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Authors
Harawa, Nina T
Brewer, Russell
Buckman, Victoria
et al.

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HIV, Sexually Transmitted Infection, and Substance Use Continuum of Care Interventions Among Criminal Justice–Involved Black Men Who Have Sex With Men: A Systematic Review

Nina Harawa, PhD, MPH, Charles R. Drew, Russell Brewer, PhD, Victoria Buckman, BA, Santhoshini Ramani, BS, Aditya Khanna, PhD, Kayo Fujimoto, PhD, and John A. Schneider, MD, MPH

Background. Because Black men who have sex with men (BMSM) experience high rates of both HIV and incarceration relative to other groups, the various stages of criminal justice involvement may serve as important intervention points for addressing HIV and related conditions in this group. Although systematic reviews of HIV interventions targeting MSM in general and BMSM in particular exist, no review has explored the range and impact of HIV, sexually transmitted infection (STI), and substance use prevention and care continuum interventions targeting focused on CJcriminal justice-involved (CJI) populations.

Objectives. To describe the range and impact of published HIV, STI, and related substance use interventions for US-based criminal justice–involved (CJI) populations and to understand their relevance for BMSM.

Search Methods. We conducted systematic searches in the following databases: PubMed, MEDLINE, Cochrane, CINAHL, and PsycINFO, covering the period preceding December 1, 2016.

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Selection Criteria. We selected articles in scientific publications involving quantitative findings for studies of US-based interventions that focused on CJI individuals, with outcomes related to sexual or substance use risk behaviors, HIV, or STIs. We excluded studies if they provided no demographic information, had minimal representation of the population of interest (<|30 African American or Black male or transgender participants), had study populations limited to those aged younger than 18 years, or were limited to evaluations of preexisting programs.

Data Collection and Analysis. We abstracted data from these articles on study design; years covered; study location; participant number, demographics, and sexual orientation (if available); criminal justic (CJ)~~I~~ setting or type; health condition; targeted outcomes; and key findings. We scored studies by using the Downs and Black quality and bias assessment. We conducted linear regression to examine changes in study quality by publication year.

Main Results. Fifty-eight articles met inclusion criteria, including 8 (13.8%) modeling or cost-effectiveness studies and 13 (22.4%) randomized controlled trials. Just 3 studies (5.2%) focused on sexual or gender minorities, with only 1 focused on BMSM. In most studies (n|=|36; 62.1%), however, more than 50% of participants were Black. The most common intervention addressed screening, including 20 empirical studies and 7 modeling studies. Education-focused interventions were also common (n|=|15) and usually employed didactic rather than skill-building approaches. They were more likely to demonstrate increases in HIV testing, knowledge, and condom-use intentions than reductions in sex- and drug-risk behaviors. Screening programs consistently indicated cost-effectiveness, including with BMSM. Care continuum interventions for people living with HIV showed mixed results; just 3 involved randomized controlled trials and these interventions did not show significant differences compared with control conditions. A

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minority of programs targeted non–custody-based CJI populations, despite their comprising a majority of the CJI population at any given time.

Authors' Conclusions. Screening CJI populations for HIV and other STIs is effective and cost-efficient and holds promise for reducing HIV in BMSM. Education-based and care provision interventions also hold promise for addressing HIV, STIs, mental health, and substance use in CJI populations. Additional empirical and modeling studies and results specific to sexual minorities are needed; their paucity represents a disparity in how HIV is addressed.

Public Health Implications. HIV/STI screening programs focused on CJI populations should be a priority for reducing HIV risk and numbers of undiagnosed infections among BMSM. Funding agencies and public health leaders should prioritize research to improve the knowledge base regarding which care continuum intervention approaches are most effective for BMSM with criminal justice involvement. Developments in modeling approaches could allow researchers to simulate the impacts and costs of criminal justice involvement–related interventions that might otherwise be cost, time, or ethically prohibitive to study empirically.
(*Am J Public Health.* 2018;108:xxx–xxx.)

Plain language summary

Black men who have sex with men (BMSM) experience high rates of HIV and incarceration. Various stages of criminal justice involvement may serve as important intervention points for addressing HIV and related conditions among this group. Although previous reviews of HIV interventions focusing on BMSM exist, none have ~~focused on interventions targeting CJ~~examined interventions focused on criminal justice-involved (CJI). This review describes the range and impact of published HIV, sexually transmitted infection, and related substance use

interventions for US-based ~~criminal justice–involved populations~~CJI to describe their potential relevance for BMSM. We selected studies after systematic database searches that involved quantitative results of interventions focused on individuals with criminal justice involvement, with outcomes related to sexual or substance use risk behaviors, HIV, or sexually transmitted infections. Fifty-eight articles, including ~~7~~ 8 modeling studies, met inclusion criteria. Although Black men constituted more than 50% of participants in most studies, only 1 focused on BMSM. Screening-related studies (n|=|27) were the most common and indicated cost-effectiveness. Education-based interventions were more likely to demonstrate increases in HIV testing, knowledge, and condom-use intentions than reductions in risk behaviors. Interventions to improve HIV care engagement showed mixed results. Additional empirical and modeling studies and an increased focus on men who have sex with men is needed; their paucity represents a disparity in HIV research.

HIV and criminal justice–involved (CJI) populations overlap as there is a high prevalence of HIV in custody settings (e.g., jails and prisons)[1] and high incarceration risk among people living with HIV.[2] Criminal justice–involved populations experience co-occurring conditions (e.g., sexually transmitted infections [STIs], substance use disorders, and mental illness[3]) that may increase their risk for HIV and serve as barriers to the uptake of HIV services. High-risk sexual and substance-using behaviors tend to precede and follow periods of incarceration. The associated risks can extend to social, sexual, and drug-using network members in communities.[4–7] For those whose daily lives involve high levels of chaos, instability, and poor access to care,[8–10] incarceration and other interactions with criminal justice systems may provide opportunities to

receive services that CJI populations may not access while in the community. Therefore, the 4 stages of criminal justice interaction—law enforcement, courts and processing, custody settings, and community reentry and postrelease supervision—may serve as important public health intervention points.[11]

Rates of incarceration have increased dramatically in the United States over the course of the HIV epidemic, largely because of policies related to substance use.[12] These policies and their implementation have disproportionately affected Black people.[12] Black men who have sex with men (BMSM) in the United States are concurrently impacted by HIV and incarceration. Black men who have sex with men experience the highest burden of HIV overall and account for the largest percentage of new HIV diagnoses among men who have sex with men (MSM).[13,14] Studies also have documented high incidence and lifetime probability of incarceration among BMSM.[15,16] Incarceration is 1 of several structural risk factors that are elevated among BMSM compared with MSM generally.[17–20]

Differences in sexual and substance-use behaviors do not explain the HIV disparities observed between BMSM and other MSM.[17–20] Instead, inequities in HIV treatment access and use, social and structural barriers (e.g., low income, unemployment, lack of insurance), and differences in risk network dynamics may drive these disparities.[17–20] Because mass incarceration contributes to these disparities, the implementation of comprehensive HIV/STI prevention and substance misuse interventions is not sufficient for reducing them.[21] Nevertheless, criminal justice contexts constitute an important setting for intervening with BMSM.

In this systematic review, we sought to describe the range and impact of published HIV and STI interventions for male CJI populations in the United States to better understand their

relevance for BMSM who are overrepresented in criminal justice settings. Previous reviews have focused on HIV prevention interventions across settings[21–25] or discussions of HIV in CJI populations.[11,26–28] There is a need, however, to identify research gaps and to highlight interventions with potential to improve HIV outcomes, reduce STIs, and decrease substance use for BMSM with CJI across the stages of criminal justice interaction. These syndemics represent an opportunity and challenge in improving the overall health of BMSM and achieving the goals of the National HIV/AIDS Strategy.[29,30]

METHODS

We focused on studies of populations identified as men or housed in facilities for men because our a priori knowledge of the literature indicated that there were too few studies limited to MSM with CJI. Some of these studies included male-to-female transgender individuals (i.e., transgender women), as US correctional facilities generally house individuals according to their sex assignment at birth, particularly if the individual has not undergone sex-reassignment surgery.[31] Hence, most transgender women have historically been housed in male facilities and transgender men in female facilities. We completed a final literature search on December 1, 2016. We did not restrict the search by publication date, and we used the PubMed, MEDLINE, Cochrane, CINAHL, and PsycINFO databases:

> (HIV OR “hiv”[MeSH] OR AIDS OR AIDS[sb] OR “human immunodeficiency virus” OR “HIV infection” OR “acquired immunodeficiency syndrome” OR “acquired immunodeficiency syndrome”[MeSH]) OR (STI OR STIs OR STD OR STDs OR “sexually transmitted infections” OR “sexually transmitted

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disease” OR “sexually transmitted diseases” OR “sexually transmitted diseases”[MeSH] OR syphilis OR chlamydia OR gonorrhea) OR (“risk behavior” OR “risk behaviors” OR “risk behavior” OR “risk behaviours” OR “risk taking” OR “risk-taking”[MeSH] OR “substance use” OR “unprotected sex” OR “unprotected intercourse”) AND (probation OR parole OR parolee OR ex-offender OR release OR ex-prisoner OR ex-prisoners OR “released convict” OR “released convicts”) OR (prisoner OR prisoners OR criminal OR criminals OR inmate OR inmates OR convicts OR convicts OR felon OR felons OR incarcerated) OR (prison OR incarceration OR “criminal justice system” OR corrections OR jail OR “correctional facility”) AND (male OR men OR “black men who have sex with men” OR homosex* OR homosexual OR homosexuals OR homosexuality OR “homosexuality, ego dystonic” OR “homosexuality, ego-dystonic” OR “ego-dystonic homosexuality” OR bisex* OR bisexual OR bisexuals OR bisexuality OR “men who have sex with men” OR MSM OR MSMW OR BMSM OR gay OR gays OR queer OR queers OR transsexual OR transsexuals OR transsexuality OR transsexualism OR same-sex OR “sexual orientation”)

Study Selection

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The inclusion criteria included published articles involving studies of new ~~and/~~or planned interventions conducted in the United States, focused on CJI individuals (arrested, detained, on probation, or paroled), with outcomes related to risk behavior, HIV, or STIs. We included studies not limited to criminal justice involvement if greater than half of the population was CJI and the intervention focused on HIV-related outcomes. Because of our interest in sexual and~~/~~ gender minorities, we included studies that were limited to noninjection drug use or substance use–specific outcomes only if they focused on MSM or transgender women.

The exclusion criteria excluded studies with no information on age, race, or gender; that were limited to evaluations of preexisting programs; with minimal representation of the population of interest (<|30 African American or Black male or transgender participants or observations); with populations limited to individuals aged younger than 18 years or cis females; that were limited to qualitative outcomes; and those found in nonscientific publications.

We imported eligible articles into Endnote software (Thomson Reuters, EndNote ×7, 2015). Three research assistants (including authors, SR and VB) conducted a primary analysis, sorting the articles on the basis of inclusion—“yes,” “no,” or “maybe”—after reviewing title ~~and/~~or both title and abstract~~s~~. Training to standardize selection ~~criteria~~ was conducted by using a random sample of 100 articles (κ|=|0.89). They then reviewed the full articles in the “yes” and “maybe” groups for further sorting. Two senior authors (NTH and JAS) resolved discrepancies and articles still classified as “maybe.” See Figure 1 for a flow diagram of the study selection process and results. The final sample included intervention articles that were sorted on the basis of common themes and analyzed further (Tables A–D, available as supplements to the online version of this article at http://www.ajph.org). Thematic areas included education or condom provision–focused

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interventions (Table A), HIV or STI screening interventions (Table B), care continuum and behavioral health interventions (Table C), and modeling or cost-effectiveness studies of interventions (Table D).

Abstracted data from these manuscripts included the authors; study design; publication year; years covered; study location; information on the number, demographics, and sexual orientation (where available) of the study population; CJI setting or type; targeted outcomes; and key findings.

Quality Assessment

We used the Downs and Black quality and bias assessment tool[32] to assess study quality, not counting the modeling and cost-effectiveness studies and 4 studies that were published as research brief reports without a full description of their methods. We calculated a score for each study by rating it across the Downs and Black domains, including reporting, external validity, bias, confounding, and power; higher scores indicated higher quality. We modified power from the initial tool to mirror a strategy used in related, previous work.[21] Two reviewers (authors, SR and VB) conducted the abstraction and quality rating, with training and oversight by senior authors (NTH and JAS).

RESULTS

We identified a total of 58 articles published between 1992 and 2016 that fit the inclusion criteria and listed them according to intervention type in Tables A–D (available as supplements to the online version of this article at http://www.ajph.org).[33–90] Key characteristics of these articles are summarized in [ID]TBL1[/ID]Table 1. Just 13 (22.4%) of the studies were

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randomized controlled trials; the remainder included 8 (13.8%) cross-sectional studies, 6 (10.3%) quasi-experimental studies, 18 (31.0%) single-group pre–post studies, 5 (8.6%) nonequivalent control studies, and 8 (13.8%) modeling studies. According to our modified Downs and Black scoring system, the quality of the 46 scored articles ranged from 10 to 25. Following a previously published Downs and Black rating system,[21] 17 (37.0%) of the articles were rated as very good (≥|20), 20 (43.5%) as good (16–19), 8 (17.4%) as fair (11–15), and 1 as poor quality (≤|10). Overall study quality, with a mean of 18.5, was lower than studies assessed in other systematic reviews of HIV interventions.[21] Linear regression analysis did not show a change in study quality over time (r|=|0.14; *P*|=|.37).

Populations and Settings

Only 3 of the 58 intervention studies (5.2%) were focused on sexual or gender minorities, with only 1 focused entirely on BMSM[54] and none on transgender individuals. The majority of studies 36 (62.1%), however, included more than 50% Black participants. Interventions were located in every region of the United States, with 14 (24.1%) studies focused on the South,[33,37,38,40,50,54,59–61,66,67,77,78,86] 16 (27.6%) on the Northeast,[39,44,46–49,52,58,62,71,72,74,83,85,87,89] 11 (19.0%) on the West,[42,45,51,57,63,65,68,73,75,81,88] 5 (8.6%) on the Midwest,[34,43,55,69,70] and 6 (10.3%) across multiple regions, including the Northwest.[35,36,56,79,80,90] Six (10.3%) studies did not specify location or used general incarceration data for the United States in their modeling.[41,53,64,76,82,84] About two thirds (n|=|41; 70.7%) of the interventions focused on HIV-specific outcomes; 3 (5.2%) involved mental health–focused approaches[42,67,86]; 29 addressed (50.0%) substance misuse[34,36,38,41,42,45,47,51,54,56,58–62,65,70,72,74,75,77,81,82,84–89]; and 18 (31.0%) focused on hepatitis, other STIs, or both ~~and/or other STIs~~.[36,40,43,45,48–50,53,59,64,67,69–71,75,79,85,88]

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Education or Condom Provision–Focused Interventions

We identified 15 educationally focused interventions,[34,42,44,47,51,55,57,58,60,61,66,73,76,81,84] all of which were geared toward primary and secondary HIV prevention, except 1 that also addressed hepatitis C prevention (Table A, available as a supplement to the online version of this article at http://www.ajph.org). Of the 15 interventions, only 6 enumerated MSM, who ranged from 2.2% to 41% of participants. In general, the educational interventions involved both small-group and individual sessions designed to increase HIV or hepatitis C knowledge and HIV testing and to reduce condomless sex, substance use, and needle sharing. In addition to instructor-led classes, a few interventions involved videos or DVDs. One intervention involved placing vending machines for condom distribution within a jail facility.[75] Although it was not an educational intervention per se, the approach was a low-intensity effort to reduce condomless sex. No interventions provided access to supplies for safe injecting. Five studies involved single-group, pre–post comparisons; 7 involved randomized controlled trial designs; and an additional 4 were quasi-randomized controlled trials in that they used various approaches to identify a control group that could approximate one assigned randomly. Although most of the studies were conducted in jails or prisons, 4 were conducted with parole or probation populations and 1 was conducted in drug courts. The mean Downs and Black score was 17.4 or good.

The 11 randomized controlled trials and quasi-randomized controlled trial studies tended to find positive relative impacts on health care–seeking behaviors, such as HIV testing and knowledge. However, several did not find similar evidence that the intervention condition was more efficacious than the control condition in reducing sexual- and drug-risk behaviors. The largest of the studies was a peer-led educational intervention by Ross et al., involving 590

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individuals from 36 Texas state prison units who received intensive training in HIV/HCV peer education and 2506 of their students in prison who completed pre–post questionnaires.[66] Because of the study design, investigators did not assess changes in risk behaviors over time; nevertheless, they did document a significant positive impact on HIV testing according to jail-based testing records. At the 12- and 18-month follow-ups, the number of interim HIV tests conducted doubled in the 5 units with trained peer educators compared with a matched sample of 5 units without trained peer educators.

HIV/Sexually Transmitted Infection Screening Interventions

More than a third of the included studies (n|=|20) involved examinations of new programs to provide HIV/STI screening or to shift the type of tests offered within existing screening programs (e.g., change to oral vs blood test for HIV)[33,36,37,39,40,43,45,46,48,50,52,56,62,68–70,74,80,83,85] or to change the modality for offering screening (e.g., opt-out vs opt-in approaches to screening) in custody settings (Table B, available as a supplement to the online version of this article at http://www.ajph.org).[52,69] Four of these studies enumerated MSM who ranged from 0.67% to 92% of participants. In general, these interventions aimed to increase screening uptake and identification of previously undiagnosed infections. The interventions consistently yielded disease prevalences well above 1%. Furthermore, in all but 1 case, a majority of those identified with an infection were informed and provided treatment. In 1 study by Tartaro and Levy,[74] jail inmates (54% Black, 79% male) were more likely to have been tested for HIV while in custody than in any other setting. Those studies comparing opt-in to opt-out approaches to HIV testing also indicated that opt-out programs result in greater numbers of people screened and new diagnoses made. Despite the fact that just 2 of the studies involved randomized controlled

trials[68,80] and several lacked comparison groups, the findings do consistently point to the benefits of screening interventions in custody settings. They also provide direction for best practices that may include opt-out screening approaches, facilitation of rapid in-custody treatment, and supported referrals to community-based care following release.

Care Continuum and Behavioral Health Interventions

We identified 15 studies that assessed the results of care continuum and behavioral health interventions that provided services designed to promote HIV risk reduction, reduce substance misuse, and encourage engagement in HIV care (Table C, available as a supplement to the online version of this article at http://www.ajph.org).[35,38,41,59,63,65,72,77–79,82,86–89] Four studies enumerated MSM who ranged from 8% to 40.8% of participants. Seven studies focused on individuals who were HIV-positive and had outcomes related to improving HIV-related care engagement, maintaining viral suppression, and reducing transmission risk after release.[35,41,65,72,78,82,87] Six studies focused on HIV prevention interventions not targeting ~~positives~~people with HIV, addressing both sexual risk behaviors and substance use,[38,63,77,86,88,89] and 2 focused primarily on either substance use or sexual risk behavior.[59,79]

Studies involving HIV-positive individuals indicated that comorbidities such as substance use disorders and mental illness were common in this group, along with housing instability and unemployment.[35,41,65,78,87] Access to a variety of social services following release was, therefore, vital to the success of interventions targeting postrelease linkage to care and medication adherence. However, it remains unclear what type of intervention may be most beneficial in improving these outcomes. Although nearly all of the interventions targeting HIV-positive individuals involved continued postrelease follow up,[35,41,65,72,78,87] Wohl et al.[78] found that a

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prerelease discharge model was as effective as a case management intervention that continued after release in their randomized trial comparing these interventions' impacts on HIV care, social service utilization, and recidivism. Both models involved linkage to community-based services.

Findings from some studies involving behavioral HIV prevention interventions also indicate the importance of including provision of or linkage to social services.[59,63,86] For example, Myers et al.[63] concluded that providing comprehensive services increased retention in HIV prevention case management.[63] Another study was inconclusive regarding setting, with mixed outcomes for a prison-only versus a community-only therapeutic program addressing substance abuse and one bridging both settings.[59] However, the bridging and community-only programs showed improvements over the prison-only and control conditions. This and other studies suggest that programs limited to time in custody might be less effective than those including the reentry period. Controlled studies of prevention interventions often yielded inconclusive findings when examining sexual and substance use risk behavior outcomes.[59,86,89] With regard to intervention dose, a multisession intervention was more efficacious in reducing frequency of postrelease sexual risk behaviors than a single-session intervention.[79]

Modeling or Cost-Effectiveness Studies of Interventions

Mathematical and computational models fill an important research gap and aid decision-making regarding public health interventions particularly in the CJI context, providing a virtual laboratory where computational experiments can be conducted to test intervention-related hypotheses (Table D, available as a supplement to the online version of this article at http://www.ajph.org).[91–94] We identified 8 studies utilizing mathematical and computational models for HIV/STIs.[49,53,54,64,67,71,75,90] Two of the 8 focused on MSM,[54,75] with 1 entirely on

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BMSM.[54] Three studies employed deterministic compartmental transmission models: 1 focused on HIV in Fulton County, Georgia[54]; another on national chlamydia data[64]; and a third on chlamydia, gonorrhea, syphilis, and HIV in Los Angeles County, CA.[75] They included the only Black MSM-focused study.[54] It showed that increasing HIV testing, treatment, and retention in care among Black MSM aged 18 to 54 years in the community and the ~~criminal justice~~CJ system could result in a 15% and 19% decline in new community- and jail-acquired cases over 10 years. However, it is now recognized that agent-based models that include network structure are much more adaptable to settings, like jails and prisons, with temporal and spatial heterogeneity.[95,96]

Six studies examined cost-effectiveness including

1. A risk-based strategy to determine candidates for syphilis and HIV screening in North Carolina jails,[67]
2. Syphilis screening and treatment in New York state jail,[71]
3. Chlamydia screening and partner notification in a Massachusetts jail,[49]
4. Universal chlamydia and gonorrhea screening in US jails,[53]
5. Condom provision and STI screening and treatment among self-identified MSM in the Los Angeles County Jail,[75] and
6. A multisession HIV prevention intervention in 4 state prisons.[90]

All of these studies showed overall cost savings or ~~and/or~~ effectiveness.

DISCUSSION

In this systematic review of HIV, STI, and substance misuse interventions among CJI men and transgender women, with attention to implications for BMSM, we found that most interventions were focused on screening and linkage-to-care programs within prisons or jails. Behavior change and care engagement–focused programs that spanned release (i.e., were initiated during custody and continued after release or provided linkages to postrelease services) were promoted as more ideal than those that were limited to time in custody. Just 7 studies

(12.5%) focused on probation, parole, or predetention (e.g., drug court) populations; those that did tended to be short-term education-focused interventions. Because the population of the United States that is under criminal justice supervision (i.e., parole or probation) at any given time outnumbers those incarcerated, more research is needed on how best to intervene in these contexts. Just 24% of the single-region studies were conducted in southern states even though 46% of all people living with HIV in the United States reside in these states.[13,14] We also note a lack of studies focused on transgender people. Finally, only 1 study focused on BMSM, limiting the conclusions that can be made regarding a population with both the highest rate of HIV and high rates of incarceration.

Screening, Education, and Care Continuum Interventions

Custody settings are high-yield locations for conducting screening for STIs and substance use–associated infectious diseases such as hepatitis; nevertheless, institutional and political barriers appear to limit the extent to which these programs become part of routine practice. For example, the Centers for Disease Control and Prevention (CDC) has provided guidance for routine opt-out HIV screening for all entrants to correctional facilities since 2009.[97] Nevertheless, just 32 state prison systems do so routinely and just 11% of people in jail reported having been tested since entry during the 2010–2011 National Inmate Survey.[1] This slow implementation may reflect tension between the public safety missions of corrections and the public health mission of the CDC.[98–100] It may also reflect implementation challenges in routinizing screening, results disclosure, linkage to care and treatment, and how to pay for screening and treatment of those diagnosed. More than 10 years after the CDC's recommendation for routine HIV testing of sexually active adults,[101] uptake in the general population also remains far below optimal.[102]

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The provision of HIV/STI education was a common focus of prevention efforts for CJI populations. In contrast, condom distribution, prevention skill building, needle exchange, or treatment-as-prevention–focused interventions were rare or nonexistent. Prohibitions against sexual activity, needles, and condoms in most custody settings likely limit implementation.[103] "Jailhouse norms" may also make it infeasible or unsafe for men to practice sexual negotiation or openly discuss sex with other men. These barriers may explain the preponderance of classroom-style intervention approaches. Furthermore, this modality is likely the most efficient way to reach as many individuals as possible when working in closed settings. Nevertheless, skills-based, rather than knowledge-based, approaches tend to be the most effective at reducing sexual risk behaviors in MSM.[22,104] Therefore, participants in education-focused programs may acquire the knowledge but not the skills for proper condom application or safer sex negotiation—making it less likely that knowledge translates into preventive behaviors.

Despite equivocal findings for the controlled HIV continuum-of-care–related interventions reviewed, studies demonstrate improvements in viral suppression during custody compared with periods in the community.[41,105] In a recent ~~study of a~~ population-based cohort study of younger BMSM in the community, HIV care continuum metrics were improved among previously incarcerated BMSM versus those with no incarceration history, suggesting possible benefits also after release.[106] Much of the relative success in care continuum outcomes within jails and prisons results from the universal health care, direct delivery of antiretroviral therapy, and highly structured environments of custody settings,[8,9] factors that cannot be replicated in small-scale community-based interventions.

Preexposure Prophylaxis for HIV

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Preexposure prophylaxis (PrEP) was not described in any of the studies, and we are not aware of any ongoing corrections-based PrEP studies and could not locate any on NIHreporter.gov. Prohibition against sex in jails and prisons, the recency of the July 2012 Food and Drug Administration approval of emtricitabine and tenofovir disoproxil fumarate for PrEP, and regulations limiting pharmaceutical-based research with prisoners likely contribute to an absence of published PrEP interventions in CJI populations. Use of PrEP in such settings (particularly right before release) should be considered given the potential for increased risk of HIV acquisition during reentry periods[8,107,108] and for extended benefit to sex- and drug-using partners in the community. The current formulation of PrEP is already available in custody settings for HIV treatment. Implementation science and modeling studies are needed to identify optimal strategies for delivery of PrEP to CJI populations.

Sexual and Gender Minorities

Despite the burden of HIV and criminal justice involvement among BMSM in the United States, BMSM were rarely direct targets of CJI-focused intervention efforts. Furthermore, studies frequently did not enumerate or analyze MSM separately. This lack of attention to sexual- and gender-minority populations is problematic given that they are at increased risk of incarceration overall.[109] For example, transgender women experience very high rates of both HIV and incarceration[110]; however, their study participation was rarely enumerated, and it is likely that some were misgendered. We recognize that, in many jail and prison settings, focusing on MSM for tailored intervention may heighten their risk for assault in custody. Nevertheless, given that researchers have safely collected information on same-sex activity and self-identified sexual orientation in custody settings, collecting this information and performing subanalyses of MSM

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groups should become standard practices. Future work should also explore tailored interventions for Black and Latino MSM in other stages of criminal justice interaction.

Review Limitations

Our systematic review is limited to the published scientific literature. It excluded studies that were only published at scientific meetings and evaluations of existing interventions. Inclusion of such studies may have provided a more comprehensive picture of the interventions conducted in CJI populations, including interventions that were not found to be effective. However, it may have also introduced bias because of either errors in the unpublished reports or poor study quality. Finally, we used the term MSM to focus on people who self-identify as male and report sex with other men, but recognize that transgender women are sometimes misidentified as MSM. We also recognize that individuals with transgender sexual partners may identify the gender of partners by the partner's gender identity, anatomy, or assigned sex at birth. We were limited in our results' summaries to using each study's approach to categorizing MSM, which likely differed among studies.

Implications

Ethical and logistical challenges to conducting research in custody settings may contribute to the relatively small number of randomized trials and published interventions identified. The impact of interventions for CJI populations occurs over diverse social spaces, long periods, and in populations vulnerable to deceit and coercion because of their legal status and low levels of education. Therefore, randomized controlled trials, the gold standard for intervention research, may be impractical, infeasible, or even unethical. All research with those incarcerated must meet

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additional criteria for local institutional review board approval and obtain approval from the US Office of Human Research Protections. Certain types of research are prohibited and gaining and maintaining access to CJI facilities and populations can be challenging.

The increased availability of microdata and advances in computational experiment methods, such as agent-based models and other complex system modeling approaches, have opened up possibilities for creating detailed in silico laboratories for robust intervention analyses that avoid the challenges listed previously. The processes of incarceration and recidivism require explicit consideration of heterogeneities that can be expressed more realistically via agent-based models than deterministic models.[111] Agent-based models are flexible enough to include modeling of intervention cost-effectiveness.[112] These developments present an exciting advancement that will allow researchers to simulate criminal justice involvement–related interventions that might be otherwise be cost, time, or ethically prohibitive. Such models will also allow for estimation of the impact of interventions on MSM subpopulations and transgender women of all races/ethnicities. They further provide important data to various stakeholders on the costs and cost savings associated with scaling up interventions to multiple criminal justice settings.

About the Authors

Nina Harawa is with David Geffen School of Medicine at University of California Los Angeles, Department of Medicine, Los Angeles, CA. Charles R. Drew is with University of Medicine and Science, Department of Psychiatry and Health Behavior, Los Angeles. Russell Brewer is with Louisiana Public Health Institute, HIV/STI Portfolio, New Orleans, LA. Victoria Buckman is with University of Chicago, The Chicago Center for HIV Elimination, Chicago, IL. Santhoshini Ramani, Aditya Khanna, and John A. Schneider are with University of Chicago, Department of

Medicine, Chicago. Kayo Fujimoto is with University of Texas Health Science Center at Houston, Division of Health Promotion and Behavioral Sciences, Houston, TX.

Correspondence should be sent to Nina Harawa, PhD, MPH, David Geffen School of Medicine at University of California Los Angeles, Department of Medicine, First Floor, 911 Broxton Ave, Los Angeles, CA 90024 (e-mail: nharawa@mednet.ucla.edu). Reprints can be ordered at http://www.ajph.org by clicking the “Reprints” link.

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Contributors

All co-authors have contributed substantially to the article, including conceptualization, writing, and review. N.T. Harawa and J.A. Schneider led the effort. S. Ramani and V. Buckman carried out the article extractions, review, and scoring. They also helped write the Methods and Results. A. Khanna and K. Fujimoto assisted with writing parts of the Results and reviewing drafts. R. Brewer helped with conceptualization and wrote the introduction.

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Human Participant Protection

This systematic review was limited to published research and therefore did not involve human participants.

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FIGURE 1—PRISMA Flow Diagram: Systematic Review of US-Based Interventions HIV, Sexually Transmitted Infection (STI), and Related Substance Misuse Interventions for Criminal Justice–Involved Populations

TABLE 1—Characteristics of Intervention Studies Addressing HIV, Sexually Transmitted Infections, and Related Substance Misuse in Criminal Justice–Involved Populations

~~Criminal Justice–Involved Populations~~Study Characteristics	Studies, No. (%)
US region	
[ems]South	14 (24.1)
[ems]Northeast	16 (27.6)
[ems]West	11 (19.0)

[ems]Midwest	5 (8.6)
[ems]Multiple regions	6 (10.3)
[ems]Region not specified	6 (10.3)
HIV-specific outcome focus	40 (70.7)
[ems]Intervention approach or target	
[ems]Mental health	3 (5.2)
[ems]Substance misuse	29 (50.0)
[ems]Hepatitis or other STIs	18 (31.0)
Intervention type (Supplemental Tables A-D)	
[ems]Education or condom provision–focused	15 (25.9)
[ems]HIV/STI screening interventions	20 (34.5)
[ems]Care continuum—behavioral health and harm reduction	15 (25.9)
[ems]Modeling or cost-effectiveness	8 (14.3)
Study type	
[ems]Randomized controlled trial	13 (22.4)
[ems]Quasi-randomized controlled trial	6 (10.3)
[ems]Cross-sectional	8 (13.8)
[ems]Nonequivalent comparison	5 (8.6)
[ems]Single-group evaluation	18 (31.0)
[ems]Modeling or cost-effectiveness	8 (13.8)
[ems]Targeted to sexual and gender minorities	3 (5.2)

Note. STI|=|sexually transmitted infection.