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HIV risk inside US prisons: A systematic review of risk reduction interventions conducted in US prisons

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Abstract

HIV prevalence in correctional populations is approximately five times that of the general adult population. This systematic review examines the broad question of HIV prevention and interventions to reduce inmate HIV-related risk behaviors in U.S. federal and state prisons. We conducted a systematic review of multiple databases and Google Scholar to identify behavioral, biomedical, social, and policy studies related to HIV among U.S. prison populations from 1980 – 2014. Studies were excluded if they did not focus on HIV, prison inmates, if they were conducted outside of the U.S., if they involved juvenile offenders, or if they included post-release outcomes. Twenty-seven articles met the study criteria. Evidence suggests that research related to the HIV care continuum, risk behaviors, gender, prevention (e.g., peer education), and policy are key topics to enhance HIV prevention interventions in the criminal justice system. This review provides a prison-specific overview of HIV in U.S. correctional populations and highlight effective interventions, including inmate peer education. There is an urgent need to continue to implement HIV prevention interventions across all prisons and improve the quality of life among those at heightened risk of HIV infection.

Keywords

HIV; gender; prisons; systematic review

Introduction

Prison populations bear a disproportionate share of the HIV infection burden, where HIV prevalence is approximately five times that of the general adult population (Maruschak, 2012). It is unclear how much HIV transmission occurs during incarceration, and some evidence suggests that most transmission in criminal justice populations occurs outside of correctional facilities (Hammett, 2006; Lima et al., 2015). However, condomless sex, unsafe tattooing, and injection drug use are known to cause HIV infection among prison inmates,

with condomless sex and drug use being the most commonly cited HIV-related risk behaviors (Braithwaite & Arriola, 2003; Center for Disease Control and Prevention [CDC], 2006; Jafa et al., 2009; Underhill, Dumont, & Operario, 2014; Beck & Berzofsky, 2013;). Furthermore, incarceration is considered an independent risk factor for HIV infection, and a history of incarceration is known to predict nonadherence to HIV treatment (Meyer, Chen, & Springer, 2011). HIV prevalence among those within the US criminal justice system is three times greater than in the community, and Black inmates are disproportionately affected compared to other racial and ethnic groups (Maruschak, 2012; Spaulding et al., 2009). Of all HIV infected prison inmates in 2010, 91.3% were male and 8.7% were female (Maruschak, 2012), and there is some evidence that transmission among men who have sex with men (MSM) contributes substantially to new infections (Lima et al., 2015). While women comprise less than 10% of the inmate population, they are also at increased risk for HIV infection given their greater level of pre-incarceration engagement in high-risk behaviors such as intravenous drug use (IDU), unsafe and transactional sex, and sexual abuse; during incarceration, and incarcerated women may contract HIV through coerced or consensual sex, needle sharing, tattooing, etc. (Fleming, Leblanc & Reid, 2013; Franklin, Fearn & Franklin, 2005). In addition to inmates' disproportionate HIV burden, incarceration triggers disruptions and often times terminations of medical benefits (Meyer et al., 2011). Thus, the correctional system provides a critical public health opportunity for HIV diagnosis, prevention and treatment (Beckwith et al., 2010; Springer & Altice, 2005; Springer, Spaulding, Meyer, & Altice, 2011).

Much of the public health literature on HIV prevention intervention programs in US correctional settings has been cited in several systematic and non-systematic review articles (Beckwith et al., 2010; Braithwaite & Arriola, 2003; Fleming et al., 2013; Franklin et al., 2005; Meyer et al., 2011; Spaulding et al., 2002; Springer & Altice, 2005; Springer et al., 2011; Underhill et al., 2014). Some systematic reviews have limited their scope by study population, such as incarcerated men or women (Braithwaite & Arriola, 2003; Fleming et al., 2013; Franklin et al., 2005). Other reviews have focused on HIV prevention interventions that include jail and prison settings (Beckwith et al., 2010; Underhill et al., 2014), and incarceration and post-release outcomes (Meyer et al., 2011; Springer et al., 2011; Underhill et al., 2014). While there have been recent reviews that examined key issue of HIV care linkages for prisoners being released to the community (Meyer et al., 2011; Springer et al., 2011), none have included policy studies, which could improve the planning, management and coordination of public health HIV interventions in US prison settings (Meyer et al., 2011; Underhill et al., 2014).

Methods

The primary aims of this systematic review were threefold: (1) to identify biomedical, social and behavioral, or policy relevant studies concerning HIV in incarcerated men and women in US federal and state prisons; (2) to synthesize the broad question of prevention interventions for reducing HIV risk-taking behaviors in US prison inmates; and (3) to identify gaps in HIV prison research.

Eligibility Criteria

We used the “Cochrane Handbook for Systematic Reviews for Interventions” (Higgins & Sally Green, 2008) and the “Preferred Reporting Items for Systematic Reviews and Meta-Analyses” (PRISM) (Moher et al., 2009) to guide this review.

In this review, we identified biomedical, social and behavioral, and policy articles on HIV/ interventions among incarcerated men and women in US prisons. Cross-sectional and descriptive studies, randomized controlled studies, clinical studies, policy articles, and studies using comparison groups were included. Peer-reviewed legal reviews and case studies were also counted. Studies that reported any type of outcome measure related to HIV transmission in US prisons were included. Studies on care linkage for current prisoners were also included. Studies were excluded if they contained: (1) international studies; (2) juvenile offenders; (3) jail inmates; and (4) post-release outcomes. These studies were excluded because the focus of this article is to examine HIV preventions to reduce related HIV risk taking behaviors in adult US prisons only. In addition, post-release outcomes of parolees were beyond the scope of this paper as such outcomes are not solely determined by the policies and programs within prisons; these factors such as Medicaid termination, adequate housing, and community service providers can greatly influence post-release outcomes (Solomon et al., 2014)

Literature Search

The second and third author conducted a systematic review of multiple medical databases – *PubMed*, *Cochrane Library*, *PsycInfo*, *Sociofile*, *EMBASE* – as well as *Google Scholar*, using the following search terms: HIV, AIDS, prison, treatment, rape, and lesbian, gay, bisexual and transgender (LGBT). Google Scholar generated over 15,000 results for each set of terms, and after screening for quality, 1,000 articles were found from each search that came from authentic, reputable and peer reviewed sources. Grey literature, refers to print or electronic literature (not peer-reviewed) produced by government, academia, business, or industry. These sources may include studies that are unpublished or have limited distribution such as conference abstracts, government reports and unpublished dissertation (Auger, 1998; Bellefontaine & Lee, 2014; McAuley, Pham, Tugwell & Moher, 2000), were also excluded from the search. The systematic review was undertaken from September 2013 through December of 2014, and literature was restricted to peer-reviewed academic articles published in 1980–2014. Differences in eligible studies identified by the second and third author were resolved by the first author.

Methodological Assessment

Using the data collection checklist developed by the “Cochrane Effective Practice and Organisation of Care Review Group” (n.d) as a guide, we created the following methodological quality criteria: (1) whether the article included a study population and data collection procedures; (2) explicit description of HIV transmission in adult men and women under investigation; and (3) any description of prison status.

Copies of all retrievable publications and abstracts were obtained. Overall, 381 potentially relevant studies were identified from the search. In the subsequent rounds of review, 354

articles were excluded because they did not meet eligibility criteria, leaving a final set of 27 studies. The flowchart in Figure 1 describes the complete details of the systematic review process. Studies were categorized broadly as biomedical (e.g., related to the HIV care continuum), social and behavioral (e.g., related to HIV/AIDS knowledge or risk behaviors), or policy (e.g., HIV-related policy or constitutional analysis) types, which are defined in Table 1. Content categories were derived from common themes in the broader HIV intervention literature: gender, HIV/AIDS care continuum, HIV/AIDS prevention, risk behaviors and perceptions, and so on. The five categories – care, risk, gender, prevention, and policy – are described in Table 2.

Results

A total of 27 peer-reviewed articles were eligible and included, and categorized by study type and content. Policy (12 articles) and social and behavioral studies (13) were the most common, while biomedical studies were the least common (2). In terms of content, prevention (16), policy (12), and care (11) were the most common themes, while gender (6) and risk (2) were the least common. A significant proportion of the articles (17) were coded as belonging to more than one content category, with the largest overlap between the care and policy categories (8). Table 3 describes all of the studies that were included in chronological order, the study type (biomedical, social and behavioral, or policy), and the relevant content category or categories.

Policy

Most articles in this category were policy or constitutional analyses and addressed HIV care and prevention policy (Amankwaa Amankwaa & Ochie, 1999; Amankwaa, Bavon, & Amankwaa, 2001; Blender, 1997; Blumberg & Langston, 1991; Charles, 2012; Jacobs, 1995; Kraemer, 2009; Larsen, 2007; Parts, 1990; Velez, 2011; Zunker, 2012). Mandatory vs. voluntary HIV testing was an established and longstanding policy debate involving questions of ethics, risks, and rights, particularly those related to privacy and information disclosure (Amankwaa et al., 1999; Amankwaa et al., 2001; Blender, 1997; Blumberg & Langston, 1991; Kraemer, 2009). Other studies addressed HIV prevention concerns, such as harm reduction recommendations for policy (Parts, 1990; Zunker, 2012) and segregated housing for HIV-infected prisoners (Jacobs, 1995; Larsen, 2007). A recent survey of testing and prevention policies in state prisons found that direct and one-to-one programs, such as HIV counseling, were more common than group-level and harm reduction programs (Lyons et al., 2014).

Peripheral discussions in the policy articles were related to various prisoner rights and ethical concerns, where a major theme was the right to privacy/confidentiality of medical information for HIV-positive individuals (Amankwaa et al., 1999; Kraemer, 2009; Larsen, 2007; Velez, 2011). Other minor themes included issues such as deliberate judicial indifference to prisoners' health/care conditions and prisoners' rights to care in conjunction with the Fourth and Eighth Amendments (Blender, 1997; Parts, 1990). Two studies also examined issues related to rape in prison: Blender (1997) discussed the concerns of sexual assault victims and sex offender rights in relation to mandatory HIV testing policy, while

Zunker (2012) examined prison condom policy in relation to the Prisoner Rape Elimination Act and the Prisoner Litigation Act.

HIV Prevention

The primary aim of HIV prevention interventions is to decrease HIV infections, with the aim of eliminating HIV transmission altogether. Nearly all of the studies in this category were concerned with educational programs, whether led by peers or professionals; peer education was highlighted as particularly beneficial (Ayanwale, 2008; Boudin et al., 1999; Clark & Boudin, 1990; Collica, 2002, 2007; Martin, Zimmerman & Long, 1993; Lyons et al., 2014; Martin et al., 1995; Grinstead, Faigles & Zack, 1997; Ross, 2006; Scott et al., 2004; West & Martin, 2000). Education programs were found to be effective in informing incarcerated men and women about HIV transmission and risk behaviors, and changing attitudes and beliefs (Ayanwale et al., 2008; Boudin et al., 1999; Grinstead, Faigles, & Zack, 1997; Ross et al., 2006; Scott et al., 2004). Lyons and colleagues' (2014) survey of state prison programs in the U.S. showed that 16 states reported having a peer education program in their facilities. However, none of these peer education programs included harm reduction approaches to reduce HIV risk-taking behaviors such as providing clean syringes or injection drug equipment or widely distributing condoms for inmates. In addition, little is known about using opioid treatment for HIV prevention interventions in prisons (Lyons et al., 2014). Harm reduction programs in correctional state facilities are urgently needed; there are close to 2000 state prisons and over 100 federal prisons nationwide and 1.4 million people are currently incarcerated in those facilities. (Prison Policy Initiative, n.d.).

HIV Care Continuum

The HIV care continuum, sometimes referred to as the HIV treatment cascade, is concerned with medical care for people living with HIV/AIDS (PLWHA). The HIV care continuum covers the entire spectrum of treatment, from the initial diagnosis to achieving viral suppression. The majority of the articles discovered in this category focused on HIV testing, which is unsurprising given the amount of policy content overlap (Amankwaa et al., 1999; Amankwaa et al., 2001; Blender, 1997; Blumberg & Langston, 1991; Jacobs, 1995; Liddicoat, 2006; Lyons et al., 2014; Ross, 2006). Mandatory vs. voluntary HIV testing is also an empirical concern as test rates can vary: one study found that the HIV test rate was higher among inmates in a routine testing program as compared to those in voluntary testing (Liddicoat, 2006). Another study found that peer education program participation improved HIV test rates for participants (Ross, 2006). Beyond diagnosis, two articles focused on aspects of antiretroviral treatment (ART): a clinical trial determining the efficacy of a combination drug treatment on maintaining viral and immune suppression (Kirkland, 2002), and a policy analysis of ART as a standard of HIV treatment that could be used to judge inadequate care in the context of the Eighth Amendment (Charles, 2012).

Gender

The research on comparing male and female's incarceration is sparse and we know very little about the experiences of incarcerated men and women and how those experiences during incarceration may help predict HIV infection. Majority of the investigation in this area overlapped with HIV prevention with a focus on HIV education programs (Boudin et

al., 1999; Collica, 2002; Grinstead et al., 1997; St Lawrence et al., 1997; West & Martin, 2000). Furthermore, no articles in our sample discussed LGBT prison inmates, despite MSM populations having been identified as high-risk (Lima, et al., 2015).

Risk behaviors

Risk behaviors include unprotected sexual intercourse, unsafe tattooing and injecting drug use behaviors, with condomless sex and needle sharing as the most common behaviors (Center for Disease Control and Prevention [CDC], 2006; Jafa et al., 2009; Underhill, Dumont, & Operario, 2014; Beck & Berzofsky, 2013). Grinstead and colleagues (1997) compared the impacts of peer and professional HIV education programs on behavioral intentions related to sex and injection drug use. The other article discussed rape in prison as a risk factor for HIV (Zunker; 2012). Although rape in prison has been a longstanding concern, there is still relatively little known about its prevalence and contribution to HIV infection.

Discussion

This systematic review represents the first approach to examine the types of studies conducted inside U.S. prisons on HIV prevention interventions. Our findings show regional and institutional variations in the type and implementation of HIV prevention, testing, and care programs available to inmates (Collica, 2007; Lyons et al., 2014). Previous studies have also found that there is often insufficient access to ART due to a lack of comprehensive policy on HIV service delivery (Underhill et al., 2014). The policy themes that emerged from our sample illustrate a lack of legal consensus that appears to contribute to such variations and care gaps (Amankwaa et al., 1999; Amankwaa et al., 2001; Jacobs, 1995; Kraemer, 2009; Parts, 1990; Zunker, 2012).

Majority of the articles focused on increasing HIV/AIDS knowledge through peer-led education programs, reducing widely known misconceptions about HIV and common risk-taking behaviors, and encouraging HIV testing. These interventions had positive effects on a variety of key outcomes including HIV knowledge, intentions to change risky behaviors, perceived risk of infection, coping and social support, and HIV test rates (Ayanwale et al., 2008; Boudin et al., 1999; Bryan et al., 2006; Collica, 2007; Grinstead et al., 1997; Lyons et al., 2014; Martin et al., 1993; Martin et al., 1995; Ross et al., 2006; Scott et al., 2004; St Lawrence et al., 1997; West & Martin, 2000; West, 2001). One evaluation of a risk reduction program for women inmates suggested that communication skills were just as important to reducing HIV risk as knowledge of HIV and safe sex, as women with these skills were better able to negotiate with sex partners (St Lawrence et al., 1997). Evidence also highlighted the efficacy of interactive education programs over passive programs; peer education programs were particularly effective at reducing HIV risk behaviors and appeared to have significant benefits for the peer educators (Boudin et al., 1999; Grinstead et al., 1997; Scott et al., 2004).

HIV testing is both the beginning of the treatment cascade and the surveillance mechanism which allows health professionals to measure or estimate inmate seroprevalence. Because HIV testing serves the important function of early detection, mandatory vs. voluntary testing

has remained a central question in public health policy debates (Amankwaa et al., 1999; Amankwaa et al., 2001; Blender, 1997; Blumberg & Langston, 1991; Kraemer, 2009); one study claimed that unidentified HIV-positive individuals contributed significantly to the gap in prison HIV care (Amankwaa et al., 2001). Given the urgent need to decrease new HIV infections, other important prevention policy recommendations have included access to condoms, bleach, and sterile needles to limit transmission (Parts, 1990; Zunker, 2012). However, most prevention interventions did not take a comprehensive harm reduction approach. Despite the prevalence of HIV education programs, no state prisons provided clean syringes or injection drug equipment, and only two – California and Vermont – provided condoms to inmates (Lyons et al., 2014). An additional recommendation not mentioned in our policy results could be administration of oral pre-exposure prophylaxis (PREP) medication as a preventative against new HIV infections, though the cost of such an intervention would likely require specific targeting of those inmates most at risk.

Our results did not highlight many of the particular needs of incarcerated women, and women have historically been excluded from HIV/AIDS research. At the beginning of the HIV/AIDS epidemic, women were left out of the clinical trials, CDC monitoring, and other protection (Clark & Boudin, 1990). In addition, HIV seroprevalence rates are higher among female inmates due to their high engagement in risky sex (e.g., condomless and transactional sex, multiple partners, sex with IDU or crack cocaine users) and IDU prior to incarceration, as well as their disproportionate experiences with sexual victimization during incarceration (Beck, Berzofsky, & Krebs, 2013; Farel et al., 2013; St Lawrence et al., 1997). Women are a fast-growing segment of the HIV-infected population, and they are disproportionately affected by IDU and heterosexual HIV transmission (West & Martin, 2000). Though it is recognized that women and men have different perceptions of HIV, and female inmates have unique and higher demands for physical and psychological healthcare services, their medical and psychosocial needs were not met by adequate programming (Abiona et al., 2009; Franklin et al., 2005; West & Martin, 2000). Given their social vulnerabilities, women need particular empowerment and trainings on safe sex practices such as safer sex negotiation (Collica, 2002; Franklin et al., 2005). Gender-specific HIV education, risk-reduction, and prevention programs are needed for female inmates as well as male inmates (Abiona et al., 2009; Franklin et al., 2005; St Lawrence et al., 1997; West & Martin, 2000).

Non-consensual sex – an issue briefly touched upon in our policy results (Zunker, 2012) – can pose an HIV risk to all inmates, but represents a particular problem for women, gender non-conforming and transgender inmates, and MSM (Abiona et al., 2009; Beck et al., 2013; Farel et al., 2013). Reliable prevalence estimates of rape in prison are difficult to obtain: sexual assault is often underreported due to stigma and fear of physical or verbal attacks from other inmates and prison guards, especially among LGBT inmates (Radford, 2007; Neal & Clements, 2010). However, a recent national inmate survey of sexual assault reported by inmates in 2011–12 estimated that 4% of all prison inmates experienced sexual victimization from other inmates, and 2.4% experienced sexual misconduct from prison staff, with women, non-heterosexual inmates, and inmates with a history of sexual victimization reporting higher rates (Beck et al., 2013). The same survey identified 11 male prisons and one female prison with high rates of inmate-on-inmate sexual victimization, and 8 male prisons and 4 female prisons with high rates of staff sexual misconduct, reflecting the

gender disparity in reports of victimization (Beck et al., 2013). Notably, we found very little information concerning HIV/AIDS among LGBT and MSM inmates (Stephens et al., 1999; Stephens et al., 2004), which seems to reflect a serious gap in the literature.

Practice Implications

In planning for prison-based HIV prevention interventions, health educators and clinicians may find this systematic review useful to determine interventions and policies that have been found effective in prison settings. This review can be used to strengthen HIV program planning efforts and provide the guidelines or standards of care for US prisons.

Limitations

Several limitations affected the generalizability of our findings. The inclusion criteria for this review (adults in US prisons) necessarily limited generalizability to jail populations, community settings, juvenile offenders, as well as international correctional facilities. Also, the variations between state and federal prison systems due to differences in state and federal penal laws limit the generalizability of our findings across US prisons.

Incarcerated Asian/Pacific Islanders, Alaskan Natives and American Indians in US prisons were not represented in this review, as none of the studies included relevant data on those populations. Women's issues were also underrepresented despite the inclusion of several studies on programs for female inmates, as gender-specific needs and policy concerns were largely undiscussed. Similarly, sparse results on HIV among LGBT inmates indicate that further investigation is required. While the co-prevalence between drug use and risk sex behaviors is widely discussed in the literature, the prevalence of transactional sex and its impact on HIV transmission within prisons remain unreported (based on this review) for both men and women. Future research should consider a meta-analysis review of HIV/AIDS intervention studies using the broad categories and study content/theme, which may provide information about relative effect size of the articles.

Conclusion

There is an urgent need to continue to implement HIV prevention interventions in prisons and improve the quality of life among those at heightened risk of HIV infection. Efforts to prevent HIV infection are challenged by the high rate of transmission among people who are unaware of their status. Promoting access to and receipt of HIV preventions in prisons can lead to earlier diagnosis of infection and reduce the risk of transmission.

References

- Abiona TC, Adefuye AS, Balogun JA, Sloan PE. Gender differences in HIV risk behaviors of inmates. *J Womens Health*. 2009; 18:65–71.
- Amankwaa AA, Amankwaa LC, Ochie CO Sr. Revisiting the debate of voluntary versus mandatory HIV/AIDS testing in U.S. prisons. *J Health Hum Serv Adm*. 1999; 22:220–236. [PubMed: 10947535]
- Amankwaa AA, Bavon AL, Amankwaa LC. Gaps between HIV/AIDS policies and treatment in correctional facilities. *J Health Hum Serv Adm*. 2001; 24:171–198. [PubMed: 12638386]
- Auger, CP. Information sources in grey literature (guides to information sources). 4th. London: Bowker Saur; 1998.

- Ayanwale L, Moorer E, Shaw H, Habtemariam T, Blackwell V, Foster P, Robnett V. Perception of HIV and prevention education among inmates of Alabama prisons. *Am J Health Stud.* 2008; 23:179–184. [PubMed: 20191111]
- Beck, AJ., Berzofsky, M., Krebs, C. Sexual Victimization in Prisons and Jails Reported by Inmates, 2011–12: National Inmate Survey, 2011–12. Bureau of Justice Statistics. 2013. 2013. Available <http://www.bjs.gov/content/pub/pdf/svpjri1112.pdf>
- Beckwith CG, Zaller ND, Fu JJ, Montague BT, Rich JD. Opportunities to diagnose, treat, and prevent HIV in the criminal justice system. *J Acquir Immune Defic Syndr.* 2010; 55:49–55. [PubMed: 20431394]
- Bellefontaine SP, Lee CM. Between black and white: Examining grey literature in meta-analyses of psychological research. *Journal of Child and Family Studies.* 2014; 23(8):1378–1388.
- Blender AN. Testing the fourth amendment for infection: mandatory AIDS and HIV testing of criminal defendants at the request of a victim of sexual assault. *Seton Hall Legis J.* 1997; 21:467–501. [PubMed: 11863018]
- Blumberg M, Langston D. Mandatory HIV testing in criminal justice settings. *Crime Delinq.* 1991; 37:5–18.
- Boudin K, Carrero I, Clark J, Flournoy V, Loftin K, Martindale S, Richardson S. ACE: A peer education and counseling program meets the needs of incarcerated women with HIV/AIDS issues. *J Assoc Nurses AIDS Care.* 1999; 10:90–98.
- Braithwaite RL, Arriola KR. Male prisoners and HIV prevention: a call for action ignored. *Am J Public Health.* 2003; 93:759–763. [PubMed: 12721138]
- Bryan A, Robbins RN, Ruiz MS, O'Neill D. Effectiveness of a HIV prevention intervention in prison among African Americans, Hispanics, and Caucasians. *Health Educ Behav.* 2006; 33:154–177. [PubMed: 16531511]
- Charles AM. Indifference, Interruption, and Immunodeficiency: The Impact and Implications of Inadequate HIV/AIDS Care in US Prisons. *BUL Rev.* 2012; 92:1979–2022.
- Clark J, Boudin K. Community of women organize themselves to cope with the AIDS crisis: A case study from Bedford Hills Correctional Facility. *Soc Just.* 1990; 17:90–109.
- Cochrane Effective Practice and Organisation of Care Review Group (n.d). Data collection checklist. Retrieved from: <http://epoc.cochrane.org/sites/epoc.cochrane.org/files/uploads/datacollectionchecklist.pdf>
- Collica KL. Levels of knowledge and risk perceptions about HIV/AIDS among female inmates in New York State: Can prison-based HIV programs set the stage for behavior change? *Prison J.* 2002; 82:101–124.
- Collica K. The prevalence of HIV peer programming in American prisons: An opportunity wasted. *J Correct Health Care.* 2007; 13:278–288.
- Farel DE, Parker SD, Muessig KE, Grodensky CA, Jones C, Golin CE, Wohl DA. Sexuality, sexual practice, and HIV risk among incarcerated African-American women in North Carolina. *Women's Health Issues.* 2013; 23:357–364.
- Fleming EB, Leblanc TT, Reid LC. The status of HIV prevention efforts for women in correctional facilities. *J Women's Health.* 2013; 22:1005–1008.
- Franklin CA, Fearn NE, Franklin TW. HIV/AIDS among female prison inmates in correctional institutions: A public health concern. *Calif J Health Promot.* 2005; 3:99–112.
- Grinstead O, Faigles B, Zack B. The effectiveness of peer HIV education for male inmates entering state prison. *J Health Educ.* 1997; 28:S31–37.
- Hammett TM. HIV/AIDS and other infectious diseases among correctional inmates: Transmission, burden, and an appropriate response. *Am J Public Health.* 2006; 96:974–978. [PubMed: 16449578]
- Higgins, JT., Sally Green, S. Cochrane handbook for systematic reviews for interventions. The Cochrane Collaboration and John Wiley & Sons Ltd; 2008.
- Hogan NL. The social construction of target populations and the transformation of prison-based AIDS policy: a descriptive case study. *J Homosex.* 1997; 32:77–114. [PubMed: 9147263]
- Jacobs S. AIDS in correctional facilities: Current status of legal issues critical to policy development. *J Crim Justice.* 1995; 23:209–221. [PubMed: 11658149]

- Jafa K, McElroy P, Fitzpatrick L, Borkowf CB, MacGowan R, Margolis A, Sullivan PS. HIV transmission in a state prison system, 1988–2005. *PLoS One*. 2009; 4:1–8.
- Jurgens R, Nowak M, Day M. HIV and incarceration: prisons and detention. *J Int AIDS Soc*. 2011; 14:218–225.
- Kirkland LR, Fischl MA, Tashima KT. Response to lamivudine-zidovudine plus abacavir twice daily in antiretroviral-naïve, incarcerated patients with HIV infection taking directly observed treatment. *Clin Infect Dis*. 2002; 34:511–518. [PubMed: 11797179]
- Kraemer JD. Screening of prisoners for HIV: Public health, legal, and ethical implications. *MSU J Med & L*. 2009; 13:187–237.
- Larney S. Does opioid substitution treatment in prisons reduce injecting-related HIV risk behaviours? A systematic review. *Addiction*. 2010; 105:216–223. [PubMed: 20078480]
- Larsen K. Deliberately indifferent: government response to HIV in US prisons. *J Contemp Health L Pol*. 2007; 24:251–311.
- Liddicoat RV, Zheng H, Internicola J, Werner BG, Kazianis A, Golan Y, Walensky RP. Implementing a routine, voluntary HIV testing program in a Massachusetts county prison. *J Urban Health*. 2006; 83:1127–1131. [PubMed: 16897416]
- Lima VD, Graf I, Beckwith CG, Springer S, Altice FL, Coombs D, Spaulding S. The Impact of Implementing a Test, Treat and Retain HIV Prevention Strategy in Atlanta Among Black Men Who Have Sex with Men with a History of Incarceration: A Mathematical Model. *PLoS One*. 2015; 10(4):e0123482.doi: 10.1371/journal.pone.0123482 [PubMed: 25905725]
- Loeb GH. Protecting the right to informational privacy for HIV-positive prisoners. *Columbia J Law Soc Probl*. 1993; 27:269–318.
- Lyons T, Osunkoya E, Anguh I, Adefuye A, Balogun J. HIV prevention and education in state prison systems: An update. *J Correct Health Care*. 2014; 20:105–155. [PubMed: 24532813]
- MacKenzie DL, Robinson JW, Campbell CS. Long-term incarceration of female offenders: Prison adjustment and coping. *Criminal Justice and Behavior*. 1989; 16:223–238.
- Martin R, Zimmerman S, Long B. AIDS education in US prisons: A survey of inmate programs. *Prison J*. 1993; 73:103–129.
- Martin R, Zimmerman SE, Long B, West A. A content assessment and comparative analysis of prison-based AIDS education programs for inmates. *Prison J*. 1995; 75:5–47.
- Maruschak, LM. HIV in prisons, 2001–2010. Washington, DC: U.S. Department of Justice; 2012. Retrieved from <http://www.bjs.gov/content/pub/pdf/hivp10.pdf>
- McAuley L, Tugwell P, Moher D. Does the inclusion of grey literature influence estimates of intervention effectiveness reported in meta-analyses? *Lancet*. 2000; 356:1228–1231. [PubMed: 11072941]
- Meyer JP, Chen NE, Springer SA. HIV treatment in the criminal justice system: Critical knowledge and intervention gaps. *AIDS Res Treat*. 2011; 680617:1–10.
- Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group. Preferred reporting items for systematic reviews and meta-analyses: The PRISMA Statement. *PLoS Med*. 2009; 6:e1000097. [PubMed: 19621072]
- Morse DL. The epidemiology of HIV/AIDS in the New York State correctional system. *Crim Justice Policy Rev*. 1990; 4:319–329.
- Neal TMS, Clements CB. Prison rape and psychological sequelae: A call for research. *Psychol Public Pol L*. 2010; 16:284–299.
- Panton JH. Personality differences between male and female inmates measured by the MMPI. *Criminal Justice and Behavior*. 1974; 1:332–339.
- Parts M. The eighth amendment and the requirement of active measures to prevent the spread of AIDS in prisons. *Colum Hum Rts L Rev*. 1990; 22:217–249.
- Pinkerton SD, Galletly CL, Seal DW. Model-based estimates of HIV acquisition due to prison rape. *Prison J*. 2007; 87:295–310. [PubMed: 18584061]
- Radford J. Removing the stigma of prison rape and sexual assault: The first step to providing HIV treatment to prisoners. *Crim L Brief*. 2007; 3:37–44.

- Ross MW, Harzke AJ, Scott DP, McCann K, Kelley M. Outcomes of project wall talk: an HIV/AIDS peer education program implemented within the Texas state prison system. *AIDS Educ Prev.* 2006; 18:504–517. [PubMed: 17166077]
- Scott DP, Harzke AJ, Mizwa MB, Pugh M, Ross MW. Evaluation of an HIV peer education program in Texas prisons. *J Correct Health Care.* 2004; 10:151–173.
- Siegal DM. Rape in Prison and AIDS: A challenge for the eighth amendment framework of *Wilson v. Seiter*. *Stanford L Rev.* 1992; 44:1541–1581.
- Solomon L, Montague BT, Beckwith CG, Baillargeon J, Costa M, Dumont D, Rich JD. Survey finds that many prisons and jails have room to improve HIV testing and coordination of postrelease treatment. *Health affairs.* 2014; 33(3):434–442. [PubMed: 24590942]
- Sowder DS. AIDS in prison: Judicial indifference to the AIDS epidemic in correctional facilities threatens the constitutionality of incarceration. *NYL Sch L Rev.* 1992; 37:663–688.
- Spaulding A, Stephenson B, Macalino G, Ruby W, Clarke JG, Flanigan TP. Human immunodeficiency virus in correctional facilities: a review. *Clin Infect Dis.* 2002; 35:305–312. [PubMed: 12115097]
- Springer SA, Altice FL. Managing HIV/AIDS in correctional settings. *Curr HIV/AIDS Rep.* 2005; 2:165–170. [PubMed: 16343373]
- Springer SA, Spaulding AC, Meyer JP, Altice FL. Public Health Implications for Adequate Transitional Care for HIV-Infected Prisoners: Five Essential Components. *Clin Infect Dis.* 2011; 53:469–479. [PubMed: 21844030]
- St Lawrence J, Eldridge GD, Shelby MC, Little CE, Brasfield TL, O'Bannon RE III. HIV risk reduction for incarcerated women: A comparison of brief interventions based on two theoretical models. *J Consult Clin Psychol.* 1997; 65:504–509. [PubMed: 9170774]
- Statistics: Inmate Race. Federal Bureau of Prisons Web site; http://www.bop.gov/about/statistics/statistics_inmate_race.jsp Updated Jan 24 2015. Accessed Jan 27, 2015
- Stephens T, Braithwaite R, Tiggs C. Correlates of inmates' self-reported HIV risk behaviors, prior incarceration, and marijuana use. *Am J Drug Alcohol Abuse.* 2004; 30:287–298. [PubMed: 15230077]
- Stephens T, Cozza S, Braithwaite RL. Transsexual orientation in HIV risk behaviours in an adult male prison. *Int J STD AIDS.* 1999; 10:28–31. [PubMed: 10215126]
- Underhill K, Dumont D, Operario D. HIV prevention for adults with criminal justice involvement: A systematic review of HIV risk-reduction interventions in incarceration and community settings. *Am J Public Health.* 2014; 104:27–53.
- Velez M. AIDS/HIV+ Inmates: A new standard to house infected inmates based on objective, proactive criteria that balances the needs of the infected inmate while protecting non-infected inmates and prison staff. *Sw L Rev.* 2011; 41:171–210.
- West AD, Martin R. Perceived risk of AIDS among prisoners following educational intervention. *J Offender Rehabil.* 2000; 32:75–104.
- Zaller N, Thurmond P, Rich JD. Limited spending: an analysis of correctional expenditures on antiretrovirals for HIV-infected prisoners. *Public Health Rep.* 2007; 122:49–54. [PubMed: 17236608]
- Zunker T. Changing the policy of prisoner-cide: providing access to condoms. *Nw Interdisc L Rev.* 2012; 5:39–76.

Figure 1.
Inclusion and Exclusion Criteria

Table 1

Study Type Definitions

Study type	Definition
Biomedical	Biological/medical aspects of disease prevention and treatment, including biological processes, biomarkers, genetics, environmental factors, medications, and HIV care continuum.
Social/Behavioral	Various levels of social context from small groups to complex cultural systems/societal influences (social), and risk taking behaviors, including underlying psychological processes (behavioral)
Policy	Issues and/or implications of public policy, includes legal case studies, and policy analyses

Table 2

Content Category Definitions

Study Themes	Subcategory	Definition
Gender		Gendered differences, gender-specific needs, interventions, or analyses
HIV/AIDS Care Continuum		Related to HIV/AIDS care & treatment; includes testing, counseling, medical adherence, antiretroviral therapy (ART), medications
Prevention		Strategies & interventions for HIV/AIDS prevention; includes education and risk-reduction
Risk behaviors		HIV/AIDS-associated risk behaviors; includes sexual risk behaviors, substance use, rape in prison, risk perception
Policy		Policy debates relevant to HIV/AIDS; includes prisoner rights, constitutionality, ethics, program comparisons & recommendations

Table 3

Review of HIV/AIDS in Prisons

#	Article	Study Type: Selection Criteria			Study Content: HIV/AIDS Major Themes				
		Biomedical	Social/Behavioral	Policy	Care	Risk	Gender	Prevention	Policy
1	Clark (1990)		qualitative case study: peer education program				women's prison program; NY state	peer education, counseling, support, health advocacy	
2	Parts (1990)			constitutional analysis				recommendations: condoms, bleach, sterile needles	prisoner rights to medical care & 8 th amendment
3	Blumberg (1991)			policy analysis	HIV testing				mandatory HIV testing policy justifications
4	Martin (1993)		survey: education programs in state prisons					limited evaluation of education program impacts	
5	Jacobs (1995)			policy analysis	HIV testing				constitutionality of testing & housing segregation
6	Martin (1995)		27-state survey: education programs					harm reduction training/resources, peer counseling, links to services	
7	Blender (1997)			constitutional analysis	HIV testing				4 th amendment & mandatory testing, concerns of sexual assault victims & sex offender rights
8	Grinstead (1997)		comparative impact of education programs on perceived risk, risky behaviors			similar outcomes re: sex, IDU, risk perception	male inmates; CA	peer vs. professional education efficacy	
9	St Lawrence (1997)		evaluation of risk reduction program				female inmates	importance of communication skills vs. knowledge of AIDS/safe sex	
10	Amankwaa (1999)			policy analysis	HIV testing				mandatory vs. voluntary testing

#	Article	Study Type: Selection Criteria				Study Content: HIV/AIDS Major Themes			
		Biomedical	Social/Behavioral	Policy	Care	Risk	Gender	Prevention	Policy
									costs, risk vs. right to privacy
11	Boudin (1999)		interviews: peer education program				female inmates; NY state	program's peer & professional support promotes knowledge/coping	
12	West (2000)		pre/post quasi-experimental study: impact of education program on perceived risk				male & female inmates	gendered (pre-to post-test) change in perceived risk; behavioral intention as predictor	
13	Amankwaa (2001)			policy analysis	HIV testing				voluntary testing ineffective; gap in care due to HIV identification
14	Collica (2002)		pre/post evaluation: impact of peer education program on knowledge, behavioral intentions				female inmates; NY state	peer education improves knowledge & desire to change behavior	
15	Kirkland (2002)	single arm clinical trial: medication effectiveness in ART-naïve inmates			combination drug treatment maintains CD4 & viral suppression				
16	Scott (2004)		pre/post evaluation & focus groups: impact of peer education program on knowledge, attitudes/beliefs					peer education improves HIV knowledge & attitudes/beliefs	
17	Bryan (2006)		pre/post evaluation: effect of beliefs/attitudes intervention; racial/ethnic comparisons (black, white, Hispanic)					program improves HIV knowledge but doesn't translate to behavior change; racial variation	

#	Article	Study Type: Selection Criteria			Study Content: HIV/AIDS Major Themes				
		Biomedical	Social/Behavioral	Policy	Care	Risk	Gender	Prevention	Policy
18	Liddicoat (2006)	comparison of new routine test program to voluntary testing			HIV test rate higher in routine program than voluntary				
19	Ross (2006)		pre/post evaluation: effect of peer education program on HIV knowledge, testing, status awareness		HIV testing			post-program knowledge & test rate improvements	
20	Collica (2007)		survey: peer education program prevalence					20% of state & no federal prisons w/ peer education programs	
21	Larsen (2007)			policy & constitutional analysis					prevention recommendations, 8 th amendment, right to privacy & housing segregation
22	Ayanwale (2008)		pre/post evaluation: impact of interactive & passive education programs on knowledge					post-programs, improved knowledge of transmission & protection	
23	Kraemer (2009)			policy analysis	HIV testing				recommendation for routine, opt-out HIV testing, constitutional rights limitations, screening ethics
24	Velez (2011)			policy analysis					housing segregation in prisons
25	Charles (2012)			policy analysis	HIV treatment standards (ART)				deliberate indifference, inadequate care & 8 th amendment protections

#	Article	Study Type: Selection Criteria			Study Content: HIV/AIDS Major Themes				
		Biomedical	Social/Behavioral	Policy	Care	Risk	Gender	Prevention	Policy
26	Zunker (2012)			policy analysis		rape in prison		condom distribution	prevention, rights, prisoner litigation & prison rape acts
27	Lyons (2014)			survey: state prison testing & prevention policies	HIV testing, counseling			mandatory testing, peer education, support groups, counseling	more direct & individual interventions than group & harm reduction programs