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Can TasP Approaches Be Implemented in Correctional Settings? A review of HIV testing and linkage to community HIV treatment programs

Katherine S. Elkington, PhD,
HIV Center for Clinical and Behavioral Studies, Division of Gender, Health and Sexuality, Columbia University and New York State Psychiatric Institute

Jessica Jaiswal, MPH, MPhil,
Department of Sociomedical Sciences, Mailman School of Public Health, Columbia University

Anya Y. Spector, PhD,
New York City Department of Health and Mental Hygiene

Heidi Reukauf, MPH, RN,
New York State Department of Health, AIDS Institute

James M. Tesoriero, PhD,
New York State Department of Health, AIDS Institute

Denis Nash, PhD, and
Epidemiology and Biostatistics Program, City University of New York, School of Public Health and Hunter College

Robert H. Remien, PhD
HIV Center for Clinical and Behavioral Studies, Division of Gender, Health and Sexuality, Columbia University and New York State Psychiatric Institute

Abstract

High rates of HIV in correctional populations makes evaluation of programs that increase HIV testing in correctional settings and linkage to HIV treatment upon release, and understanding key implementation issues of these programs, essential to reducing new HIV infection. We conducted a systematic search for studies of outcomes or implementation issues of programs that promote HIV testing or that promote linkage to community HIV treatment post-release. Thirty-five articles met inclusion criteria: nine HIV testing initiatives and four linkage programs. HIV testing uptake rates were between 22% and 98% and rates of linkage to community treatment were between 79% and 84%. Findings suggest that some programs may be effective at reducing HIV transmission within the communities to which inmates return. However, attention to implementation factors, such as organizational culture and staff collaborations, appears critical to the success of these programs. Future research using rigorous design and adequate comparison groups is needed.

Please address all correspondence to Katherine S. Elkington at New York State Psychiatric Institute and Columbia University, 1051 Riverside Drive, #15, New York, NY 10032. Phone: 212-568-4208. ke2143@cumc.columbia.edu.

Keywords

HIV testing; HIV treatment; linkage; corrections

In 2010, as an approach to eliminating the US HIV epidemic, the National HIV/AIDS Strategy[1] placed an emphasis on reducing community viral load by increasing early identification of HIV infection, rapid linkage to HIV care, treatment initiation with optimal medication adherence, and sustained retention in care of HIV-positive individuals. This approach, known as Treatment as Prevention (TasP) is emerging as a promising strategy to prevent HIV.[2,3] It is estimated that the HIV seroprevalence among adults in correctional facilities (jails or prisons) is approximately three times higher than the general population (1.5% compared with 0.5%),[4,5] with prevalence among prison populations exceeding 5% in some states (e.g., New York).[6] However, among correctional populations, many individuals living with HIV continue to face barriers to testing and treatment, remaining undiagnosed or failing to engage in HIV care. A recent review of testing, treatment, and linkage to care efforts for incarcerated and recently released populations found that rates of linkage to care upon release were substantially lower than the national average (36% versus 62%); during incarceration, rates of linkage to care were much higher for incarcerated populations compared with the general population (76% vs 62%).[7] Given the high rates of HIV in correctional populations and the significant barriers to enrolling in community treatment once released, identifying and evaluating those programs that successfully address barriers to HIV testing while in correctional settings and linkage to HIV treatment upon release into the community are essential to public as well as correctional health.

Adults involved in the criminal justice system are disproportionally racial/ethnic minorities,[8] of lower socioeconomic status and are at significant risk for HIV due to a confluence of individual and contextual/structural factors.[9–12] Once an individual has contracted HIV, there are similar multi-level factors within correctional settings and the community that present significant obstacles to HIV testing in correctional settings, and access and retention in HIV treatment and care in the community. In particular, concerns about stigma and discrimination, medical mistrust around quality of care and/or provider intentions, and a lack of medical confidentiality have been cited by inmates as significant barriers to accessing testing and disclosure in correctional settings.[13–17]

Key structural barriers within correctional settings also make providing HIV testing difficult. For example, in jail or detention settings (in contrast with prisons) inmates may not remain incarcerated for a sufficient period of time and may be released without the opportunity to be tested or to obtain the test results.[17] Furthermore, in the majority of states, HIV testing within correctional facilities is not mandatory or routine, and despite the CDC's recommendation, only 7–39% of prisons do so routinely and just over a third of jails offer HIV testing.[13,18] In correctional settings where HIV testing is available, biases within the facility may hamper who is actually offered testing. For example, while prisoners with histories of drug use were 10% more likely to be tested, over 60% of men reporting sexual risk behaviors were never tested, and African American and Hispanic inmates are 30% less likely than their White counterparts to be tested.[19,20] Therefore, inmates in these settings

must on their own initiative seek HIV testing; the absence of the routine offer of an HIV test may result in many missed opportunities to identify HIV cases among this high-risk population.

Upon release into the community, inmates also face numerous challenges to succesful linkage and retention in HIV treatment and care. Prevalent barriers to accessing and remaining in HIV care include lack of adequate housing;[21–23] lack of health insurance post-release; difficulty securing employment; psychaitric and substance abuse problems; re-incarceration;[21,24–27] and the experience of multiple, intersecting stigmatized identities related to HIV status, criminal history, race/ethnicity, poverty, substance use, mental illness, or sexual orientation. For example, once linked to care, a lack of stable housing can pose serious challenges to such tasks as making and keeping appointments, consistently taking one's medications, and storing medications safely. Similarly, the transition back into the community may disrupt sobriety achieved while incarcerated or any psychiatric care the individual was receiving while incarcerated.

Despite these barriers to testing and linkage to treatment, correctional facilities have been identified as critical settings in which to reduce HIV burden via TasP approaches of increasing HIV testing and linkage to treatment and care in the community.[13,17] Recognizing that challenges on multiple levels hamper inmates' ability to access and remain consistently engaged in care, several HIV testing delivery strategies and linkage programs to HIV treatment in the community have been developed and implemented to combat these barriers and improve the medical and psychosocial health of correctional populations. However, many of the barriers that limit inmate access to HIV testing in correctional settings and linkage to care in the community post-release may also influence the successful implementation of these programs. Improvements in the implementation, and consequently in the optimal delivery, of HIV services in correctional settings are critical in order successfully to mount TasP approaches to HIV reduction and successfully move HIV-positive inmates along the HIV continuum of care.[28]

In order to understand where and how to allocate scarce resources within both correctional settings and the community, it is necessary to understand the effectiveness *and* implementation of these programs. Such data will allow researchers, policymakers, correctional health practitioners, community-based organizations and HIV medical practitioners to make informed decisions about which programs to implement, adapt or even develop in the context of system or organizational characteristics that influence implementation. Thus, we conducted a systematic review of programs designed to specifically address two parts of the cascade that are critical to TasP approaches within correctional populations: HIV testing in correctional settings to identify HIV-positive inmates and linkage of HIV-positive inmates to HIV care in the community post-release. The goals of the paper are two: (1) to review the effectiveness of HIV testing and linkage to community treatment programs and describe key components of these programs; and (2) to review facilitators and barriers to the implementation of these programs in correctional and community settings.

Methods

Procedures

A systematic review of the published literature was performed by three of the authors (KSE, JJ, AYS) to identify 1) empirical studies of programs or strategies that increase uptake of testing in correctional settings and 2) empirical studies of programs that promote linkage to treatment and care post-release. Studies of such endeavors were selected for review if they were 1) conducted in the United States, 2) were published over the past 15 years (between 2000 and 2015), 3) were published in peer-reviewed journals, 4) reported outcome data (i.e., not solely program description) or described implementation findings of programs with published outcome data, and 5) were reported in English.

The literature search was conducted via Medline (searchable through PubMed), PsycINFO and SocIndex databases (online databases in the social and health sciences). Additionally, studies were obtained through bibliographic review of acquired publications. Search term categories for the first search (HIV testing within corrections facilities) included: ‘correctional’ OR ‘incarcerated’ OR ‘inmates,’ OR ‘jail’ AND ‘HIV testing’ OR ‘linkage,’ OR ‘HIV treatment.’ Search term categories for the second search (linkage to community HIV care post release) included: ‘incarcerated’ OR ‘inmates’ OR ‘correctional’ OR ‘prison,’ OR ‘jail’ AND ‘HIV,’ OR ‘transition,’ OR ‘linkage,’ OR ‘intervention,’ OR ‘program,’ OR ‘community,’ OR ‘post-release.’

Data synthesis

Three authors (KSE, JJ, AYS) read the full text of all included studies and gathered information on study site, characteristics of study samples, characteristics of testing or linkage programs, and relevant outcomes (e.g., testing uptake; percent HIV-positive case detection; percent linked to treatment) as reported by each study. The majority of studies included in the review did not include a control group or control period or include changes in program outcomes (i.e., pre-post data). Therefore, were unable to generate effect sizes for intervention outcomes, making a meta-analysis of included studies not possible.

Results

The systematic review of the databases for empirical studies of programs or strategies that increase uptake of testing in correctional settings resulted in 320 potential articles, of which 296 were excluded based on a careful review of title and abstract. Out of 24 articles whose full-text was reviewed, 11 met the aforementioned inclusion criteria and were included in the review. A bibliographic review of these publications found three additional manuscripts to be included. In total, 14 articles met inclusion criteria and were included in this review (see Figure 1).

The systematic review of the databases for empirical studies of programs that promote linkage to treatment and care in the community post-release resulted in 577 potential articles to be included in the review. Out of 52 articles whose full-text was reviewed, 17 met the aforementioned inclusion criteria and were included in the review. A bibliographic review of

these publications found four additional studies to be included. In total, 21 articles met inclusion criteria and were included in this review (see Figure 2).

A total of 35 articles are included in this review. The majority of the studies across both literature searches employed a post-test only design (n=14; i.e., only present rates of testing or linkage following implementation of the program without providing rates of testing or linkage prior to program implementation), which precludes evaluation of program effect. Eight programs employed a pre-posttest design or had a comparison group, n=7 were (randomized) control trials; n=6 solely describe implementation of the programs. First, we review the effectiveness of (1) programs that improve HIV testing in correctional facilities and (2) programs that improve linkage to HIV care and treatment in the community; we provide description of key components of each type of program. Second, we review facilitators and barriers that influence the implementation of these two types of programs in correctional and community settings.

Effectiveness of HIV Testing and Linkage to HIV Community Care Programs

Programs improving HIV testing in correctional facilities

Our review of HIV testing programs documented three related strategies that were implemented to address the challenges of HIV testing in correctional settings: 1) routine opt-out voluntary HIV testing, 2) timing of HIV testing, and 3) use of rapid HIV testing to ensure prisoners' receipt of results. Table 1 provides more detailed information about the 14 HIV testing programs reviewed. Of note, several studies examined feasibility and acceptability of multiple testing strategies (i.e., routine, opt-out rapid testing) at the same time, precluding our ability to make declarative statements about specific methods.

Routine opt-out HIV testing—The CDC has recommended routine opt-out HIV testing for all patients in health care settings, including correctional settings, since 2006.[29] Routine opt-out testing has been conceptualized as a policy measure to protect the public's health as well as to preserve the privacy and human rights of the incarcerated individual by prioritizing access to health care screening, while maintaining the individual's ultimate right to refuse.[30] Eight published articles examined the feasibility and/or efficacy of routine opt-out testing in correctional setting and found acceptance/uptake rates between 22% and 90%,[31–39]—with significant increases the uptake of HIV testing in studies that compared pre-routine opt-out testing protocols. Rates in detection of HIV cases ranged from 0.03 to 2%, with confirmed *new* cases ranging from 0.13% to 0.8%. Of note, data from one study[38] are derived from the "Enhancing Linkages to HIV Primary Care and Services in Jail Settings" (EnhanceLink), which is a 20-site initiative to determine how best to detect HIV and secure linkages to treatment within jails and in the community after release.[38,40]

Three studies[31,34,37] conducted in jail and prison settings provided data comparing opt-out to inmate-request strategies. These studies found increases in uptake of HIV testing between 21% and 85% when opt-out was implemented. Two studies in jail and prison settings also examined differences between opt-in and opt-out strategies, and found increases between 18%–21%[8] after opt-out strategies were implemented.[34,39] Changes in detection of new HIV

infections increased from 1.8 new cases per year during on-request testing to 5.1 with opt-in and to 7.6 opt-out testing policies.[34]

One study, as part of the Criminal Justice Drug Abuse Treatment Studies (CJ-DATS), the HIV Services and Treatment Implementation in Corrections trial (HIV-STIC) examined the success of a process improvement model to implement improved HIV services across the HIV care continuum (prevention, testing, linkage to community treatment) using 14 cluster-randomized trials. Pearson et al.[35] found that out of two cluster-randomized trials focused on increasing opt-out HIV testing, there was no significant overall effect of increased HIV testing between experiment and control conditions (logOR=0.16, 95%CI: −0.24–0.57). Trial-specific analyses revealed a significant effect for one trial (logOR=0.37SE=0.07) and closer examination of both intervention sites reported increases in uptake of testing of up to 23%.[41]

Timing of HIV test—Three studies, two of which were randomized control trials (RCTs), examined how timing of HIV testing influenced uptake in jail settings; no studies examined timing of testing in prison facilities. Kavasery and colleagues examined the effect of when a test was offered on testing uptake in controlled trials of routine opt-out HIV testing for males[33] and females.[32] Comparing testing on the same day as intake (immediate), the day after intake (early) or several days after intake (delayed), they found males were between 2.4 and 3.0 times more likely to accept testing if offered same-day or next-day after intake compared with seven days post-intake.[33] Females offered early testing were 2.3 and 2.7 times more likely to accept testing compared with immediate and delayed testings, respectively.[32] Similarly, an evaluation of a routine jail-based HIV testing in Rhode Island[29] found that routinely offering HIV testing to all detainees within 24 hours of admission to jail resulted in capturing 29% of newly diagnosed inmates. Taken together these findings suggest that approaching inmates for screening as early as possible in the detention or incarceration process (within 24–48 hours) will result in a substantial increase in testing uptake as well as detection of new cases before release in jail settings.

Rapid HIV testing—Eight published manuscripts, representing six different HIV testing initiatives, examined the feasibility and acceptability of providing (opt out) rapid HIV testing in jails;[32,33,37,39,42–45] again, no studies examined rapid testing in prisons. The advantage of this method of testing over traditional testing methods is that it increases the likelihood that test results are received by the inmate prior to turnover, transfer, or release;[13] rapid-testing can be available in as little as 20 minutes whereas traditonal testing methods can take from 7–14 days to get results. Rates of acceptance of rapid HIV testing across all eight studies ranged from 22% to 98%, of which almost all tested inmates received their results (89.5%–100%). Between 0.6% and 2.0% of tests were positive, and rates of *new* HIV detection ranged from 0.0% to 0.89%. Only two studies had comparison or baseline groups, noting an increase between 21%–67% in rates of HIV testing following implementation of rapid testing.[37,39] Spaulding and colleagues[39] also compared acceptance of different methods of rapid testing (oral swab or finger-stick) with each other as well as with traditional serum blood test. Acceptance rate of the serum test was 43.2% compared with 64.3% for rapid-oral HIV testing; rate of new preliminary positives was 0.43% with rapid-

oral HIV testing. When finger-stick rapid HIV testing was implemented, acceptance of testing went to 81.32% and rate of new preliminary positives increased to 0.52%.

Programs improving linkage to HIV treatment and care in the community

Our review of programs to improve linkage to HIV treatment and care in the community revealed two approaches. The first is a 'correctional system-based' approach that focuses on improving staff ability and/or expanding staff capacity within the correctional setting. The second is a 'correctional system—community setting partnership' approach, in which correctional facilities partner with agencies within community settings (e.g., community-based organizations [CBOs], hospitals, health departments, and community-based organizations) to deliver linkage programs to inmates while incarcerated and upon release. We review linkage to HIV community treatment and care programs according to these two approaches. Table 2 provides more detailed information about the linkage programs, including program description and definition of linkage, reviewed here.

Correctional-system based approach—Two studies of correctional-system based approaches, one of which was an RCT, linked between 35%–65% of HIV-positive inmates to at least one HIV care appointment within four weeks post-release.[46–48] A common element of these programs was that inmates met with department of corrections (DOCS) case managers to plan post-release care for a period of time pre-release. Specifically, in the Bridges to Good Care and Treatment (BRIGHT) program, DOCS case managers were required to meet with participants at a minimum of every two weeks prior to release, twice a week the first week following release, weekly for the following two weeks and then at approximately two-week intervals up to six months after release.[48] Despite intensive case management, an RCT of the intervention found BRIGHT participants compared with the standard of care (SOC) were not significantly more likely to attend an HIV appointment within four, 12 or 24 weeks post-release.[46]

The second program, designed by the University of Mississippi (MS) Medical Center and adopted by the MS Department of Corrections,[47] also included an electronic sharing of medical records component in addition to face- to face meetings with DOCS and community case managers within six months prior to release. Specifically, MS DOCS and the Statewide HIV Community Service Delivery Network shared the same medical records system. This method of medical record sharing between DOCS and the community Network permitted 90% of discharged inmates to have a scheduled appointment at an HIV clinic upon release. Over the course of the intervention, the average number of days from release to linkage (defined as first contact with a provider) decreased from 79 to 40 days. However only 35% actually attended the appointment within 30 days; and inmates were only provided with a 30-day supply of antiretroviral (ARVs) medications.

Correctional system-community setting partnership approach—Five different programs have been developed that involved community organizations entering DOCS facilities and conducting the linkage work: Positive Transitions, and the HIV-STIC program, both RCTs, EnhanceLink-COMPASS, EnhanceLink-Project Bridge, and the Corrections

Demonstration Project. Documented by 19 different manuscripts across multiple sites, these programs reported linkage rates between 79%–88.4%.

Positive Transitions (POST), a six-session (four pre and two post-release) intervention to decrease HIV risk and increase access to care for HIV-positive inmates, was evaluated using an RCT design[49]. Participants from jails and prisons were randomized prior to release to either the SOC condition, transitional case management (TCM), or POST, which also included TCM. Comparing behaviors in the three months prior to incarceration to three months post-incarceration, participants in POST reported a within-group significant increase from 62.5% to 84.4% in access to HIV care at a clinic. However, the magnitude of change was not significantly different from the SOC group (44.4% to 63.0%).

As part of the HIV-STIC multi-site randomized trial comparing the change team approach, which comprised both correctional and community HIV staff, to standard HIV training of correctional staff, Pearson et al[35] found across 7 cluster randomized trails, 88.4% of HIV-positive participants were linked to care (compared with 69.5% in control arm), with neither overall significant effect of successful linkage to HIV treatment and care (logOR=0.70; 95%CI:−0.33–1.74) or site-specific effects.

In EnhanceLink the collaboration between correctional settings and community organizations was a key feature of the initiative. The manner in which this collaboration was implemented varied from site to site (see Draine et al.[40] for detailed program description), and two different linkage programs were implemented: COMPASS and Project Bridge (see Table 2 for detailed program description). Cumulatively across all 10 sites, 9,837 HIV-positive inmates were offered linkage to transitional services including housing, drug treatment, medical care and social services and 82% accepted the offer.[38] Of those inmates enrolled in the client-level portion of the multi-site evaluation (n=1,386) across all sites, 79% were linked to care and 74% received additional community services within 30 days post release.[50] Site-specific or subsample data from EnhanceLink reveal that between 55.6%–100% of inmates were linked to care upon relase (see Table 2).[22,23,51–56]

The Corrections Demonstration Project (CDP) is a five-site initiative to enhance collaboration between public health, correctional facilities and community-based health providers to improve continuity of care for HIV-positive inmates post-release.[57] Case management services were offered that started inside the facility and continued for six months post-release from either a jail or a prison facility. Approximately 97% of those enrolled in the program reported having a primary location for HIV treatment and care during the follow-up period. Data on HIV service linkage was not described, but a significant increase between pre- and post-incarceration was noted for use of substance abuse treatment (34% vs. 62%, respectively). Of note, a key feature of the program was to meet the inmate ‘at the gate’ upon release. However, “logistical impediments” (pg. 667) to successful implementation of this program resulted in 54% of participants not being met upon release and not linked. Comparison between the two groups found participants met at the gate upon release were more likely to engage in drug treatment and not engage in sex exchange in the six months post-release than those who are not ‘met at the gate.’ This

finding suggests a key element of case management post-release linkage programs occurs immediately upon release into the community.

Implementation of HIV Testing and Linkage to HIV Community Care Programs

The translation of evidenced-based HIV testing, linkage, treatment, and prevention programs into real-world settings can be challenging. Implementation of these programs for inmates/ex-offenders appears to be particularly challenging at both structural and individual levels. Below we describe facilitators and barriers to implementation experienced with the testing or linkage programs reviewed above. Facilitators and barriers are reviewed at structural (system/staff and policy) and individual levels, and separately for testing and linkage programs. In some instances, implementation issues were discussed as part of the manuscript in which outcome data were reported, whereas in others, manuscripts were written specifically to detail the implementation process.

Implementation of programs improving HIV testing in correctional settings

Correctional system/staff—All reported barriers related to implementation of HIV testing programs and initiatives were at the system level. With opt-out testing models, high turnover/rapid release of inmates in jails was cited as a considerable barrier to providing results of testing if rapid testing was not implemented as part of the protocol and the provision of confirmatory testing if rapid testing was used.[32,33,37,58] These findings suggest that correctional systems may need to develop procedures to accomplish screening and result delivery within 24–48 hours, and engage public health infrastructure (i.e., Department of health and local CBOs) when necessary to track participants who did not receive their screening result or receive confirmatory testing.[40] Qualitative evaluation of correctional medical staff perspectives revealed opt-out, rapid-testing improved and streamlined the testing and linkage to treatment process within correctional facilities, but staff noted the delivery of positive HIV test results during the initial highly-active intake period was considered difficult[43,58]

Implementation of programs improving linkage to HIV treatment in the community

Correctional system/staff—A critical barrier to successful implementation of linkage programs was the difference between correctional and HIV/AIDS community agency mission and culture.[36,59,60] Correctional agencies' focus on security contrasted with the HIV community agencies' focus on health and well-being of inmates. Additionally, policies and procedures within corrections agencies also hindered implementation of programs. For example, correctional facilities, focused on security, often limited access of community HIV agencies to inmates or required community organizations to have correctional escorts that were often unavailable.

Strong communication and collaborative relationships with correctional staff were also critical.[36,60] Regardless of administrative mandates, relationships with on the ground workers were seen as the linchpin to successfully getting programs, or their specific elements, to work. For example, programs designed to meet a participant immediately upon

release (at the gate) were only able to do so with excellent communication with correctional staff who would inform program staff if inmates were being released early, moved, or otherwise advancing unexpectedly through or out of the system.[59,61] Additionally, communication between corrections agencies, CBOs and state or county level departments of health was often problematic; the latter was perceived to be far removed from the issues facing frontline staff.

Community setting/staff—Community-based organization staff involved in CDP described one of the biggest obstacles to successful linkage and engagement in HIV treatment and care was getting their participants enrolled in support or auxiliary services (e.g., housing, substance use treatment) due to low availability of services. Furthermore, because participants had criminal records, especially drug charges, staff described that participants were often ineligible for these services. Indeed, discrimination related to multiple stigmatized identities (e.g., HIV-positive, ex-offender, substance user or mentally ill and minority status) prevented ex-inmates from accessing and remaining in services upon release.[48,59,58] Establishing stable housing was highlighted as a particular barrier to successful linkage to HIV treatment and care. In a related vein, finding employment was a significant barrier despite innovative methods tried by staff members to identify positions that would be friendly towards those with a criminal history (e.g., soliciting opportunities at Alcoholics Anonymous meetings; identifying employment agencies that would work with ex-offenders).[61]

Staff also described difficulties with “long-distance” linkage. In many instances inmates are incarcerated far from home, and therefore the local CBO who initially works with the inmate pre-release is not well-placed to assist the inmate locate services in his/her community upon release. Community-based organizations engaged in on-site linkage frequently described insufficient communication between themselves and local CBOs in the inmates neighborhood resulting in many inmates getting lost upon release.[59]

Policy—Securing health insurance was a significant barrier to accessing services, including medical care. Although several states have developed mechanisms to address the gap in coverage immediately post-release (e.g., NYS with AIDS Drug Assistance Program), lack of Medicaid coverage upon release remains one of the most significant barriers to successfully implementing linkage to care programs.[59]

Individual—At the individual level, linkage staff described significant difficulty convincing participants that medical care was a priority, when other basic needs (i.e., shelter) were unaddressed.[58,59,61] Similarly, engaging participants to begin and remain in auxiliary services, such as substance abuse or mental health treatment, was a challenge. Staff described the importance of establishing trusting relationships with inmates and noted that the brief nature of some programs (less than six months) hampered their ability to engage with and thus successfully work with inmates upon release.[61] Finally, individuals with various comorbidities, especially substance use, appeared to be less successful at linking to and obtaining HIV care.[47] Substance use emerged as a significant barrier to adherence in treatment and care, either directly or indirectly via unstable housing and relationships.[48] Findings from the EnhanceLink program indicate that individuals who were more likely to

be linked to care included those who were White, male, aged 40 years and older, those who received HIV or medication education while in jail, had a completed discharge plan upon release, and whose release was known in advance by EnhanceLink staff.[50,51] Comparing characteristics of those lost-to follow-up to those who successfully linked, Teixeira and colleagues[52] found those lost-to-follow-up were more likely to be younger, non-Hispanic Black, female or transwomen. Indeed, Meyer and colleagues[51] found that incarcerated females fair less well at each point of the HIV continuum than their male counterparts.

Finally, the HIV-STIC study was designed to examine implementation strategies aimed at improving HIV services for inmates or those under community supervision. The study focused on improving acceptability (i.e., staff perceived value in improving HIV services), feasibility (i.e., practical considerations of services improvements) and organizations support (i.e., organizational acceptance of and commitment to planned improvements to HIV services). It was hypothesized that improvements in these implementation factors via a local change team (the implementation strategy) comprised of correctional, medical and community staff would in turn improve HIV services for inmates. The study found that over 13 months, the medical staff in the experimental arm showed increases in feasibility and acceptability compared with the control arm. This was not the case for correctional staff who reported decreases in feasibility of implementing improved HIV services. There were no differences in changes in organizational support across arms over time. Taken together, these findings indicate that differences in staff attitudes may highlight the potential differences in mission between medical and correctional staff, particularly in the context of unchanging organizational support.[36,60] Evaluation of client outcomes (i.e., increases in HIV testing and linkage to community treatment upon release) were negligible.[35] However, inmates in experimental correctional facilities did demonstrate an increase in awareness of HIV and perceived relevance of HIV services.[41]

Discussion

The programs reviewed here provide important information on the results and components of HIV testing and linkage to community treatment programs for HIV-positive inmates both while in correctional settings and once released into the community. The results of the testing programs varied widely, with HIV testing acceptance rates ranging from 22% to 98% depending on the modality and timing offered. Similarly, results from linkage programs also showed wide variability (35%–84%) depending on program type and site-specific implementation issues. Taken together, these findings suggest that TasP approaches to HIV in correctional settings may be effective at reducing HIV transmission within the communities to which inmates return upon release. However, attention to key implementation factors, such as culture and mission of the respective correctional and public health agencies and strong staff collaborations, appears critical to the success of both testing and linkage to community treatment programs, and thus to TasP approaches of reducing HIV.

Overall, testing programs that offered rapid, opt-out HIV testing, implemented within 48 hours, reported the highest rates of testing uptake and were identified as effective, feasible and acceptable methods of increasing uptake of testing and delivery of results to almost all

participants tested. Elements of these programs, therefore, addressed two key system barriers to HIV testing in correctional settings: high inmate turnover and timely return of positive results. However, the ability of these programs to identify *new* HIV positive cases was limited (up to 0.91% tested were new cases). Based on a cost-effective analysis, researchers have advised that routine, opt-out HIV testing only be provided in facilities where prevalence of previously undiagnosed HIV infection has been documented to be more than 0.1%.[62]

Success of HIV testing programs to detect new HIV infection may be improved if programs address known individual-level barriers to HIV testing within correctional settings. Correctional settings are in a unique position to facilitate testing and initiation of ART more equitably compared with the general population due to access to free medical care and providers.[63] However, barriers to HIV testing within correctional settings identified in the broader literature, such as HIV-related stigma, confidentiality concerns, and mistrust of correctional medical care, were not addressed by the majority of programs designed to promote testing of HIV-positive inmates in correctional settings, nor were these potential barriers examined to determine how they may have influenced testing uptake and program outcomes. Greater exploration of individual-level barriers and facilitators to successful testing is necessary via qualitative or mix-method inquiry in order to develop meaningful policy and programming in order to increase uptake of HIV testing and the identification of HIV-positive individuals while they are incarcerated.[15]

The success of correctional-based and collaborative approaches to linkage was also highly variable. While different definitions of linkage make comparison across programs difficult, linkage rates appear higher among collaborative approaches (79%–84%) compared with correctional-based approaches (35%–65%), and rates for each were similar to linkage rates noted in the general population (62%[7]). However, one correctional-based and two collaborative approach linkage programs evaluated by RCTs showed no significant improvement of the experimental program compared with SOC in any of the studies. These findings, corroborated by staff reports, suggest that HIV linkage to treatment programs may need to be substantially intensified with respect to length and access to or provision of auxiliary support services to meet the needs of this high-risk, high-need population.

The success of these linkage-to-community care programs may be also hampered by additional factors at multiple levels that interfere with their implementation. Yet, we have a limited understanding of barriers and facilitators to implementation of programs that seek to link HIV-positive inmates to community services upon release. Furthermore, in contrast to research that has examined implementation strategies to optimize HIV testing programs (e.g., time of testing, opt-out vs opt-in testing, rapid testing), almost no work has developed and examined key implementation strategies to linkage. Improving implementation, and subsequently the success and sustainability of linkage programs in routine practice, should be a critical focus of future research. Studies that described implementation barriers to linkage programs found that navigating the contrasting culture and mission between correctional settings and HIV CBOs, as well as achieving commitments to the programs at the level of jail or prison administration were essential for case management, referral, and other key linkage elements to be successfully achieved. The CJ-DATS: HIV-STIC

intervention is the only study found as part of this review that examined an implementation strategy targeting organizational-level barriers to improve uptake of HIV services across the care continuum.[28,35,41,60] Emerging findings from this study suggest a complex interaction of staff and system level factors that influence the successful rollout and uptake of evidence-based practices for HIV for inmates. Future research that employs a multi-level, ecological model to examine implementation facilitators and barriers at system-, staff-, and inmate-levels will help inform the development of implementation strategies for linkage programs that can successfully work within correctional settings and that will allow the scale-up and sustainability of efficacious programs across various correctional and community settings. The combination of more intensive linkage programs for inmates with structural or organizational-level interventions may significantly improve the success of linking inmates to HIV treatment upon release.

Finally, we found that studies of HIV testing and linkage to HIV community care programs were variable in their methodology and overall quality. Specifically, three key limitations of the testing and linkage program literature precluded a rigorous evaluation of the efficacy of these approaches, and are thus avenues for future research. First, the study designs used to assess efficacy of these interventions. As noted, the majority of programs (n=14) were evaluated with a single-arm, post-test design in which testing uptake or linkage rates were reported as evidence of program success without comparison to rates of testing uptake or linkage before the program was implemented or to a standard of care/comparison group. In particular, the three linkage program evaluation studies that used controlled designs (BRIGHT, POST, HIV-STIC) found no difference between the intervention and standard of care. Future studies that employ more rigorous study design (e.g., RCT or a quasi-experimental design) are needed in order to identify successful testing and linkage strategies to be disseminated throughout correctional settings. The second limitation to determining efficacy of linkage programs is the lack of consensus among researchers on definitions for linkage and retention in treatment employed by researchers (e.g., attendance at appointment within 30 days, 60 days, 90 days) (see Table 2). A clear and consensually understood meaning of successful linkage will allow comparison across programs and close examination of those programmatic elements that confer success. Finally, we are lacking reliable or valid measurement strategies that can be used to track offenders over time. Montague and colleagues[64] recommend using innovative technological strategies to develop scalable metrics with which to assess adequacy of linkage to care after release. Without such metrics it is challenging to determine how well interventions succeeded and how ex-offenders are using services post release. The authors recommend using de-identified client level data from Ryan White-funded programs that serve post-release prisoners in order to track programs' successes and challenges in engaging and retaining ex-offenders in treatment and services. Using aggregated data may help identify best practices by examining those programs that are successful and replicating key components across settings.

In conclusion, despite the significant need to provide HIV testing to inmates in correctional facilities and link HIV-positive inmates to HIV treatment and care upon release in the community, there are few programs that have been developed and implemented to address this need. This review identified nine separate HIV testing initiatives and four linkage to HIV community treatment programs, the evaluation of which was hampered by limited data

that described changes in HIV testing uptake or linkage success. Moreover, implementation difficulties appeared to limit the success of linkage programs and much work remains to be done to optimize these programs. Nonetheless, several programs demonstrated substantial success, reporting rates of HIV testing uptake (98%) and linkage to HIV treatment (84%) that are higher than those reported in the general population,[65] suggesting that TasP approaches to HIV prevention and elimination in this high risk and high need population can indeed be effective.

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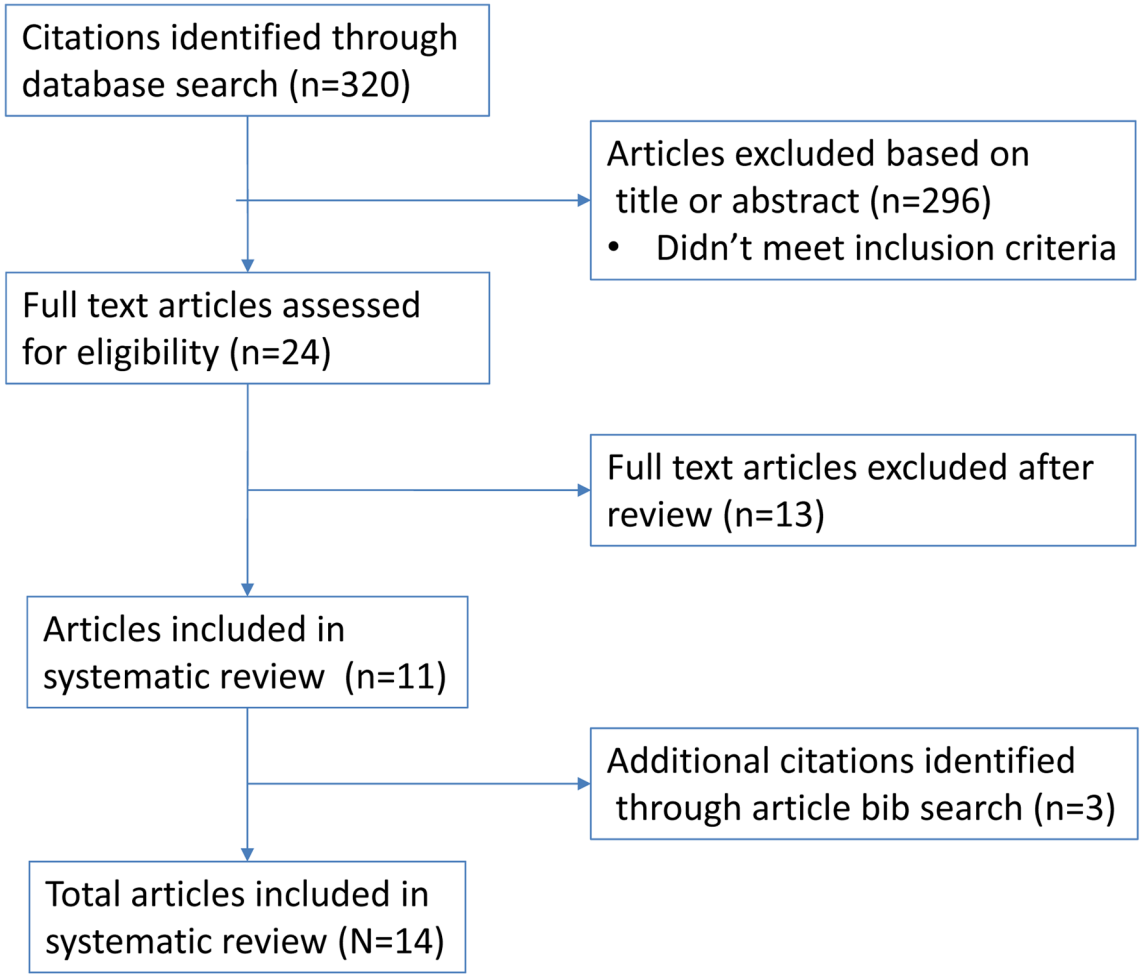

Figure 1.
Systematic search strategy for empirical studies on programs or strategies that increase uptake of testing in correctional settings

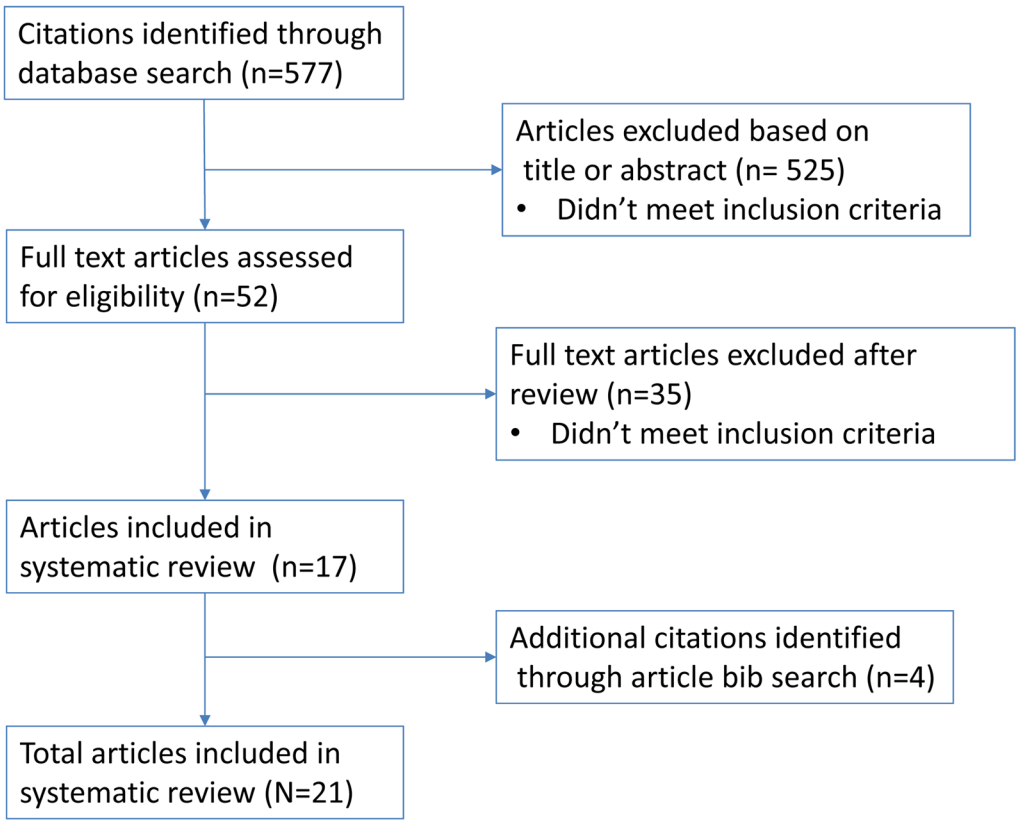

Figure 2.
Systematic search strategy for empirical studies of programs that promote linkage to treatment and care in the community post-release

Table 1

Description and findings from n=14 studies of HIV testing programs in correctional facilities

Author, year	Sample, site	Study Design	Testing Strategy Approach	Time of HIV test offering/delivery	Offered %(n)	Tested %(n)	Identified HIV+/ Reactive test[a,b]* % (n)	Newly HIV+ Identified[a,c] %(n)
Beckwith et al., 2012[38]	Multi-site: Baltimore N=72,000 inmates Philadelphia N=39,181 inmates Washington DC N=17,903 Inmates Jail	12-month uptake data 2-month baseline data	Routine opt-out HIV testing Rapid (oral) HIV test	Jail intake or 3–4 days after intake during syphilis testing	Baltimore: 13% (9268) of total intakes Philadelphia: 100% (39,181) of total intakes Washington DC: 89% (15,982) of total intakes	Baltimore: **Baseline**: 0.4% **12m**: 22% (2066) Philadelphia: **Baseline**: 10% **12m**: 69% (27,000) Washington DC: **Baseline**: 12% **12m**: 79% (12,546)	Baltimore: **12m**: 2% (42) Philadelphia: **12m**: 0.6% (156) Washington DC: **12m**: 0.8% (106)	Baltimore: **12m**: 0.34% (7) Philadelphia: **12m**: 0.28% (75) Washington DC: **12m**: 0.48% (60)
Beckwith et.al., 2011[44]	N= 1,364 newly detained male inmates; Jail	Pilot program uptake No baseline/control group	Rapid (oral) HIV test	Jail intake or within 24 hours	1,364 enrolled in pilot program	98% (1343)	0.8% (12)	.07% (1)
Beckwith et al., 2007[43]	N=113 male inmates; mean age 29; 46% white; 25% Black; 17% Hispanic Jail	Pilot program uptake No baseline/control group	Rapid (oral) HIV test	Within 48 hours of jail intake	100 enrolled in pilot program	95% (95)	1% (1)	0% (0)
CDC, 2011[29]	N= 34,278 male inmates Prison	Comparison groups across 3 testing policies (59) months: Voluntary testing=19 months Opt-in=31 months Opt-out= 9 months	Routine opt-out HIV testing Enzyme immunoassay/Western blot	On request During intake to all those not know to be HIV+	Voluntary testing: N=12,202 Opt-in testing: N= 16,908 Opt-out testing: N=5,168	Voluntary testing: 5% (610) Opt-in testing: 72% (12,173) Opt-out testing: 90% (4,651)	N/A	Voluntary testing: 0.50% (3) Opt-in testing: 0.11% (13) Opt-out testing: 0.13% (6)
CDC, 2010[31]	N=140,739 jail admissions (male and female) Jail	Evaluation of 7 years of HIV testing records; program uptake No baseline/control group	Routine opt-out HIV testing; Timing of HIV test Enzyme immunoassay/Western blot	Jail intake, within 24 hours	140, 739	73% (102,229)	1.2% (1259)	0.17% (169)
Kavasery, Maru, Sylla et al, 2009[33]	N=298 male inmates; mean age 35; 19% Hispanic; 35% black; 46% white/other Jail	RCT of timing of HIV test delivery (3-weeks)	Routine opt-out HIV testing Rapid (oral) test Timing of HIV test	**1** Immediate: day of admission (n=103) **2** Early: 1 day later (n=98) **3** Delayed: 7 days later (n=97)	Immediate: 95% (98) Early: 76% (74) Delayed: 51% (49)	Immediate: 45% (46) Early: 53% (52) Delayed: 33% (32) Early>Delayed Imm.>Delayed	1.38% (2)	0.69% (1)
Kavasery, Maru, Homonoff, et al., 2009[32]	N=323 female inmates; mean age 33.6; 51% white/other; 32% black; Jail	RCT of timing of HIV test delivery (5-weeks)	Routine opt-out HIV testing Rapid (oral) test Timing of HIV test	**1** Immediate: day of admission (n=108) **2** Early: 1 day later (n=108) **3** Delayed; 7 days later (n=107)	Immediate: 86% (93) Early: 81% (87) Delayed: 63% (67)	Immediate: 55% (59) Early: 73% (79) Delayed: 50% (54) Early>Imm Early>Delayed	1.04%* (2)	0% (0)

Author, year	Sample, site	Study Design	Testing Strategy Approach	Time of HIV test offering/delivery	Offered %(n)	Tested %(n)	Identified HIV+/ Reactive test[a,b*] % (n)	Newly HIV+ Identified[a,c] %(n)
Kendrick et al, 2004[46]	N=2128 Female detainees; Jail, (STD clinic, & emergency department)	Program uptake data (4.5 months) No baseline/control group	Rapid HIV test "SUDS" rapid test	Jail intake (initial medical examination)	2128 enrolled	46% (988)	0.91% (9)	0.91% (9)
Liddicoat et al., 2006[35]	N=1004 inmates; 91% male; 48.1% African American Prison	Pre-post trial with historical 12-month control comparison group (5 months)	Routine opt-out HIV testing Blood drawn enzyme immunoassay	Intervention: Prison intake Control: upon request	Intervention: 1,004 enrolled Control: 1723	Intervention: 73.1% (734) Control: 18% (318)	Intervention: 0.3% (2) Control: Not provided	Intervention: 0.3% (2) Control: Not provided
MacGowan et al., 2009[45]	N=550,000 male and female intakes; Jail	Program uptake data (2.5 years) No baseline/control group	Rapid HIV testing	24 or 72 hours post intake	Not reported	33,211	1.3% (440)	0.8% (269)
Pearson et al., 2014[36]	N=6600 Male and female intakes Jail and prison	Cluster randomized trials on matched pairs of facilities; (2.5 years)	Routine opt-out HIV testing	Not provided	Site 1:1650 Site 2: 1650	Site 1 Exp: 48.1% (794) Cont: 49.2% (812) Site 2 Exp: 52.90% (873) Cont: 43.69% (721) Site 2: Exp >Cont.	Not provided	Not provided
Spaulding et al., 2014[40]	N=30,316 male and female intakes Jail	Baseline: 3 months Phase 1: 14.5 months Phase 2: 12 months	Baseline: opt-in serum HIV testing Phase 1: opt-out oral rapid HIV test Phase 2: opt-out finger stick HIV test	Jail intake or at medical evaluation within 14 days of intake	Baseline: 5218 Phase 1: 18,869 Phase 2: 20,947	Baseline 43.2% (2253) Phase 1: 64.3% (12,141) Phase 2: 81.32% (17,035)	Baseline: 3.16% Phase 1: Not reported Phase 2: 1.33% (226)	Baseline: Not reported Phase 1: 0.43% (52) Phase 2: 0.52% (89)
Spaulding et al., 2013[39]	N=877,119 admissions 20 Jails	Program uptake data (3 years) No baseline/control group	Routine opt-out HIV testing	Jail intake	56.9% (499,131)	42.13% (210,267)	0.62 % (1,312)	0.39 % (822)
Swan et al., 2015[37], [e]	N=3300[d] Male and female intakes Jail and prison	Cluster randomized trials on matched pairs of facilities (10 months)	Routine opt-out HIV testing	Not provided	Not provided	Site 1 [d]: Baseline=4% Post-intervention= 8% Site 2 [d]: Baseline:=3% Post-intervention=26%	Not provided	Not provided

[a] %= identified by the testing method being evaluated (e.g. rapid testing as opposed to confirmatory screening);% includes false positives

[b] %=number tested positive/number offered tested

[c] %=number tested newly positive/number offered tested

[d] Sites described represent experimental sites only.

[e] Subset of Pearson et al. not included in determination of overall rates of linkage

RCT=Randomized control trial; Exp=Experimental group; Cont.=Control group

Table 2

Description and findings from n=21 studies of linkage programs to HIV care in the community upon release

Author, year	Sample, site	Study Design	Linkage Program Approach[a]	% Linked to care in the community	Program Description
Konkle-Parker et al. 2011[48]	N=676; 78.9% male; 83.9% African American; 50% ≥40 years Prison	Program uptake No baseline group/ comparison *Definition of linkage:* Contact with provider within 30 days of release	Correctional-system based	*30 days or less:* 35% *At some point post release: 61%* Significant decrease in the number of days from release to linkage in care from 79 to 40 days.	**MISSISSIPPI** *Description:* a discharge planning program coordinated between corrections and community case managers *Pre-release contact*: DOCS case managers (CM) and community CM meet with participants within 6 months pre-release *Post-release contact*: Not described; participants had to attend community clinic to receive CM and ancillary services; DOCS CM and community CM coordinate. *Unique elements:* Medical record sharing between DOCS and community network.
Wohl et al. 2011[47]*b*	N=104; 62.5% male, 9.6% white, 67.3% African American Prison	RCT: BCM vs SOC; assessed 4, 12, 24 and 48 weeks after prison release *Definition of linkage:* ≥1 appointment within 4 weeks post-release	Correctional-system based	No significant differences in linkage between groups *4 weeks:* BRIGHT=65.1% SOC= 54.4% *12 weeks*: BRIGHT=88.4% SOC=78.3%. *24 weeks:* BRIGHT= 90.7% SOC=89.1% *48 weeks*: No change from 24 weeks	**Bridging Case Management (BCM)-BRIGHT** *Description:* client-led case management for inmates transitioning back into community *Pre-release contact*: DOCS case managers (CM) meet with participants at a minimum of every 2 weeks before release *Post-release contact*: 2 × week in 1st week; 1 × week in 2–3 weeks; 1 × 2 weeks in 4–24 weeks *Unique elements*: motivational; primarily directed by the client rather than the case manager
Arriola et al. 2007[52]	n=226 from five sites; 67% white; 20% African American Jail and prison	Pre-post design; baseline and 6-month follow up interviews *Definition of linkage:* Not described	correctional system – community setting partnership	Linkage to HIV services not reported. 46% met by case manager at release; associated with better substance use and sexual risk outcomes	**CDP (Corrections Demonstration Project)** *Description:* Department of Health, correctional facilities and community-based organizations developed case management-based linkage programming *Pre-release contact*: case manager assesses discharge planning needs *Post-release contact*: 30-day services/status form completed at 30 day intervals *Unique elements:* Case managers attempted to meet client as soon as possible after release (“at the gate”) to transport to housing or drug treatment
MacGowan et al 2014[50]	n=73; 88 % men; 56 % non-Hispanic black; mean age 41 years old. Correctional facilities (jails, prison, medical facility)	RCT *Definition of linkage:* at least one appointment 3 months post-release	Correctional system – Community setting partnership	POST Baseline: 62.5% 3m post: 84.4% SOC: Baseline: 44.4% 3m post: 63.0%	**POST** *Description:* a linkage intervention with community CM, focused on HIV prevention, adherence and access to HIV services *Pre-release contact*: 4 sessions pre-release with community CM

Author, year	Sample, site	Study Design	Linkage Program Approach[a]	% Linked to care in the community	Program Description
				No significant differences between POST and SOC	*Post-release contact*: 2 sessions post-release with community CM
Pearson et al. 2014[36c]	14 cluster-randomized trials at 9 sites Prison and jail	RCT (cluster) *Definition of linkage:* contact with community HIV treatment	Correctional system – Community setting partnership	Experimental: 88.4% Control: 69.5% No significant differences between experiment and control groups	**HIV-STIC** *Description:* modified Network for the Improvement of Addiction Treatment (NIATx) process improvement model to improve access to HIV services using a Local Change Team (LCT), which comprised correctional and community HIV staff. *Staff/organizational-level intervention; linkage programs not described.*
Booker et al. 2013[51]	N=1021; 68.6% male; 60% Black, 19.7% white; 24.3% Hispanic, 46.5% between 40–49 years old Jail	Program uptake No baseline/control group *Definition of linkage:* provider appointment, VL/CD4 test or prescription refil within 30 days post-release	Correctional system – Community setting partnership	79% linked to care	**EnhanceLink** * *Description*: a 20 site evaluation project designed to identify HIV-positive people in jail and link them to community-based care following release.
Spaulding et al. 2013[39]	20 jails, N=877,119 inmates; no demographic data provided Jail	Program uptake No baseline group/ comparison *Definition of linkage*: attendance at appointment 30 days post-release	Correctional system – Community setting partnership	Across all sites: 9,837 HIV positive inmates were offered linkage 82% accepted	**EnhanceLink** * *Description*: a 20 site evaluation project designed to identify HIV-positive people in jail and link them to community-based care following release.
Altoff et al. 2012[63]	N=867 across 10 jails; 68% male; 58% African American, 23% White; mean age 43 years old Jail	Program uptake No baseline/control group *Definition of linkage:* 1 clinic visit during each quarter in the 6 month post-release period.	Correctional system – Community setting partnership	First quarter: 58 % Second quarter: 47%	Site-specific/subsample study of EnhanceLink *
Beckwith, Bazerman et al 2014[64]	n=64; 89% male, 44% Black, 30% Hispanic, 23% white Jail	Retrospective review of medical records No baseline group/ comparison *Definition of linkage:* Appointment within 90 days of release	Correctional system – Community setting partnership	58% linked post-release. 12.5% linked within 90 days.	Site-specific/subsample study of EnhanceLink *
Jordan et al. 2013[65]	N= 4845; NYC Department of Corrections, Rikers Island jails Jail	Pre-post design *Definition of linkage:* Linked to community health provider within 30 days of release	Correctional system – Community setting partnership	Pre: 70% Post: 74%	Site-specific/subsample study of EnhanceLink *
Meyer et al 2014[56]	N=867; 68% male; 59% Black, 223% Hispanic; mean age 43 Jail	Pre-post design Baseline and 6 months *Definition of linkage:* Clinic appointment, usual HIV provider 6 months post release	Correctional system – Community setting partnership	Usual HIV provider Baseline: 65% women, 73% men 6m: 50% women, 63% men 6m:	Site-specific/subsample study of EnhanceLink *

Author, year	Sample, site	Study Design	Linkage Program Approach[a]	% Linked to care in the community	Program Description
				HIV clinic appointment: 61.2%	
Teixeira et al. 2015[57]	N=434; 78% male, 56.7% non-Hispanic Black, 35.5% Latino, 49% between 40–49 years old Jail	Pre-post design Baseline and 6 months *Definition of linkage*: Usual HIV provider in past 30 days	Correctional system – Community setting partnership	Baseline: 83.6% linked 6 months: 92.9%	Site-specific/subsample study of EnhanceLink*
Nunn et al 2010[66]	N=20; 75% male; 40% African American; 25% Hispanic; 40% aged 20–39; 60% aged 40–49. Jail	Qualitative, in-depth interviews. *Definition of linkage*: Not defined	Correctional system – Community setting partnership	100% linked	Site-specific/subsample study of EnhanceLink*
Rich et al. 2001[23]	N=97; 71% male,; 51% Black, 35% White; mean age 39 years Prison	Program uptake No baseline/control group *Definition of linkage:* kept referral appointment	Correctional system – Community setting partnership	75% linked with medical care in community; 100% received HIV-related medical services	Site-specific/subsample study of EnhanceLink*
Zaller et al 2008[22]	N=59, 68% male; 38% white, 45% Black; mean age 42 years Prison	Program uptake No baseline/control group *Definition of linkage*: described	Correctional system – Community setting partnership	95% received HIV related medical care	Site-specific/subsample study of EnhanceLink*

*EnhanceLink linkage program (i.e. COMPASS or Bridge) not specified; RCT=randomized control trial; SOC=standard of care

[a]Approach = '*correctional-system based'* approach that focuses on improving staff ability and/or expanding staff capacity within the correctional setting or '*correctional system – community setting partnership*' approach, in which correctional facilities partner with agencies within community settings (e.g. CBOs, hospitals, health departments) to deliver linkage programs to inmates while incarcerated and upon release.

[b]Haley et al. 2014[49]: implementation study for BCM (see manuscript for review of findings)

[c]Visher et al. 2014[54] and Swan et al 2015[37]: implementation study for HIV-STIC (see manuscript for review of findings)

[d]Meyers et al. 2003[53], Robillard et al. 2003 [62] and Robillard et al. 2011[55] implementation study for CDP (see manuscript for review of findings)