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The Reproductive Health Needs Of Women At Risk Of Hiv Infection In Connecticut

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The Reproductive Health Needs of Women at Risk of HIV Infection in Connecticut

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Abstract

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Background: The number of women involved in criminal justice systems (WICJ) and women who use opioids has been dramatically increasing in the United States. An often-overlooked aspect of healthcare for these women who are at risk of HIV infection is reproductive health. We aim to provide a framework, informed by a systematic review and primary data, to guide future interventions addressing the sexual and reproductive health (SRH) needs of women at risk of HIV infection.

Methods: We completed a systematic literature review of the pregnancy prevention and planning needs of US WICJ published in English from 2000-2018. We identified 2,674 articles and three independent reviewers determined that 24 articles (14 descriptive studies in adults, 6 descriptive studies in adolescents and 3 interventional studies) met inclusion criteria. In parallel, a reproductive health assessment was administrated to 76 women enrolling in two ongoing HIV prevention studies (either WICJ or women who use drugs on drug treatment (WWUD)) and analyzed in the context of the Behavioral Health Model for vulnerable populations.

Results: The literature review demonstrates contraception underutilization and negative pregnancy attitudes among WICJ (in a wide variety of settings), resulting in frequent negative SRH outcomes (unintentional pregnancies, abortions and miscarriages). Our survey of 59 WICJ and 18 WWUD demonstrates multiple sociocultural, medical and psychiatric comorbidities that predispose women to health care underutilization, producing incongruent SRH behaviors (58.1% do not use contraception, while only 10.5% want more children) and negative SRH outcomes (75% report teenage pregnancy,

45%/ 48% have a history of miscarriage and abortions, respectively, and over two-thirds have a prior unplanned pregnancy). Despite this, 90.5% have received some up-to-date preventative SRH care.

Conclusion: Overall, WICJ and WWUD in need of HIV prevention interventions are also at risk of multiple negative SRH outcomes. Connections to the criminal justice system and drug treatment facilities offer opportunities to address the multilevel barriers to care faced by these populations. Women at risk of HIV infection need targeted, gender-responsive, trauma-informed interventions that incorporate HIV and pregnancy prevention while addressing the multiple structural, interpersonal and sociocultural barriers specific to these populations

Acknowledgements

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Introduction

Women Involved in Criminal Justice Systems

The United States incarcerates more of its population than any other country—155% times the country with the next highest level of incarceration [1]. As a result, over 6.6 million people are currently involved in the U.S. criminal justice system (CJS) [2] with 4.5 million people under community supervision (i.e., probation or parole) and 2.1 million people incarcerated in prisons (incarceration lasting more than 1 year) and jails (incarceration lasting less than one year) [1]. As a result of a number of policies, including the war on drugs in the 1980s and mandatory minimum sentencing, the number of people are involved in CJS has tripled [1]. The surge in CJ involvement has particularly impacted women—so much so that the United States now incarcerates more women than any other country worldwide [3, 4]. Currently, there are over 1.2 million incarcerated women in the United States—eight times the number of incarcerated women in the 1980s [3, 4].

Women of color have been disproportionally impacted by rising rates of incarceration. Only 49 per 100,000 White women are incarcerated compared to 96 per 100,000 Black women and 67 per 100,000 Hispanic women [1]. In fact, while Black women experienced a 53% increase in imprisonment between 2000 and 2016, Black men saw a 30% decrease in imprisonment [3]. Black women are nearly as likely to be incarcerated as White men over the course of their lifetimes [1, 3].

Additionally, women and girls are far more likely to be imprisoned for nonviolent crimes than men. Over 50% of women in prison are charged with drug- or property-based offenses compared to 31% of men [3]. However, women often face the same minimum

sentences despite their predisposition towards non-violent crimes. This pattern also translates to incarceration of adolescent girls: girls represent 15% of imprisoned individuals under 18 years old, but they comprise 38% of truancy/curfew imprisonments and over half of incarcerations for teenage runaways [3].

People involved in CJS are disproportionately impacted by social determinants of health including poverty, unstable housing, limited access to health care, undereducation, racial discrimination, unemployment, and food insecurity [5]. These factors predispose to high rates of poor health outcomes; substance use; mental illness; and infections with sexually transmitted infections (STIs), human immunodeficiency virus (HIV) and hepatitis C [6, 7]. Furthermore, incarceration, which is designed to penalize rather than provide care, increases risk for infectious diseases often due to overcrowding, contributes to social and familial fragmentation and is associated with difficulties finding employment and housing upon release. Studies demonstrate that high incarceration rates are linked to numerous poor community health outcomes, including increased rates of teen pregnancy and STIs [8].

Women involved in criminal justice (WICJ) experience significantly more negative socioeconomic and health outcomes than incarcerated men or women in the community [9, 10]. One study in Los Angeles found a chlamydia and gonorrhea prevalence among women entering jail of 11.4% and 3.1%, respectively [11], compared to a national prevalence among women of 0.63% and 0.12%, respectively [12, 13]. Likewise, incarcerated women are nine times more likely to be living with HIV compared to women in the community [14], and HIV rates among incarcerated Black women are twice that of incarcerated Hispanic or White women [15].

WICJ not only experience health disparities in terms of infectious diseases (HIV, STIs), but they also commonly experience psychiatric and substance use disorders (SUDs). According to the Bureau of Justice Statistics, 73% of women in state prisons and 75% of women in local jails exhibit symptoms of psychiatric disorders [16]. Additionally, recent serious psychological distress was reported by 20% of women in prison and 32% of women in jail compared to 14% and 26% of men in prison and in jail, respectively [17]. Three quarters of WICJ with a severe mental illness also have a SUD [18] and in a recent systematic review, 51% of incarcerated women meet criteria for SUDs compared to 30% of incarcerated men [19].

These mental and physical comorbidities are often compounded by a history of violence exposure, as three-quarters of WICJ report severe intimate partner violence (IPV) and 77% report a history of physical or sexual assault throughout their lifetimes [20-22]. Additionally, violence exposure starts at a young age: 70% of WICJ report physical abuse and 59% report sexual abuse as children [20]. For women, the impact of incarceration also extends beyond the individual, as 60% of WICJ in state prisons have children under 18 years old [3]. Overall, justice involvement is a destabilizing force that compounds the multifactorial socioeconomic, psychiatric and interpersonal stressors that WICJ disproportionately face.

In this context, it is unsurprising that WICJ excessively experience negative reproductive health outcomes compared to women in the community. WICJ have irregular menstrual cycles three times as often [23] and abnormal pap smears six times as often as the general population [24, 25]. The majority of WICJ (50-84%) have a history of unintentional pregnancies [26, 27] compared to 36.4% in the general population [28].

Only 21-36.5% of WICJ engage in consistent contraception use to prevent pregnancy [26, 29-31]. As a result, more than half of WICJ have a history of abortion [30-33]—twice the rate in the general population [34] (53-55% v. 23.7%). Between 6-10% of incarcerated women are pregnant, and they lack access to appropriate nutrition, rest periods, education and support services while in prison or jail [35, 36]. Often, pregnant, incarcerated women are also exposed to dehumanizing and dangerous conditions (i.e. shackling during labor) contrary to federal regulations [36].

While the vast majority of incarcerated women are of reproductive age [3] and demonstrate clear need for interventions targeted at reproductive health, little attention has focused on designing thoughtful interventions to address the SRH needs of WICJ. While access to healthcare in CJ facilities is constitutionally protected [37], CJ- provided healthcare is rarely gender-informed due to the historical lack of women in CJ facilities. Incarceration represents a unique opportunity to provide healthcare for populations who face inordinate barriers to care in the community. Prior gender-specific interventions have been mostly psychoeducational targeting HIV and STI prevention [38, 39], often excluding the contraceptive needs of this population. While contraception provision to WICJ is scarred by a protracted history of reproductive coercion, including sterilization of WICJ as recently as 2010 in California [40], comprehensive, culturally-informed pregnancy prevention and planning strategies are a vital component of health care for WICJ.

Women with Substance Use Disorders

There are over 21.5 million Americans with SUDs and the rate of SUDs is 10.7% among men compared to 5.7% among women [41]. SUDs are comprised of either alcohol use disorder or drug use disorders (including marijuana, cocaine (including crack), heroin, hallucinogens, inhalants and methamphetamine, misuse of prescription pain relievers, tranquilizers, stimulants and sedatives) and SUDs are defined by the Diagnostic and Statistical Manual of Mental Disorders, 4th edition, (DSM IV) criteria [41, 42].

Among SUDs, there has been a rapid increase in opioid use in the past two decades. In fact, the United States is currently experiencing an epidemic of opioid use disorder (OUD). Of 3.8 million people who have misused opioids in the past month, 2 million people in the United States report a prescription OUD in the past year [43]. Over half a million people in the US have a heroin use disorder, and opioid overdoses are the leading cause of accidental death resulting in over 115 deaths daily [43]. Unlike other SUDs, there are a number of highly effective evidence-based medication assisted treatment (MAT) options for OUDs (naltrexone, methadone, buprenorphine).

However, people with SUDs face many of the same barriers to care as people involved in the CJS. Stigma around incarceration and substance use deters people from seeking out health care [44]. Compounded with poor nutrition, lack of employment opportunities, low socioeconomic status, interpersonal violence, housing instability and comorbid psychiatric disorders, people with SUDs often lack ability to access the healthcare they need.

While men are more likely to experience SUDs, women are, in general, more profoundly impacted by their SUDs. In a study of treatment-seeking people with OUD,

women had significantly more psychiatric and medical comorbidities, employment problems and family/social impairment compared to men [45]. Women also progress faster from substance use initiation to addiction, experience more serious psychological distress and are less likely to be enrolled in treatment for OUD compared to men [45-47]. Women with SUDs are wary of treatment because they often use with sexual partners, so they may have limited autonomy to modify their own substance use (and if they try, risk causing stress in their relationship) and they are concerned about how accessing treatment for SUDs (and by doing so, reporting substance use) will impact parental rights. Overall, women with SUDs experience faster transitions to dependence, more psychiatric comorbidities and are less likely to be in treatment than men due to their unique social and familial circumstances.

Moreover, the opioid use epidemic has particularly impacted women of reproductive age, who are at risk for a variety of negative SRH outcomes. A recent systematic review on contraceptive use among women seeking treatment for OUD found that 6-77% (median: 55%) of women reported any contraception use, which is 25% lower than comparison populations [48]. Nearly two-thirds women who use opioids solely rely on condoms, a partner dependent method, for pregnancy prevention compared to 8% who rely on highly effective methods, such as intrauterine devices (IUD), implants and tubal ligation [48]. As a result, nearly nine in ten women who use opioids report a history of unintentional pregnancies [49, 50] and 54% of women with OUD report a history of at least four pregnancies compared to 14% of the general population [51]. Nearly five times as many women with OUD have had abortions compared to the general population [51]. Women with OUD who carry pregnancies to term without treatment are at increased risk

of premature labor, low birth weight and neonatal absence syndrome (NAS) [52]. In summary, women with SUDs and OUD in particular, experience inordinate rates of negative SRH outcomes from contraception underutilization to poor birth outcomes and require innovative interventions to address their SRH needs.

Theoretical Framework: The Behavioral Model for Vulnerable Populations

To understand the reproductive health needs of WICJ and WWUD, we applied the Behavioral Model for Vulnerable Populations, an adapted version of the original Behavioral Model [53-55]. The Behavioral Model aims to identify factors that impact health service utilization among specific populations (Figure 1). We used the behavioral model as a way to understand how underlying structural, socioeconomic and psychosocial factors influence SRH behaviors and resulting SRH outcomes.

We adopted the framework that predisposing factors, enabling resources and need factors impact health behaviors and outcomes and adapted this model to the factors specific to reproductive health in the context of criminal justice involvement and substance use disorders. Predisposing factors are inherent factors that predict healthcare utilization, such as demographic characteristics, living situation and criminal justice involvement. Enabling factors are those that help vulnerable population connect to care, such as having a primary care provider, insurance status, SUD treatment and food security. Need factors are personal perceived (subjective) and evaluated (objective) need for health services and severity of disease. SRH Behaviors were divided into risky sexual and injection behaviors and SRH behaviors related to pregnancy planning. SRH outcomes involved historical markers of reproductive health (history of teenage

pregnancies, unintentional pregnancies, abortions and miscarriages) as well as current markers of maintenance SRH care.

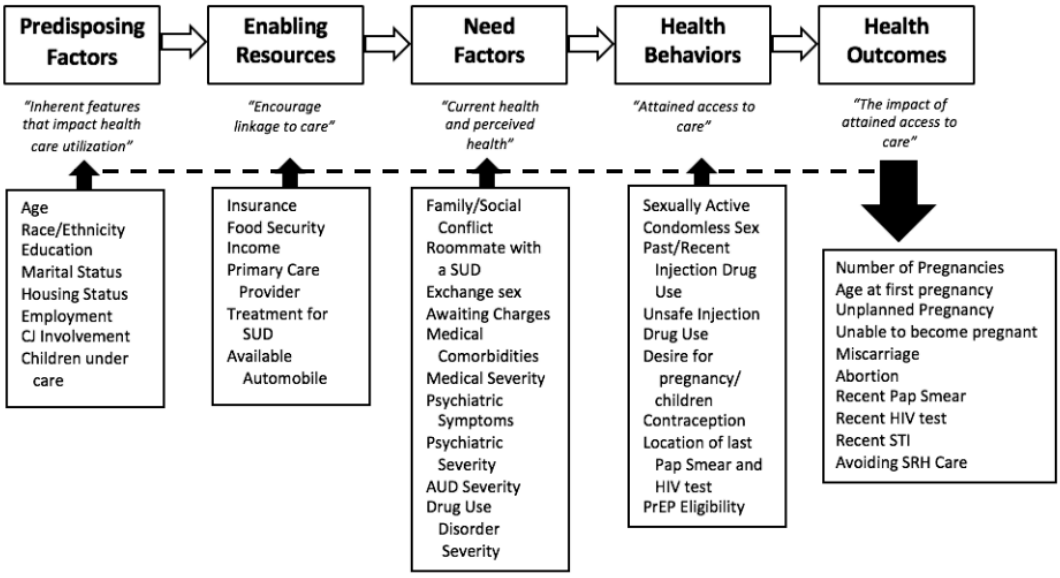

Figure 1. The Behavioral Model for Vulnerable Populations adapted for reproductive health outcomes. Adapted from Gelberg, L., R.M. Andersen, and B.D. Leake, *The Behavioral Model for Vulnerable Populations: application to medical care use and outcomes for homeless people.* Health Serv Res, 2000. **34**(6): p. 1273-302 and Chen, N.E., et al., *Adherence to HIV treatment and care among previously homeless jail detainees.* AIDS Behav, 2013. **17**(8): p. 2654-66.

Statement of Purpose

The purpose of this study was to elucidate the reproductive health needs of women who are at highest risk of acquiring HIV. By targeting both WICJ and WWUD, we aimed to highlight the overlapping needs of these populations in a community-based population in New Haven, Connecticut. To contextualize the results, we completed a systematic review of the status of pregnancy planning and prevention among WICJ in the literature. We anticipated this would set the stage for the results of our reproductive health assessment among community-based WICJ and WWUD. We hypothesized that CJ involvement and substance use would be associated with frequent negative reproductive health outcomes,

including unintentional pregnancies, teenage pregnancies, induced abortions and miscarriages within the context of the behavioral model for vulnerable populations. We aimed to highlight the need for reproductive health interventions in WICJ/WWUD and provide targets for future interventions in reproductive health.

Section A: SRH Systematic Review

Systematic Review Methods

We planned a systematic review to identify the SRH needs of women involved in CJS. We narrowed our focus from the overarching SRH of WICJ to pregnancy prevention and termination needs among WICJ because SRH is such a broad topic encompassing menstruation management, pregnancy prevention, planning, and management, breast and cervical cancer prevention and management, STI prevention and management, parenting, sexuality and more. By doing so, we intended to explore an often overlooked and understudied aspect of the SRH of WICJ. We aimed to answer the following: 1) What is the prevalence of pregnancy prevention and termination among WICJ? 2) What are the pregnancy planning needs of WICJ? and 3) What interventions have targeted addressing pregnancy prevention and termination among WICJ?

We queried Pubmed, Ovid Medline, Ovid Embase and Web of Science using key terms in three realms: (1) pregnancy prevention and termination, (2) the criminal justice system (CJS) and (3) women. In the search terminology, the star (*) indicates searching for the beginning of that word with any ending (i.e. pregnancy or pregnancies), while the # indicates that any letter can fill that space (i.e. woman or women). Specifically, pregnancy prevention and termination included the MESH terms contraception,

contraceptive devices, abortion, induced, pregnancy, reproductive rights, delivery, obstetric, women's health, maternal health services, reproductive behavior, reproductive health (services) and key words of birth control, condom, contraception, pregnan*, miscarry*, abort*, family plan*, IUD, "the pill", vaginal ring, Nuvaring, Depo-Provera, Implanon, Nexplanon, cervical cap*, diaphragm*, spermicide, morning after pill*, emergency contraception, long acting reversible contraception/LARC, tubal ligation or sterilization. CJS key words included prisons, prisoners, criminals, incarcerate*, criminal justice system, prison*, jail*, court*, correctional, inmate*, convict*, offender*, imprison*, parol*, probat*, justice-involve*, justice involve* ex-con, felon or correctional health care. Gender-specific terms included wom#n, female* and girl*. The search was narrowed to any journal article published between 2000 and 2018 in English with full text available through Yale University. A United States filter was applied.

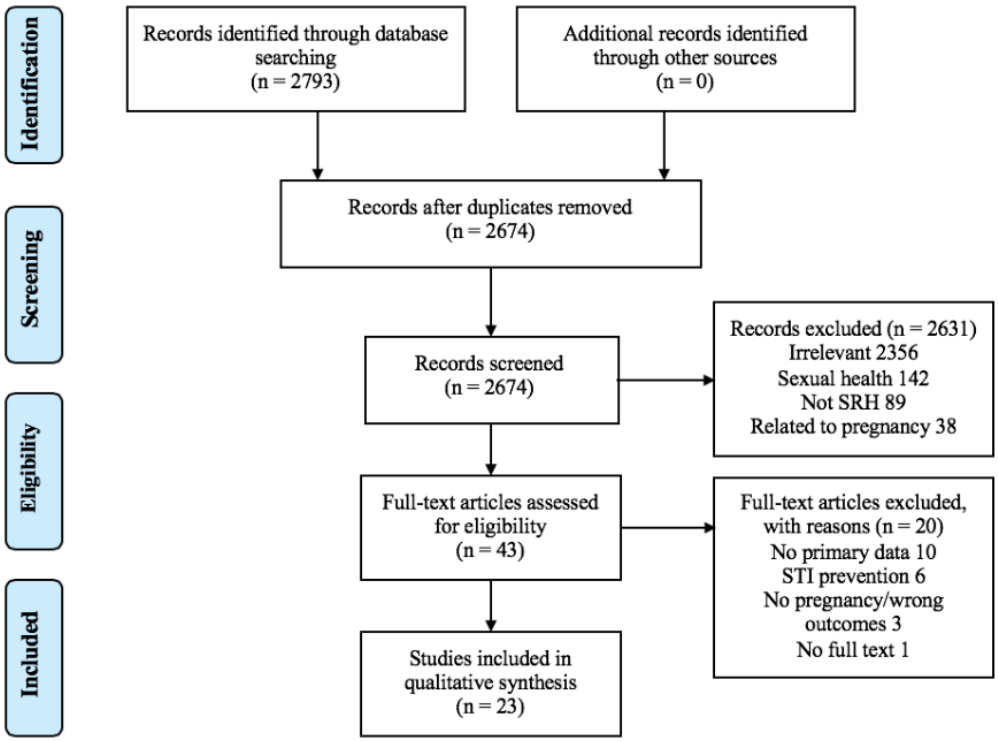

Figure 2. PRISMA Diagram for Systematic Review of Pregnancy Planning and Prevention Needs among WICJ. *Source*: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). *P*referred *R*eporting *I*tems for *S*ystematic Reviews and *M*eta-*A*nalyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097.

Citations were imported into EndNote X8, duplicates were removed and then, references were uploaded to Covidence (Australia), a screening and data extraction tool. Abstracts were reviewed for the following inclusion criteria: (1) involving cis-gendered women, defined as women whose biological sex is female and identify as female gender, (2) present or past justice-involvement including incarceration in prison or jail, parole or probation, (3) study population in the United States, (4) primary data published in English in a peer-reviewed journal with available full text, (5) a primary or secondary outcome of pregnancy prevention, unintended pregnancy or termination. We intentionally excluded articles that focused only on sexual health, STI/HIV prevention and condom use

without mention of contraceptive benefit or discussion of pregnancy prevention. All studies published prior to the extraction date of July 23, 2018 were included. Two reviewers (EH and ZA) independently voted on study inclusion. After discussing 32 discrepancies in the extraction, a third reviewer (JM) resolved the discrepancies and 43 articles were selected for full-text review. Of those, 23 were ultimately included in the analysis, with additional details of exclusion in the PRISMA diagram (Figure 2). We extracted data based on the CJ setting, the population of women and the primary/secondary pregnancy-prevention-specific reproductive health outcomes. Studies were grouped based on descriptive (n=20) or interventional (n=3) study designs. The descriptive studies were subcategorized by population (adolescents; n=6 or adults; n=14) for presentation. Studies were defined as applicable to an adolescent population if they were based in a prison, jail or probation service specific to adolescent populations (age ranged from 11-19 years old depending on the study).

I designed the systematic review with guidance from Dr. Jaimie Meyer. Alyssa Grimshaw helped perform the data query, and I reviewed the articles along with Zoe Adams with Dr. Jaimie Meyer resolving discrepancies. I completed the majority of the full text extraction with review by Zoe Adams for completeness.

Systematic Review Results

Non-Interventional Studies with Adult WICJ

Fourteen studies investigated the pregnancy planning and termination needs of adult WICJ (Table A). The studies mostly were cross sectional in nature, focused on

contraception attitudes/use/access and/or pregnancy attitudes [26, 29, 30, 56-58], unintended pregnancies [27], emergency contraception (EC) [33] and timing of conception [59]. Two studies were based on surveys of correctional providers for access to women's health services in prisons/jails [60, 61]. Two studies included qualitative data on sterilization and contraception attitudes [58, 62]. Nearly all studies were specific to WICJ in closed systems (jail, prison or combined facility) but one study was based in community corrections [31].

A main focus of the published literature was the incongruency between current SRH behaviors, desired SRH outcomes and historical negative SRH outcomes: women consistently reported low rates of contraception use in spite of high rates of negative pregnancy attitudes and nearly universal histories of unintended pregnancies. A range of 50% to 84% reported a history of unintended pregnancies [26, 27] and anywhere from 50% to 90% of women expressed negative pregnancy attitudes [29-31, 56, 62]. However, over three quarters of women planned to have sex at release [26, 29] while only one-fifth to one-third of women engaged in consistent contraception use [26, 29-31]. One study reported 39% of the women in a local jail planned to use the rhythm method as their main form of contraception [29]. Clarke et al. found that over half of pregnant women entering jail had previous incarcerations and 44% conceived within 1 year of release--- indicating a missed opportunity for pregnancy planning interventions [59]. Sufrin et al also established potential of using the CJS for pregnancy planning by demonstrating that nearly a third of women entering jail are eligible for EC [33]. Qualitative results indicate that WICJ are interested in contraception provision in prisons/jails: 97% of surveyed WICJ believe that contraception should be provided in jail and 70% of surveyed WICJ

were interested in EC provision at release from jail. However, WICJ report lower personal interest in using these services due to misperceptions about EC being an abortifacient, stigma of using contraception in jail (concern that others would think they were engaging in sexual activity with corrections officers) and mistrust of the medical community [33, 58].

In a survey of 950 correctional healthcare providers on available resources, 70% of facilities reported offering contraceptive counseling, but only 11% provided universal counseling and 70% lacked a formal policy regarding counseling [60]. Over half of women in prison or jail were required to discontinue their pre-incarceration contraceptives (i.e. stop taking oral contraceptives or the hormonal patch/ring), and healthcare providers reported low confidence in their own contraceptive counseling capabilities [60]. Approximately two-thirds of surveyed CJ facilities allowed abortions and of those that do, 88% allow transportation to the appointment, but only 54% help arrange transportation [61].

Non-interventional Studies with Adolescent WICJ

Six studies focused on the reproductive health needs of adolescent populations (11-19 years old; Table B). Four studies concentrated on predictors of teenage pregnancy [63-66], one was a mixed methods study on reproductive health and access to services [67] and one described reproductive health services in prisons or jails [68]. Four studies were based in juvenile detention centers [63, 66-68], one in juvenile county courts [64] and one on probation [65].

The prevalence of teenage pregnancies ranged from 22.5% in a short term juvenile detention center in Georgia to 36% in a juvenile detention facility in Northern California [63, 66, 67]. Black adolescent WICJ were three times more likely to have a history of pregnancy than white adolescent WICJ [64]. In one study, twenty percent of adolescent girls reported strong pregnancy intentions [63], and another study found that SRH services were not utilized due to interest in pregnancy, often in order to save a relationship [67]. Pregnant adolescents frequently had histories of repeat incarcerations [63], and adolescents involved in the CJS reported that fear of outstanding warrants prevented them from accessing SRH services [67]. Unfortunately, a survey of SRH provision in adolescent prisons or jails found that under 18% of institutions universally test for pregnancy and STIs despite 25% of institutions housing at least one pregnant adolescent [68]. The studies were mostly limited by self-reported data and convenience bias [63, 65, 66] and were from populations largely consisting of one race/ethnicity leading to lack of generalizability [66, 67].

Interventional Studies with WICJ (adolescent and adult)

Three studies consisted of interventional or pseudo-interventional methods on contraception provision or counseling in short-term or combined prisons/jail facilities (Table C) [32, 69-71]. Women were fourteen times more likely to start contraception in jail compared to linking to no-cost contraception at release (contraception provision included IUD insertion, Depo-Provera or prescription of either an oral or transdermal hormonal contraception) [69]. Sufrin et al. inserted long term reversible contraception (LARC) methods with a median duration of use around a year and no reported

complications [32]. After a contraception counseling intervention, Grubb et al. saw 52% of incarcerated adolescent girls start contraception (OCPs or Depo-Provera) compared to 7% of incarcerated adolescents prior to the intervention [71].

Author (Date)	CJ Involvement	Study Sample	Study Design	Measures	Major Outcomes	Minor Outcomes	Limitations
Clarke (2006)	Combined prison/jail	484 women	Cross sectional survey	Demographics, substance use, sexual/reproductive health history (SRH hx), contraceptive hx, general health	High markers of unintended pregnancy(inconsistent 66% birth control (BC), 80% condom use, 38% multiple sex partners, 84% unplanned pregnancy, 49% hx of STIs)	Only 15.4% said not likely to have sex within 6 mo of release	Self-report and social desirability bias English speaking women only
Clarke (2006)	Combined prison/jail	223 women <36 yo, sexually active w/ no plans to conceive	Cross sectional survey	Demographics, substance use, SRH hx, birth control burden, conception locus, pregnancy attitude (PA), contraceptive plan/desire for pregnancy	Nearly half of the women had negative PAs and 41.3% had ambivalent PAs	Negative PA-> --more likely to have a previous unplanned pregnancy, previous abortion, recent contraceptive use (37% v. 22%), want to start/continue contraception (66% v. 47%)	Self-report and social desirability bias Desire to start contraception, but not actual initiation Contraception plans ?influenced by incarceration English speaking women
Hale (2009)	Five local jails from a medium-sized metro area	188 women	Cross sectional survey	Demographics, SRH, contraception use, preferred contraception, pregnancy, contraception and sexual intercourse intentions	36.5% inconsistent contraception use 61.5% Negative PA 76.9% Intended to have sex at release while only 38.5% planned to become pregnant 77.9% of women able to bear children reported intentions to use BC/STI protection at release	People of color less likely to use BC compared to Whites (10% v. 14%) Past BC methods: 74% condom, 66% BC pills, 39% withdrawal, 24% Depo-Provera 7% never used BC Planned BC: 58% condom, 10% OCPs, 9% withdrawal	Only adult women Short term facility (most <6 months)
Sufrin (2009)	Any CJ facility that includes women	950 CJ clinical care providers	Cross sectional survey	BC counseling/continuation/prescribed methods/dispensed, comfort counseling	70% contraceptive counseling (only 11% routine)	If counsel on STIs, offer abortions or take care of juveniles, more likely to counsel on contraception	Convenience sample—those who actually responded could care more about SRH

				on BC, STI screening, challenges to providing SRH care	70% no formal policy on contraception 38% provided BC; 55% not allowed to continue BC Only 50% of providers ranked their BC counseling ability as (very) good	84% felt they would benefit from more education regarding contraception	Self report / response bias Clinicians- reflect practice, not always policy
Sufrin (2009)	Any CJ facility	286 CJ clinical care providers in 2006-7	Cross sectional survey	Provider/facility characteristics, abortion/ contraceptive services, and general/SRH care, aware of regulations preventing healthcare	68% WICJ can obtain elective abortions 88% provides transportation, but 54% help arrange appointments No individual/ institutional differences	Providers from states with a republican-dominated legislature or with a policy that restricted abortion coverage were more likely to have limited abortion availability	Unsure of characteristics of non-responders (convenience sample) Unable to correlate with actual practices
Sufrin (2009)	Urban county jail booking facility in SF	Women 18-44 in 2008-9	Cross sectional study	Sociodemographic, SRH variables, sex with alcohol/drugs or violence, condom use, prior experiences with EC, EC eligibility (vaginal sex without an intact condom in past 5 days and not on reliable BC method)	29% eligible for EC; of these 48% willing to take EC if offered Half eligible for EC had ambivalent PA / 23% ambivalent PA overall 71% of women would accept EC at release	Women who had taken EC were more likely to say they would take it (45% v. 25%) Strongest predictor of willingness to take EC was not having a misperception about it's safety, efficacy or MOA 69% had delivered a child; 32% of women on contraception	Does not include women arrested for sex work Self-report No information about non-respondents
Clarke (2010)	Entering a combined prison/jail	269 pregnant women between	Retrospecti ve Chart Review	Timing of conception for first pregnancy during study period, age, gravidity, number	52% had prior incarcerations; 44% conceived within 1 yr of prior release (50% in 3 mo)	Women with prior incarcerations→ more substance use and less likely to report	Inability to assess pregnancy intentions

		1997-2002		of prior pregnancies, substance use, incarceration and release dates	Women who conceived in 3 mo were more likely to be incarcerated for >30 days while pregnant than women who conceived >90 days of last incarceration	pregnancies→ likely unplanned	Unknown number of pregnancies among released women Estimated time from conception (LMP)—not exact
Oswalt (2010)	Five local jails in a medium sized southeast metropolitan area	188 women	Cross sectional survey	Demographics, SRH, contraceptive use and preferred contraception	Intended contraceptive use at release varied on interest in children 25% access to an OB-Gyn prior to incarceration 74.1% used condoms as BC Half of women had a STI hx	Participants who did not plan to use condoms at release: less likely to have a hx of STDs/PID, more likely to have a PCP, fewer sex partners, more likely to not have used BC prior to incarceration	Only adult women Local jails with short length of incarceration (<6 months) Self-reported data
Kelly (2012)	Three urban jails in the Kansas City Metropolitan area	290 women/ 306 men in 2010	Cross sectional survey	Unintended pregnancy and individual/community level indicators of violence	Women with a history of IPV were 2 times more likely to have experienced unintended pregnancy History of sexual abuse before 16—1.2 times more likely to experienced unintended pregnancy	Men/family with neighborhood violence 1.8 times more likely to have experienced unintended pregnancy 50% had a history of unintended pregnancy	Not representative of US overall Self-reported Only describe associations
LaRochelle (2012)	Urban, county jail intake facility in SF	228 reproductive-aged non pregnant recently arrested women in 2008-9	Cross-sectional survey	Demographics, reproductive hx, contraception use, barriers to contraception use, PAs	21% currently using contraception (39% year prior to arrest) 61% no contraception use in past year, 11% wanted to have used it 60% use contraception offered in jail Comparable PAs regardless of contraception use	Barriers: cost, finding a clinic, transportation 63% history of delivering a child; 54% history of inducted abortion 45% wanted contraception (only 14% currently using)	Did not compared women who did not want to participate in the study ? consistency of contraception use Not generalizable due to greater access/social services in SF Self-report

Ramasw any (2014)	County jail in Kansas City, Missouri	102 women and 29 interviews within 1 wk of release	Mixed methods (Secondary analysis of a cross sectional survey and semi-structed interviews)	Sociodemographics , pregnancy, contraceptive hx, incarceration hx, factors associated with sterilization, hx of tubal ligation, other women in your life who have had TLs	One third reported hx of sterilization Independent association: physical abuse before age 16 Motivation: limit childbearing; supported by family/physicians; financial concerns	67% unintentional pregnancy One woman reports provider pressure due to medical reasons Negative experiences with contraceptives Pressure from mothers	Cross sectional design and secondary data analysis (no information on when women received tubal ligations and if there were LARCs available) Inclusion from one jail
Ramasw amy (2015)	Urban jail in Kansas City, Missouri	102 incarcerat ed women	Longitudin al study; surveys→ 6 mo post-release follow-up with 66	Pregnancy prevention pre-incarceration and after release, highly effective BC utilization	54% post-release vs. 42% pre-incarceration use of highly effective BC 90% negative PA Previous pregnancy associated with BC use post-release	Consistent use of BC and alcohol use were associated with utilization of highly effective BC	Small sample size Low follow up rate
Schonber g (2015)	Rikers Island Jail	32 women in 2011-2	Qualitative study	Themes: contraceptive availability; jail as an opportunity for SRH, concerns about barriers to care; factors impacting interest	31/32-> contraception should be provided in jail High levels of mistrust/stigma of contraceptives and jail-provided medical care Positive PA prevent use	Women questioned contraceptive services without follow-up care	Convenience sample Strong social services: ?generalizability Biased results due to power balance by interviews during incarceration
Dasgupta (2017)	Community corrections	299 substance-using women in NYC who had condomle ss sex in the past 3 mo	Cross sectional survey	Risk environment factors associated with HIV (physical, social, economic, policy/legal) SRH outcomes	Nearly half of women had histories of miscarriages (46%) and/or abortions (53%) Few women used contraceptives despite negative PAs IPV associated with negative SRH outcomes	Average: 4.7 pregnancies 90% not trying to get pregnant 67% did not want a pregnancy in the future	No casual analysis (cross sectional) No temporal knowledge about contraceptive use Entry criteria included HIV risk behaviors→ not generalizable

Table A. Extraction tables of descriptive studies on the pregnancy prevention and termination needs among adult WICJ (n=14).

Author (Date)	CJ Involvement	Study Sample	Study Design	Measures	Major Outcomes	Minor Outcomes	Limitations
Crosby (2004)	Eight Georgia Detention facilities	197 newly detained adolescents (14-8 yo) in 2001-3	Cross sectional survey	35 risk behavior metrics for the last 2 mos to identify risk factors for history of pregnancy	1/3 hx of pregnancy 1/3 of those having sex had not used contraception in past 2 mos	20% unsure of pregnancy intentions; 20% strong positive PA	Self reported Convenience sample Not a health risk assessment instrument High STI rate in the south
Gallagher (2007)	Juvenile Residential facilities	2004 Juvenile Residential Facility census on 14,590 women	Cross sectional survey	Health care correlates (type of facility, ownership, crowded conditions, population size, length of stay) SRH (hepatitis B vaccine, STI and pregnancy testing, gynecologic exam)	<18% of facilities reported universal STI/pregnancy testing 25% housed >1 pregnant teen 25% no obstetric services Often no OBGyn in house	Gynecologic services to all women more likely in all-female, state-owned large population, less crowded, long stay facilities 70% JJRF can access some sort of health services	Reflective of policies, not implementation
Khurana (2011)	Five midwestern juvenile county courts in 2004-7	1190 females 11-18 yo (56% White, 44% Black)	Cross sectional survey	Global Risk Assessment Device: prior CJS involvement, family/ peer relationships, substance use, trauma, mental health, sexual activity	Blacks 3x more likely to have a hx of pregnancy than Whites	White females reported more substance use 13% any pregnancy Blacks more likely to be sexually active, have condomless sex/ multiple sex partners, lack medical care	No data on abortions/miscarriages Cross-sectional—no causation Geographically limited to the midwest
Bryan (2012)	Probation in Denver area	Adolescents (33% female, n=728)	Longitudinal study every 6mo for 2yr	Sexual history, marijuana use, confounding variables	Greater marijuana use associated with a steeper decline in condom use over time	Negative correlation between marijuana use and pregnancy (higher in females)	No casual conclusions Self reported sex and drug use behavior Small cell sizes for inferences

Gray (2016)	Short term juvenile detention center Georgia	188 13-17 yo Black girls w/ a hx of vaginal intercourse in 2011-2	Cross-sectional survey	Socioecological factors (individual, paternal/familial, sexual risk, psychosocial, substance use)	22% hx of pregnancy Girls with hx of pregnancy more likely to live in a household receiving governmental aid, use OCPs, exchange sex, casual sex partners, condomless sex, hx of physical abuse	No pregnancy→ incarcerated at least twice, previous hx of alcohol use 58% condomless sex in past month	Only Black girls Self reported Recall bias Cannot infer causation
Johnston (2016)	Juvenile detention facility in Northern California	27 adolescent girls 12-19 yo in 2012	Mixed methods (cross sectional survey and semi-structured interview)	Demographics, sexual health behaviors and experiences with reproductive health care services (RHS)	86% history of sexual intercourse, 36% past pregnancy, 14% exchange sex, 50% hx of STI, sexual debut 13.8yo Outstanding warrants/on the run—afraid to get services or unaware of where to get services	Drugs/desire to get pregnant (to save relationship or because family/friends have children)→ lack of use of RHS Barrier: getting to clinic for RHS Detention as opportunity for education on STIs/condom use	Latina/Hispanic population (86%) ? generalizability Strong educational programming—unique Self-reported Qualitative study

Table B. Extraction tables of descriptive studies on the pregnancy prevention and termination needs among adolescent WICJ (n=6).

Author (Date)	CJ Involvement	Study Sample	Study Design	Measures	Major Outcomes	Minor Outcomes	Limitations
Clarke (2006)	Combined prison/jail	224 18-35 yo sexually active women w/ no plans to conceive	Pseudo intervention (Phase 1—referral for no cost contraception at release in 2002-3; Phase 2—contraception begun in CJ facility 2003-4) due to a planned change in protocol	Desire to initiation contraception, PAs, contraception initiation	Phase 2 participants were 14x more likely to start contraception compared to phase 1 (39% vs. 4%) Homeless women more likely to start contraceptives (opposite of data from community sources)	Previous unplanned pregnancy 65% Previous termination 29/39%; Negative PA 51/56%; Always used BC in past 3 mo 10/8%; Desire for BC 76/7o	Self-reported contraceptive use (unknown if consistent use, though 48% depo-provera)
Sufrin (2015)	San Francisco County Jail	2009-2014 in 87 women who had LARC methods inserted	Retrospective descriptive study	LARC insertion, complications, median duration of use, factors behind discontinuation of LARC	53 IUDs and 34 implants inserted No complications in LARC users Median duration 11/ 13 mo for IUDs/ implants	Discontinued LARC due to desire for pregnancy (32%) Black women more likely to discontinue LARC over white women (OR=4.4) Women with hx of abortion--- more likely to discontinue	Retrospective chart review—?women counseled for LARC or did not return for insertion Follow up only women who accessed via city health system or return to jail
Grubb (2018)	A short term pre adjudication facility	120 women from 11-17 yo in 2006-12 at baseline and 186 women after intervention in 2012	Interventional QI contraception counseling and initiation education for medical professionals	Contraceptive counseling, initiation and utilization of contraception Baseline vs. pre/post intervention	After intervention: 84% vs 10% patients counseled; 52% vs. 7% started contraception (either OCPs or depo-provera)	Overall contraception use 69% vs. 14%	Unable to provide LARC due to funding Lack of follow up care

Table C. Extraction tables of interventional studies on the pregnancy prevention and termination needs among adolescent /adult WICJ (n=3).

Section B: SRH Assessment Methods and Results

Methods

We performed a secondary data analysis compiled from two ongoing clinical trials on HIV prevention, known as Project Empowering and Project Options. Project Empowering is a pre-exposure prophylaxis (PrEP) demonstration project that aims to screen WICJ and members of their risk networks for PrEP eligibility and start those who meet eligibility criteria on PrEP. The aim of Project Options was to develop and test the effect of a patient-centered HIV prevention decision aid on PrEP uptake among women in SUD treatment. By combining the two sets of data, we hoped to create a dataset that would evaluate the needs of two overlapping populations of women in need of HIV prevention.

Projects Empowering and Options were designed by Dr. Jaimie Meyer with data collection performed by Carolina Price, DeShana Tracey, and me. I designed the reproductive health assessment used in this study following a review of the literature.

Study Setting

The study was based in a mid-sized city in Southeast Connecticut home to a large number of community-based WICJ and WWUD. The CJS in Connecticut is one of only six integrated correctional systems, in which all prisons and jails (and the healthcare delivered in these facilities) are overseen by the Connecticut Department of Corrections (CTDOC). A singular CJ facility for women in the state, a combination prison and jail, houses up to 1600 women. CTDOC also oversees community-based parole services.

Probation is overseen by the Connecticut Court Support Services Division for Adult [72]Probation, including a specialized gender-responsive program for women at "highest risk for re-offending."

There are a number of different drug treatment programs in the Greater New Haven area that are available to women and provide MATs for WWUD. APT Foundation, Inc. is the largest drug treatment program in Connecticut, with nearly 7000 people on methadone, approximately one-third of whom are women. The APT foundation is unique in that it is an open access model (patients can present for evaluation and be started on MAT the same day); thereby, decreasing the barriers to treatment initiation [72].

Study Participants and Data Collection

Empowering: WICJ were recruited as index participants from advertisements in probation and parole offices, community outreach programs, courts, drug treatment centers, halfway houses and area health centers. A dedicated trained research assistant screened index participants for recent CJ involvement, self-reported HIV-uninfected status and female gender over the phone. Those who met initial screening criteria and more complete inclusion criteria (please see section below) were invited to enroll. After completing informed consent procedures and signing a release of information, participants completed a baseline survey in a private setting given by a trained research assistant in English or Spanish using REDCap. The survey took approximately 1-1.5 hours to complete and participants were compensated $20 for their time. Once index participants were enrolled as "seeds," modified respondent driven sampling (RDS) was

used as part of standardized procedures for peer-referral in order to efficiently develop a large convenience sample. Index participants were asked to recruit up to six people from their risk networks such as male or female sex partners, drug-using partners, friends or acquaintances. Referral coupons were valid for one month and participants were compensated $10 for each new participant they successfully brought in for enrollment. Data from all enrolled women were included, regardless of if they were seeds or network members.

Options: Women with SUDs receiving drug treatment were recruited onsite by research assistants through the largest drug treatment center in Connecticut. Trained research assistants were onsite 1-2 days per week to recruit participants and program staff also referred potential participants through a HIPAA secure Qualtrics link and private protected phone line. A trained research assistant completed a baseline interview through RedCAP and if the participants opted in, they also received a decision aid on starting PrEP. Those who choose to complete the decision aid were followed for up to a year, but the data included in this analysis stems from the baseline interview. The interviews were completed in a private setting in English or Spanish and participants were compensated $20 for their time.

Inclusion and Exclusion Criteria

Empowering: WICJ "seeds" were eligible if they were ≥18 years old, currently residing in New Haven, Connecticut, self-reported HIV-uninfected, recently involved in the CJS (released from prison or jail in the past 6 months or on probation/ parole) and identified as being of female gender. Potential participants were excluded if they were

unable or unwilling to provide informed consent or were threatening to staff. Referred risk network members were included if they had a unique and valid referral coupon, lived in New Haven, Connecticut, were ≥18 years old and able and willing to provide informed consent. Study procedures were approved by the Yale University IRB and Research Advisory Committees from the CTDOC and the CSSD.

Options: Participants were included if they self-identify as female (cis- or trans-women), age ≥ 18 years old, self-reported HIV-uninfected status or unknown, entering or receiving treatment at our partnering site. They were excluded if they were unable or unwilling to provide informed consent, threatening to staff or were experiencing symptoms of physiological withdrawal that would interfere with the ability to provide informed consent. Study procedures were approved by the Yale University IRB and the research advisory executive board at the APT Foundation, Inc.

Materials and Survey

A reproductive health survey was designed to illuminate the status of SRH in populations at high risk of acquiring HIV. In order to achieve that, the survey asked about both SRH behaviors and the resulting SRH outcomes within the context of the Behavioral Model for Vulnerable Populations (Figure 1).

Health behaviors were further categorized into "risk-related" health behaviors and SRH behaviors.

Risk-related health behaviors included risky sex (i.e. condomless sex) or injection drug use (i.e. sharing injection equipment), exchange sex and PrEP eligibility. Sharing drug equipment in the past six months was defined as any injection using needles,

syringes or other drug preparation equipment that had already been used by another person. Sharing any drug equipment in the past 30 days was defined as using works (needles/syringes), cooker/cotton/rinse water or splitting drugs (front/back loading) with another person. Exchange sex was defined as exchanging sex for money, drugs, food or shelter ever or in the past 30 days. PrEP Eligibility was defined either by sexual risk or injection risk per the 2017 CDC Guidelines [73]. In Empowering, WICJ were PrEP eligible per sexual risk if they had sex with one or more partners in the past 6 months AND either, (1) had infrequent condom use with 1 or more partners of unknown HIV status OR (2) were in an ongoing sexual relationship with an HIV+ partner OR (3) were diagnosed with a bacterial STI (syphilis, gonorrhea) in the past six months. WICJ who qualified for PrEP due to injection drug use injected any drugs not prescribed by a clinician in the past six months AND shared any injection or drug preparation equipment in the past 6 months. Women who qualified with these criteria were also required to be an adult, be HIV and Hepatitis B negative, have a creatinine within normal limits and not be currently pregnant. In OPTIONS, WWUD were PrEP eligible if they had any of the following risk behaviors in the past six months: (1) condomless sex with HIV+ partners or partners whose HIV status they did not know OR (2) shared drug equipment, needles or works OR (3) exchanged sex OR (4) had sex with five or more partners.

SRH behaviors included those behaviors that impacted SRH outcomes, specifically contraception use, reasons for choosing contraception, location of SRH care maintenance (HIV test/pap smear). In this category, we also included attitudes that impacted SRH behaviors such as desire for pregnancy and desire for future children.

SRH outcomes included number of pregnancies, age at first pregnancy, teenage pregnancy (defined as any pregnancy prior to age 20), self-reported unplanned pregnancy, an inability to become pregnant when desired in the past, a history of miscarriage(s) and/or abortion(s), a recent pap smear (defined as any pap smear in the past three years per guidelines [74]), recent STIs (defined as any STI in the past 6 months), recent HIV test (defined as an HIV test in the past year per CDC guidelines [75]) and not receiving SRH care due to fear of stigma or discrimination.

Composite SRH variables. Composite variables were created to analyze holistic measures of SRH maintenance and negative SRH outcomes. To capture the number of women engaging in any SRH maintenance, we combined all women who had received either a recent pap smear OR recent HIV test. To highlight the women hitting milestones for preventative SRH care, we identified the women who had both received a recent pap smear AND recent HIV test. Finally, to describe women who are engaging in comprehensive SRH care, we identified those women who had received a recent HIV test AND recent pap smear AND were currently using any form of contraception. Finally, we defined any lifetime negative SRH outcome as any unplanned pregnancy, a history of inability to become pregnant, miscarriage or abortion.

The remainder of the baseline survey data was organized as potential explanatory factors based on the behavioral health model for vulnerable populations, as detailed previously. As a result, we broke down personal-level, population-level and society-level factors into predisposing factors, enabling resources and need variables to explain the SRH behaviors and outcomes in WICJ and WWUD.

Predisposing factors included demographics (age, race/ethnicity, marital status, education, housing status, employment pattern and criminal justice involvement). History of CJ involvement was categorized into people-based, property-based, drug-related and public disorder offenses.

Enabling resources included health insurance status, food security (those who reported not going two or more days in the past 90 days without having anything or barely anything to eat), having a primary healthcare provider, being in treatment for a SUD (those who report being in a medication-based drug treatment program (methadone, buprenorphine, suboxone or other) in the past six months) and those who reported an available automobile.

Need variables were comprised of women who reported living with someone with a current SUD (alcohol or drug problem), women currently awaiting charges, medical and psychiatric comorbidities, number of medical and psychiatric hospitalizations, prescribed medication for medical and psychiatric conditions, those who reported feeling depressed or anxious in the past month or ever, and those who reported a lifetime suicide attempt. Severity of need factors were calculated using the Addiction Severity Index (ASI), a standardized and validated tool to assess multiple domains (medical, psychiatric, employment, legal, drug use, alcohol use and family/social). Scores are calculated on a scale from 0.0-1.0 with higher scores indicating more severe impairment [76, 77]. Prior validated cut-offs were used to calculate severe psychiatric disorders (ASI≥0.22), severe alcohol use disorders (ASI≥0.17) and severe drug use disorders (ASI≥0.12) in concordance with DSM IV criteria [78, 79].

Analytical Plan and Statistical Analysis

We decided to combine the SRH data from the population of WICJ and their risk networks (i.e. Empowering study participants) and WWUD (i.e. Options study participants) because the two studies had similar inclusion/exclusion criteria and were focused on PrEP implementation (and therefore, both studies recruited women at high-risk of HIV infection). However, we also analyzed the data comparatively to identify any significant differences between the two groups.

All categorical variables were descriptively analyzed for frequency and all continuous variables were analyzed for mean (± SD). The population of WICJ and their risk networks (i.e. Empowering study participants) and WWUD (i.e. Options study participants) were compared with chi-square and Fisher's exact test, where appropriate, for categorical variables and with independent t-test for continuous variables. All analyses were completed using SPSS, V24 (IBM Corp).

Dr. Jaimie Meyer and I designed the analytic plan together and I extracted, cleaned and analyzed the data myself.

Results

We surveyed the reproductive health needs of 76 women over one year from 2017-2018. Fifty-eight WICJ were enrolled in Project Empowering and eighteen WWUD were enrolled in Project Options. Many of the women were both WICJ and WWUD, but they could only participate in one of the studies.

Predisposing factors. On average, women were 41.6 years old; 50.7% were White, 30.7% Black, and 16% Hispanic (Table D). Two-thirds had a high school education or less and nearly 90% were not married. Half of the WICJ reported transitional housing or currently being homeless while over 80% of the WWUD reported living alone or with family. Nearly two-thirds of women were currently unemployed, retired or disabled. Just over a quarter of the women had children under their care. WWUD were significantly older than WICJ (mean 46.9 (SD 8.03) vs. mean 39.9 (SD 9.92) years old; p=0.008). Otherwise, there were no significant differences in predisposing factors between WICJ and WWUD.

There were no significant differences in criminal justice involvement between WICJ and WWUD (89% of WWUD also had past CJS involvement *(P*=0.77)). The most common charges were public disorder (76.3%) and property-based offenses (52.6%). Overall, women had a lifetime average of 9.1 ± 12.8 prior charges (Table D).

Enabling resources. All of the women had health insurance and nearly two-thirds of the women had food security (Table D). The average monthly income was $541 ± $117 and just over two-thirds reported a current primary care healthcare provider. Nearly 60% were currently in treatment for SUDs, and 10% reported reliable access to an automobile. There were no significant differences between WWUD and WICJ in terms of any enabling resources, though not all variables were measured in both groups.

Need. Significantly more of the WICJ lived with someone with a current SUD compared to the WWUD (36.2% vs. 5.60%; *p*=0.02). Nearly 20% of the women were currently awaiting charges.

Medical severity/need: Nearly a quarter of women were diagnosed with Hepatitis C and over two-thirds were diagnosed with depression (Table D). The medical ASI was 0.27 ± 0.04.

Psychiatric severity/need: Nearly three-quarters of the women reported being prescribed medications for psychiatric disorders, and 85% and 84% reported a lifetime history of depression and anxiety, respectively. In the past month, half the women felt depressed, and three-quarters of the women felt anxious. Nearly 50% had ever attempted suicide and 52.6% had a severe psychiatric disorder per ASI criteria.

Risk-Related Health Behaviors. Overall, 80.3% of the women reported having sex in the past six months and 93.4% of those women reported condomless sex (Table D). Nearly half of the women had a history of exchange sex with just over a quarter engaging in exchange sex over the past month. Nearly 50% of the population had a history of injection drug use and 10.5% had shared any drug equipment in the past 30 days. Half of the women were PrEP-eligible.

SRH Behaviors. Only 10% of the women currently desired pregnancy, but 58.1% of the women reported no contraception use (Table D). Of those who reported contraception use, 20.3% used sterilization (i.e. tubal ligation), 10.8% reported LARC use and 10.8% reported user-dependent methods. Contraception was most often chosen based on perceived efficacy, ease of use and healthcare provider recommendation. Women most often received pap smears at primary care offices, while HIV tests were more often performed at community healthcare locations. Of note, nearly all WWUD received their last pap smear in primary care facilities, while 19% of WICJ received their

last pap smear in prison/jail and nearly 40% of WICJ received their last pap smear in community healthcare or planned parenthood facilities ($p<0.001$).

SRH Outcomes. On average, women reported nearly four pregnancies throughout their lifetimes (Table D). Three-quarters of the women experienced pregnancy as teenagers and the average age of first pregnancy was 19. Over three-quarters of the women reported an unintentional pregnancy. Nearly 45% and 48% of the women had a history of miscarriage and medically induced abortion, respectively. Overall, 81.6% of women had experienced at least one negative reproductive health outcome. Few women had a recent STI (5.6%) or trouble accessing contraception (6.6%). Only 14.5% of the population reported avoiding reproductive health care due to fear of stigma or discrimination.

The majority of women had received any reproductive preventative care (90.5%; either a recent HIV test and/or pap smear). Approximately two-thirds had a recent HIV test and pap smear. However, few women were up to date on pap smears, HIV tests and were using any form of contraception (23.7%).

	WICJ (n=58)	WWUD (n=18)	Total (n=76)	*p*-value
Predisposing Factors				
Age	39.9± 9.92	46.9 ± 8.03	41.6 ± 9.91	**0.008***
Race/Ethnicity				0.369
White	31 (53.4%)	7 (41.2%)	38 (50.7%)	
Black	15 (25.9%)	8 (47.1%)	23 (30.7%)	
Hispanic	10 (17.2%)	2 (11.8%)	12 (16.0%)	
Other	2 (3.4%)	0 (0.0%)	2 (2.7%)	
Education- high school or less	41 (70.7%)	11 (61.1%)	52 (68.4%)	0.445
Marital status- Not married	50 (86.2%)	18 (100%)	68 (89.5%)	0.186
Current Housing Status (n=58)		n/a		n/a
Renting an apartment/house	18 (31%)		18 (31%)	
Staying with friends/family	11 (19%)		11 (19%)	
Transitional	16 (27.6%)		16 (27.6%)	
Homeless	12 (22.4%)		12 (22.4%)	
Living situation, past 3 years				0.053
Alone or with family	37 (63.8%)	15 (83.3%)	52 (68.4%)	
No stable arrangement	15 (25.9%)	0 (0.00%)	15 (19.7%)	
Controlled environment	6 (10.3%)	3 (16.7%)	9 (11.8%)	
Religious (n=57)	49 (86.0%)	n/a	49 (86.0%)	n/a
Pattern of Employment				0.283
Unemployed/retired/disabled	40 (69.0%)	9 (50.0%)	49 (64.5%)	
Part time	8 (13.8%)	5 (27.8%)	13 (17.1%)	
Full Time	10 (17.2%)	4 (22.2%)	14 (18.4%)	
Any children under care (n=58)	16 (27.6%)	n/a	16 (27.6%)	n/a
History of CJ Involvement				
People-based	18 (31.0%)	6 (33.3%)	24 (31.6%)	0.855
Property-based	34 (58.6%)	6 (33.3%)	40 (52.6%)	0.061
Drug-related	24 (41.4%)	7 (38.9%)	31 (40.8%)	0.851
Public disorder	47 (81.0%)	11 (61.1%)	58 (76.3%)	0.082
Recent CJ Involvement (n=58)				
Released from CJ facility in past 6 months	23 (40.4%)	n/a	23 (40.4%)	n/a
Probation	34 (58.6%)		34 (58.6%)	
Parole	1 (1.70%)		1 (1.70%)	
No history of CJ charges	8 (13.2%)	2 (11.1%)	10 (13.2%)	0.769
Total charges	10.2 ± 14.2	5.44 ± 6.16	9.09 ± 12.8	0.169
Enabling Resources				
Health insurance status (n=58)	58 (100%)	n/a	58 (100%)	n/a
Food security (n=58)	36 (63.2%)	n/a	36 (63.2%)	n/a
Total monthly income	511± 52.8	639 ± 125	541 ± 117	0.281
Primary healthcare provider (n=58)	39 (67.2%)	n/a	39 (67.2%)	n/a
Recent treatment for SUDs	31 (53.4%)	14 (77.8%)	45 (59.2%)	0.099
Available automobile	4 (6.9%)	4 (22.2%)	8 (10.5%)	0.085
Need				
Living with anyone with a SUD	21 (36.2%)	1 (5.60%)	22 (28.9%)	**0.016***
Presently awaiting charges	11 (19.0%)	4 (22.2%)	15 (19.7%)	0.744
Medical Problems (n=58)		n/a		n/a
Diabetes	6 (10.3%)		6 (10.3%)	
Hypertension	8 (13.8%)		8 (13.8%)	
Hepatitis C	12 (22.4%)		12 (22.4%)	

Depression	39 (67.2%)		39 (67.2%)	
Other psychiatric disorders	20 (34.5%)		20 (34.5%)	
Medical Severity				
Number of hospitalizations	6.72 ± 1.96	4.06 ± 2.20	6.09 ± 3.74	0.478
Prescribed medication	24 (41.4%)	8 (44.4%)	32 (42.1%)	0.818
Medical ASI	0.27 ±0.05	0.26 ±0.09	0.27 ± 0.04	0.478
Psychiatric Severity				
Number of hospitalizations	3.53 ± 0.93	3.56 ± 1.77	3.54 ± 1.95	0.991
Depression ever	47 (81.0%)	18 (100%)	65 (85.5%)	0.057
Depression in the past 30 days	29 (50.0%)	12 (66.7%)	41 (53.9%)	0.215
Anxiety ever	49 (84.5%)	15 (83.3%)	64 (84.2%)	1.000
Anxiety in the past 30 days	38 (65.5%)	13 (72.2%)	51 (67.1%)	0.597
Lifetime attempted suicide	26 (44.8%)	9 (50.0%)	35 (46.1%)	0.701
Prescribed medications	41 (70.7%)	15 (83.3%)	56 (73.7%)	0.369
Severe Psychiatric Disorder (ASI)	30 (51.7%)	10 (55.6%)	40 (52.6%)	0.776
Severe Alcohol Use Disorder (ASI; n=18)	n/a	4 (22.2%)	4 (22.2%)	n/a
Severe Drug Use Disorder (ASI; n=18)	n/a	6 (33.3%)	6 (33.3%)	n/a
Risk-related Health Behaviors				
Sex past six months	47 (81.0%)	14 (77.8%)	61 (80.3%)	0.744
Any condomless sex	45 (95.7%)	12 (85.7%)	57 (93.4%)	0.223
Inject drugs, ever	28 (48.3%)	8 (44.4%)	36 (47.4%)	0.776
Share drug preparation equipment (6 months)	12 (20.7%)	0 (0.00%)	12 (15.8%)	0.058
Share any drug equipment (past 30 days)	7 (12.1%)	1 (5.6%)	8 (10.5%)	0.672
Exchange sex, ever	27 (46.6%)	31 (53.4%)	36 (47.4%)	0.798
Past 30 days	13 (22.4%)	5 (27.8%)	18 (23.7%)	0.640
PrEP eligibility	28 (44.2%)	10 (55.6%)	38 (50.0%)	0.703
SRH Behaviors				
Desire pregnancy currently	7 (12.1%)	1 (5.6%)	8 (10.5%)	0.672
Want more children (ever)	7 (12.1%)	3 (16.7%)	10 (13.2%)	0.693
Contraception				0.248
Sterilization	9 (16.1%)	6 (33.3%)	15 (20.3%)	
LARC	7 (12.5%)	1 (5.6%)	8 (10.8%)	
User dependent	5 (8.9%)	3 (16.7%)	8 (10.8%)	
None	35 (62.5%)	8 (44.4%)	43 (58.1%)	
Choose contraception for				
Efficacy	8 (13.8%)	2 (11.1%)	10 (13.2%)	1.000
Ease	8 (13.8%)	2 (11.1%)	10 (13.2%)	1.000
Recommended by healthcare provider	10 (17.2%)	2 (11.1%)	12 (15.8%)	0.720
Location of pap smear				**<0.001***
Prison/Jail	11 (19.0%)	0 (0.0%)	11 (14.5%)	
Primary Care	24 (41.4%)	17 (94.4%)	41 (53.9%)	
Planned Parenthood/community healthcare	23 (39.7%)	1 (5.6%)	24 (31.6%)	
HIV test location (n=57)		n/a		n/a
Jail/prison/transitional housing	11 (19.3%)		11 (19.3%)	
Healthcare provider	16 (28.1%)		16 (28.1%)	
Community healthcare	20 (35.1%)		20 (35.1%)	
Other	10 (17.5%)		10 (17.5%)	

SRH Outcomes				
Number of pregnancies	3.93±2.89	5.28±4.11	3.92 ± 0.39	0.127
Age at first pregnancy	19.1±4.82	19.1±3.62	19 ± 0.68	0.989
Teenage pregnancy	44 (75.9%)	13 (72.2%)	57 (75.0%)	0.755
Unintentional pregnancy	42 (72.4%)	16 (88.9%)	58 (76.3%)	0.211
Unable to become pregnant	10 (17.2%)	6 (33.3%)	16 (21.1%)	0.143
Miscarriage	23 (39.7%)	11 (61.1%)	34 (44.7%)	0.110
Abortion	28 (48.3%)	9 (50.0%)	37 (48.3%)	0.898
Trouble accessing contraception	4 (6.9%)	1 (5.6%)	5 (6.60%)	1.000
Recent pap smear	44 (80.0%)	15 (83.3%)	59 (77.6%)	1.000
Avoided SRH care due to fear of stigma/discrimination	9 (15.5%)	2 (11.1%)	11 (14.5%)	1.000
Recent HIV test	39 (67.2%)	16 (88.9%)	55 (72.4%)	0.129
STIs, past 6 months	4 (6.9%)	0 (0.0%)	4 (5.30%)	0.567
Any Negative SRH Outcome	45 (77.6%)	17 (94.4%)	62 (81.6%)	0.166
SRH Composites				
Any SRH maintenance (recent HIV test and/or Pap Smear)	50 (89.3%)	17 (94.4%)	67 (90.5%)	1.000
Recent HIV test and Pap Smear	32 (57.1%)	14 (77.8%)	46 (62.2%)	0.116
Comprehensive SRH-care (recent HIV test, pap smear and current contraception)	11 (19.0%)	7 (38.9%)	18 (23.7%)	0.082

Table D. Characteristics of WICJ (n=58) and WWUD (n=18) organized based on the behavioral model for vulnerable patients with SRH focused behaviors and outcomes (N=76).

Discussion

Our systematic review was, to our knowledge, the first to analyze the pregnancy planning and termination needs of WICJ. In our analysis, we revealed a widespread lack of utilization of pregnancy prevention techniques despite negative pregnancy attitudes among WICJ. To contextualize these results, we assessed broader reproductive health behaviors and outcomes among WICJ and other WWUD in the framework of the behavioral model for vulnerable populations. To our knowledge, this is also the first study that identifies the SRH needs of community-based WICJ and WWUD who are enrolling in HIV prevention interventions.

An overwhelming number of the surveyed women had histories of negative SRH outcomes (81.6%). We demonstrate a cycle of negative SRH outcomes that starts young, as nearly three-quarters of the women reported pregnancies as teenagers. In the only other study on SRH in community-based WICJ, similar frequencies of miscarriages and abortions (around 50%) were found despite more stringent risk criteria (women in the other study were required to be at risk of HIV infection in the past 90 days for inclusion) [31]. These results and our results in community-based WICJ mirror the current literature on the SRH of incarcerated women where women are having sex, not using contraception and unintentionally getting pregnant resulting in a cycle of poverty and CJ involvement [26, 56]. Overall, women at risk of HIV experience numerous negative SRH outcomes that both deserve attention and require directed healthcare.

The excessive number of negative SRH outcomes must be examined in the context of the socioeconomic and health circumstances of this population. Women at high risk of HIV infection who are already engaged in care suffer from under-education

(two-thirds had less than a high school education), homelessness (nearly a quarter of the WICJ), unemployment (under one in five women reported full time employment), criminal justice involvement (almost 90%) and food insecurity (nearly 40%). This is compounded by nearly 60% undergoing treatment for SUDs, over 50% qualifying for severe psychiatric disorders and nearly half the women reporting a history of attempted suicide. In this setting, it is unsurprising that nearly half the women report a history of exchange sex and another half of the women are PrEP-eligible. All of these factors are markers of medical, psychiatric and social instability, which when compounded with the stigma, shame and sociocultural marginalization that both WICJ and WWUD often face, lead to less frequent healthcare engagement thereby resulting in negative SRH outcomes.

Prior research indicates that systemic issues, such as racial discrimination, violence exposure and unstable housing, further destabilize the SRH of women. African American women experience increased distrust and discrimination in family planning settings [80], are more likely to become pregnant as teenagers than teenagers of other races [64] and people of color are less likely to report using any form of contraception in CJ settings [29]. While we did not analyze exposure to violence among the women in our sample (at baseline), our literature review demonstrates the inordinate impact that both childhood and adult physical/sexual violence exposure places on SRH [27, 31, 66]. For example, IPV-exposed women are less likely to negotiate condom use because they are afraid of retribution, ultimately leading to lack of autonomy to engage in SRH care or pregnancy prevention measures. Studies also show that women who are IPV-exposed are less likely to use their preferred form of contraception [81]. Additionally, in WICJ, childhood physical violence exposure is associated with sterilization and WICJ with

either IPV or neighborhood violence exposure are more likely to have abnormal pap smears than the general population [25]. While women who are homeless are more likely to use contraception while incarcerated [69], past studies have found that unstable housing status predicts barriers to contraception use outside of prison or jail (likely because women with unstable housing are overwhelmed by their basic subsistence needs in the community) [82]. By acknowledging how these barriers affect reproductive health, we can build informed interventions whose impact is magnified by addressing barriers to care.

Women involved with Criminal Justice

Similar to research on HIV prevention, it is likely that, in the midst of unmet basic subsistence needs (such as food and housing), pregnancy prevention is not a prioritized concern for WICJ. This theory is replicated in surveys of CJ healthcare providers who state that contraception is "not high on the care needs in a large jail" due to financial and structural constraints [60]. As a result, two-thirds of our study population reported either not using contraception or using user-dependent contraception, even though only 10% of women were currently interested in becoming pregnant. Unfortunately, by not focusing on SRH preventative care, the ultimate consequences (HIV infection, STIs, unintentional pregnancies) further compound the original risk factors of socioeconomic, interpersonal and psychiatric instability into a self-perpetuating cycle.

Although our data suggests high rates of negative SRH outcomes, over 90% of WICJ in our study indicated that they recently received one measure of preventative SRH care (either a HIV test or pap smear). However, these numbers dropped to under a quarter

of women who were on any form of contraception, had an HIV test in the past year and had a pap smear in the past three years. This data highlights the underlying issue: WICJ are not accessing holistic SRH care. Other studies suggest that siloed SRH care is due to receiving individual measures of care in prisons or jails, such as pap smears [24], but we found low rates of accessing both HIV tests and pap smears during incarceration (Table D). However, it could be that the women in our analysis were accessing a HIV prevention study and, as a result, had already begun engaging in care outside of the structure of prisons and jails. Additionally, up to 40% of WICJ have a history of abnormal pap smears [24], so identifying those who obtained pap smears in the past three years may be underestimating the number of WICJ who are not up to date on their pap smears. Regardless, we demonstrate that while most women access partial SRH, WICJ seldom access comprehensive SRH care—an area that demands attention.

Criminal justice facilities are a prime target for pregnancy planning interventions as 4 in 10 pregnancies among WICJ happen within one year of release from prison/jail and 50% of those pregnancies happen within 90 days of release [59]. Additionally, many WICJ indicate an interest in initiating contraception and accessing contraception while in prison or jail [58, 67]. Utilization of contact with the CJ system is an option often used within the context of a broken healthcare system to reach vulnerable populations that experience insurmountable barriers to care in the community [83]. Incarceration represents a moment of opportunity where the basic subsistence needs (housing, food clothing) of WICJ are minimally met and represents a moment of temporary stability—a chance to address preventative healthcare, such as SRH care, without the distractions of fundamental unmet needs in the community.

Unfortunately, pregnancy prevention and planning services are rarely routinely offered in CJ facilities. Only 11% of CJ facilities provide regular contraceptive counseling and 38% of CJ facilities offer any contraception services. Moreover, the majority of correctional care providers desire more education on contraceptive counseling [60]. Research on improving SRH services in CJ facilities is notably lacking. The few interventions that analyzed the impact of offering pregnancy planning services in CJ facilities indicate that small interventions can produce significant results [58, 67]. Simply offering contraception during incarceration led to 14 times more women on contraception [69] and standardized contraception education led to 7 times more adolescents on contraception [71]. Clearly, small investments into contraceptive education and provision can significantly impact contraceptive use among WICJ, ultimately resulting in fewer negative SRH outcomes.

Contraceptive choice is a highly personal decision especially for traditionally disadvantaged and vulnerable populations, and barriers to providing pregnancy prevention services to WICJ cannot be underestimated. Any discussion of contraception provision in incarcerated women must incorporate the historical context of forced sterilization and reproductive coercion in the United States. Following a long history of sterilization of vulnerable populations (starting in the Eugenics era of the early 1900s), 148 women in California CJ facilities underwent tubal ligation surgeries as recently as 2006-2010 [40, 84] and a report found that up to one third of these procedures were performed without informed consent [85]. Additionally, in 2017, a Tennessee judge offered decreased jail time for WICJ who received contraceptive implants [86]. Some CJ systems are clearly violating the reproductive rights of WICJ and in response, informed

SRH interventions and education are needed to maintain the reproductive autonomy of WICJ.

In this setting, qualitative studies are vital tools to illuminate the perspectives of WICJ on contraception, particularly in the context of its provision in CJ facilities. When queried, WICJ report high levels of mistrust of medical care in CJ facilities, misperceptions and lack of education surrounding contraceptive options and concerns about follow-up care [58]. Additionally, while many studies demonstrate very high rates of negative pregnancy attitudes among WICJ [26, 33, 70], some adolescent girls in juvenile detention and women in jail report intentionally not using contraception due to a desire for pregnancy [58, 67]. Any intervention must provide comprehensive education on both pregnancy prevention and preconception counseling while gaining the confidence of a rightfully mistrustful population and ensuring strong linkage to care in the community.

Additionally, examination of sterilization rates and attitudes provides valuable insight into the SRH needs of WICJ (especially with the history of forced sterilization specific to this population). While other studies reported that up to one-third of WICJ had undergone sterilization, we found an equivalent rate of sterilization in our population compared with the general population (20.3% vs. 22.1%) [87]. In a qualitative discussion of high sterilization rates in women in jail in Missouri, WICJ suggested that they chose sterilization in the face of heavy structural constraints such as concerns about financial burden of both children and alternative forms of contraception [62]. Of note, WICJ also preferred sterilization because of encouragement from their mothers, likely perpetuating high rates of sterilization between generations of women in similar socioeconomic

circumstances [62]. Perhaps, in our study, which is set in a state with high resource availability and where Medicaid has been expanded, women's contraceptive choices were less frequently driven by financial concerns.

Overall, we argue for the provision and integration of comprehensive SRH services into CJ facilities in a manner that incorporates the medical, psychiatric and social comorbidities of WICJ and emphasizes reproductive autonomy. Non-user dependent methods, such as contraceptive implants and IUDs (LARC), are excellent options for WICJ who desire long term contraception and face multiple barriers to care. LARC requires few interactions with health care providers, offers up to 99% protection from pregnancy, demands little to no follow up care and is the contraception of choice according to national guidelines [88]. In fact, they were successfully provided in a San Francisco jail with no instance of negative outcomes [32]. However, they are a provider-dependent method, requiring a provider to insert and remove the devices, and especially in a population with a history of reproductive coercion, must be offered in concert with user dependent methods (such as OCPs, hormonal patches and vaginal rings), preconception services for women who wish to become pregnant and connection to healthcare in the community.

Additionally, our results demonstrate the need for integrated HIV prevention and reproductive healthcare for WICJ. In a population where half of the women are at risk of HIV and 40% of the women are at risk of an unintentional pregnancy, dual-prevention technology is desperately needed. Prior studies have linked STI incidence and unplanned pregnancy in WICJ, but condoms remain the only dual prevention strategy available [56]. Condoms are only moderately effective at pregnancy prevention (18% of women who

exclusively use condoms will become pregnant in one year), are a user-dependent method, and negotiation can precipitate IPV in partnerships that involve violence [89-93]. As a consequence, condoms are rarely employed, as demonstrated in our study where nearly all women reported condomless sex in the past six months. Clarke et al. piloted a motivational interviewing intervention for contraception initiation among incarcerated women, highlighting the need for integrated STI and pregnancy prevention interventions [94]. However, they targeted STI and pregnancy prevention with separate methods---condoms for STI prevention and an array of contraceptive methods for pregnancy prevention as demanded by the low efficacy of condoms for pregnancy prevention [94]. In the wake of recent advances in HIV prevention (i.e. PrEP), our results call for both technology that integrates pregnancy and HIV prevention into non-user dependent methods, such as combined contraceptive and PrEP injectables/vaginal rings, and empowerment interventions to address both pregnancy and HIV prevention choices for populations at high risk of negative SRH outcomes.

Women with Substance Use Disorders

We found similar rates of negative SRH outcomes and underutilization of contraception among WWUD (Table D). Importantly, we did not discover any differences between the WICJ and WWUD in terms of history in CJ involvement, total charges or treatment for SUD. As a consequence, these populations can truly be viewed as overlapping (i.e. in our study, WWUD are basically WICJ) and as a result, dissemination of SRH interventions through CJ systems will also reach WWUD. SUD treatment facilities can also be used to target the HIV and pregnancy prevention in WWUD. Prior research suggests that

substance use further increases the risk of unintentional pregnancy, even among WICJ [59], and research is similarly lacking to address SRH in this population. Heil et al report a unique way to address environmental and structural barriers to contraception use in this population [95]. They employ behavioral economics to encourage contraceptive use among women on MAT: 100% of women receiving financial incentives initiated contraception (compared to 29% without incentives) and 0% became pregnant in the six months of the study (compared to 20% without incentives) [95]. As a result, they demonstrate a successful community-based intervention that is cost effective due to the high cost of unintentional pregnancies (each unintentional pregnancy costs the government $20,716—equal to an annual cost of $21 billion dollars) [96]. While only women with no interest in becoming pregnant in the next six months were enrolled in the study, financial encouragement must be carefully monitored in vulnerable populations that have a history of reproductive coercion. Similar to our results above, 71% of women reported zero condom use, indicating another setting rife for alternative interventions targeted at both HIV and pregnancy prevention [95].

Limitations

Our study was limited by multiple factors. First, with respect to our systematic review, a United States filter was employed to limit the number of results and as a result, we could have missed applicable articles. However, we restricted the review to the United States as the CJS varies significantly between countries, and we hoped to inform interventions that would be specific to the CJS in the United States.

In terms of the reproductive health assessments, all data was self-reported and could have been limited by desirability bias. As a result, we could have under-identified socially undesirable outcomes, such as history of unintended pregnancy, induced abortions or lack of contraception use. Secondarily, we accessed women through HIV prevention studies, potentially lacking access to women who are not currently engaging in care (and therefore, could be at even higher risk for negative SRH outcomes). Additionally, we asked about general SRH history at one point in time, so we were unable to assess causality and when negative SRH outcomes were happening along the CJ, substance use and time continuums. Finally, the political climate of Connecticut means that participants had greater access to social services and the Medicaid expansion, which may limit generalizability to other states with more limited social services.

Conclusions

Women in need of HIV prevention strategies, such as those involved with the CJS and undergoing treatment for SUDs, are similarly at risk of a host of negative reproductive health outcomes, including contraception underutilization and unintentional pregnancy. These outcomes pose lifetime financial, emotional and social burdens while also offering opportunities for impactful interventions. We suggest that most WICJ and WWUD are engaging in some SRH services but require integrated SRH care in both CJ facilities and drug treatment centers to address endemic negative SRH outcomes. Acknowledging and eliminating barriers to care, addressing the sociocultural, interpersonal and structural circumstances specific to WICJ/WWUD and emphasizing reproductive autonomy will result in well-functioning, impactful and cost-effective SRH interventions.

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