose incidents, patient quality of life, stigma, violence, harm reduction service utilization including SSP, and naloxone use). The cost-effectiveness of both interventions across these service cascades of care should also be assessed to evaluate the impacts of each delivery mode and to inform real-world implementation.

MHUs and PNs can make a significant difference in ensuring that individuals living with HIV, OUD, and/or HCV, receive optimal assistance and healthcare post-release from incarceration. They may be used as the backbone of prevention and care provision to the CJ-involved population and can bridge the gap from release to engagement in conventional care. Community-based research comparing MHU and PN models should include feasibility (service utilization among released individuals), acceptability (mitigation of stigma, patient satisfaction, perceived usefulness); sustainment (continued utilization), and costs required to implement and sustain the approaches as well as to scale-up in additional communities. Additional outcomes may examine broader community health care impact including other health services accessed, expanded OUD services, and common barriers (e.g., stigma) to service access across the community provider spectrum.

Conclusion

CJ-involved individuals are among the most vulnerable populations with respect to OUD, HIV and HCV, and their linkage to care must integrate multiple services, including but not limited to MOUD, HIV and HCV treatment and HIV prevention (PrEP). The need for a randomized controlled trial comparing PN to MHU in service delivery for linkage to ID and SUD prevention and treatment services for those released from CJ settings combined with implementation research will help to fill a gap in the literature and better inform the field on the effectiveness of delivery models for community linkage.

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Table 1

Summary of studies assessing associations between patient/peer navigation and HIV, OUD, HCV, and other outcomes.

Study	Study Design	Location	Population	CJ-specific?	Intervention	Outcomes	Peer or Patient Navigation?	Reported or Perceived Outcomes
Westergaard et al., 2019	Retrospective Cohort Study	Wisconsin Department of Corrections	Recently released HIV-positive individuals receiving ART while incarcerated	Yes- State Prison	Effect of patient navigation vs standard release planning	Linkage to care (Obtaining HIV test at any community-based provider within 180 days of release) VS for those linked to care	Patient navigation-No shared experience	Patient navigation increased linkage to care (84% linked with patient navigation, 60% without, $p = 0.002$). No significant difference in VS among those linked to care.
Cunningham et al., 2018	RCT	Los Angeles County Jails, United States	HIV-positive men and transgender women released from jail	Yes- Jails	Effect of peer navigation vs. traditional case management (assessing needs and referrals to services)	Viral Suppression after release HIV care retention (Number of HIV primary care visits per 12 months, given at least one visit in the previous 12 months (self-report)).	Peer navigators-prior experience with incarceration and HIV	Peer navigation intervention prevented declines in VS (Peer navigation arm: 49% at baseline, 49% at 12 months, Control arm: 52% at baseline, 30% at 12 months, Difference-in-difference 22% (95% CI: 3%–41%, $p = 0.02$) and improved HIV primary care visit retention after release from incarceration, compared with transitional case management.
Myers et al., 2018	RCT	San Francisco County Jail	People living with HIV in the jail system	Yes- Jails	Effect of patient navigation vs TAU (discharge planning & case management)	Linkage to HIV care HIV care retention HIV sexual risk behaviors VS	Called patient navigation, but peers had prior experience with HIV, incarceration, and substance use disorders	Patient navigation resulted in greater linkage to care within 30 days of release (AOR=2.15 (95% CI: 1.23–3.75) and consistent retention over 12 months (AOR=1.95 (95% CI: 1.11–3.46). No significant difference in HIV sexual risk behaviors or VS
Wohl et al., 2016	One group-baseline and follow-up assessments	Los Angeles, California	Hard to reach HIV-positive persons recently released from jail, prison, or other institutions	Yes- Jails, Prisons,	Effect of patient navigation	Linkage to HIV care VS	Patient navigation-experience with HIV case management	Patient navigation increased% of patients linked to care (68% at 3 month, 85% at 6 months, 94% at 12 months (no statistical test)) and% of patients with VS (51% at pre-enrollment vs. 63% at time of retention $X^2=11.8$, $p<0.01$)
Teixeria et al., 2015	One group-baseline and follow-up assessments	New York City Jails	HIV-positive individuals released from jails	Yes- Jails	Effect of care coordinator	ART uptake ART adherence (self-report) VL	Care coordinator-background unclear	Care coordinator increased% of patients taking ART (55.6% at baseline 92.6% at 6 months $p<0.05$),% of patients taking ART as directed (80.7% at baseline 93.2% at 6 months $p<0.05$), and decreased VLs (54,031 at baseline 13,738 at 6 months $p<0.05$).
Jordan et al., 2013	Program Outcome Evaluation	New York City Jail System	HIV-positive persons released from jails	Yes- Jails	Effect of patient navigation	Linkage to primary care	Patient Care Coordinator	Patient navigation increased% linked to primary care among those released to the community (70% (941/1345) in 2009; 75% (1259/1676) in 2010;

Study	Study Design	Location	Population	CJ-specific?	Intervention	Outcomes	Peer or Patient Navigation?	Reported or Perceived Outcomes
								and 73% (1336/1824) in 2011 (no statistical test)).
Samuels et al., 2018	Observational Retrospective Cohort	Rhode Island Emergency Departments (ED)	ED patients discharged after a non-fatal opioid overdose	No	Effect of usual care, receiving take-home naloxone, or take-home naloxone and a peer recovery coach	Time to medication for opioid use disorder (MOUD) initiation	Not stated	Peer recovery coaches decreased time to MOUD initiation (81.5 days vs 139 days usual care).
Corrigan et al., 2017	RCT	Metropolitan Chicago, Illinois	Homeless African Americans with mental illness	No	Effect of peer navigations vs. TAU	Physical and mental health Recovery from mental illness Quality of life	Peer navigators-African American who were homeless during their adult life and in recovery from serious mental illness	Peer navigation intervention improved mental & physical health and quality of life more than TAU.
Ford et al., 2016	Program Outcome Evaluation	New York City Health Centers providing clinical care, harm reduction, and social services	Hepatitis C patients	No	Effect of patient navigation	HCV treatment initiation SVR	No shared experience	Peer navigation participants were twice as likely to initiate HCV treatment (46% vs 25% for off-site participants). Peer navigation improved SVR rates 94% (74) versus 86% (43) receiving off-site care.
Metsch et al., 2016	RCT	Hospitals across the United States	Hospitalized patients with HIV and substance use	No	Effect of patient navigation with or without financial incentive	VS	No shared experience	Patient navigation with or without financial incentives did not improve VS at 12 months relative to TAU
Giordano et al., 2016	RCT	Houston Harris Health System, Texas	Hospitalized adults either newly diagnosed with HIV or out of care	No	Effect of peer mentors	Retention in HIV care VL	No shared experience	Peer mentoring did not increase reengagement in outpatient HIV care among hospitalized, out-of-care persons.
Trooskin et al., 2015	Program Outcome Evaluation	Philadelphia	Door-to-door and street outreach participants with reactive HCV tests	No	Effect of patient navigation	HCV diagnosis Linkage to HCV care	Not stated	Patient navigation increased HCV diagnosis; anti-HCV seroprevalence was 3.9% (n = 52), higher than community rates. Patient navigation improved linkage to HCV care; 87% (n = 42) had successful confirmatory tests performed.

Antiretroviral Treatment/Therapy (ART), Emergency Department (ED), Hepatitis C Virus (HCV), Human Immunodeficiency Virus (HIV), Medication for Opioid Use Disorder (MOUD), Randomized Control Trial (RCT), Street-connected youth (SCY), Sustained Virologic Response (SVR), Treatment as usual (TAU), Viral Load (VL), Viral Suppression (VS).

Table 2

Summary of studies assessing associations between Mobile Health Units and HIV, OUD, HCV, and other outcomes.

Study	Study Design	Location	Population	CJ-specific?	Intervention	Outcomes	Mobile Health Units?	Reported or Perceived Outcomes
Malone et al., 2020	Data Analysis	All 50 states, the District of Columbia, and Puerto Rico	Vulnerable populations/ people living in resource-limited areas	No	Effect of Mobile Health Clinics Analyzing demographics, services provided, and mobile clinic's affiliated institutions and funding	Linkage between community and clinical facilities	Mobile Health Clinics	Mobile Health Clinics increased linkage for a median number of 3491 visits annually.
Regis et al., 2020	Case Study	Boston, Massachusetts	Individuals with OUD at high risk of near-term death from a drug overdose	No	Effectiveness of mobile health initiatives	Increase access to harm reduction services, addiction treatment, and primary care by bringing on-demand services directly to the individuals	Community Care – Mobile Health Initiatives	Increase outcome in success in expanding access to health care for people with OUD and high levels of demand for and acceptability of the mobile medical model
Krawczyk et al., 2019	Retrospective Cohort Study	Baltimore City, MD	Justice-involved and other vulnerable persons lacking access to opioid pharmacotherapy	Yes- Jails	Buprenorphine to help engage persons who are disconnected from care	Delivering buprenorphine to hard-to-reach populations	Mobile Treatment Site	Mobile treatment site resulted in greater linkage. 67.9% of people who began treatment returned for a second visit or more, and 20.5% who initiated care were transferred to continue buprenorphine at a partnering site
Robinowitz et al., 2014	Program Outcome Evaluation	Baltimore, MD	People who inject drugs	No	Effect of mobile health units, specializing in wound care	Linkage between people who inject drugs and wound clinic within mobile health clinics	Mobile Health Clinic	Wound clinics within mobile health clinics can be successful, low cost, and can reach populations who otherwise might not receive care for their wounds.
Gibson et al., 2014	Cross-Sectional Study	Greater New Haven, CT	People who inject drugs	No	Effect of mobile health units	Linkage to mobile health units for people who inject drugs	Mobile Medical Clinics	Mobile medical clinics increase healthcare accessibility to reduce health disparities for marginalized communities.
Liebman et al., 2002	Retrospective Study	New Haven, CT	Individuals with increased risk of being HIV-positive/STDs	No	Effect of mobile medical programs improving STD and HIV testing by providing services to high-risk individuals	Linkage to mobile medical programs for HIV-positive individuals	Mobile Medical Programs	Mobile Medical Program was successful in HIV and STD testing

Human Immunodeficiency Virus (HIV), Opioid Use Disorder (OUD), Sexually Transmitted Disease (STD).