**HARM REDUCTION AND HIV IN THE UNITED STATES: A REVIEW OF THE HISTORY, EFFICACY, AND FUTURE DIRECTIONS**

by

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**ABSTRACT**

Jeremy Martinson, PhD

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Jordan Zarone, MPH

University of Pittsburgh, 2014

Since the emergence of HIV in the United States in the 1980s, efforts have been made to reduce the risk of virus transmission by encouraging alterations in the behaviors that perpetuate its spread. The advent of harm reduction campaigns aimed towards injection drug users (IDU) represents one such effort, but these methods have historically not been readily accepted due to the national attitudes regarding illicit drug use. IDU constitute a population for whom the impact of HIV continues to be extreme. It is well established that this population engages in risk behaviors at a level exceeding the non-IDU population, while simultaneously receiving an inadequate degree of health and prevention services. The prolonged insufficiency of services targeting IDU has contributed a substantial morbidity and mortality burden to an epidemic of significant public health importance around the globe. Recently, there has been an upsurge in the support of employing needle and syringe exchange programs (NSEP) and housing-first (HF) models as measures to prevent HIV transmission. A favorable attitude towards these programs and the people they serve, however, has yet to be widely adopted by US policymakers and mainstream society. This review of primary and secondary literature examines the challenges faced in the establishment of harm reduction programs in the United States, and considers the evidence of the efficacy of such programs as they relate to HIV risk behaviors and transmission, drug injection behavior, and related health outcomes. It was concluded that despite difficulties in linking the NSEP and HF harm reduction approaches directly to HIV incidence reduction, there is substantial evidence in support of reduced HIV risk behavior associated with these programs. The complexity of the numerous interacting lifestyle factors contributing to HIV risk and transmission in IDU poses a challenge to researchers, and there is limited cost-effect analysis available. As evidence supporting the association of harm reduction programs with a decline in some of the harmful lifestyle factors accumulates, however, there is room for optimism regarding widespread employment of such programs in the future.

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# Introduction

Injection drug users (IDU) were first recognized as an important risk group for HIV/AIDS in a 1982 edition of the Centers for Disease Control’s (CDC) Morbidity and Mortality Weekly Report (MMWR) (Vlahov et al., 2001). Since the beginning of the HIV epidemic through 2010, approximately 182,000 IDU died of AIDS related diagnoses in the United States (CDC, 2012). Of the 16 million people around the globe classified as injection drug users (IDU), 3 million are HIV positive, and the United States ranks in the top three contributors to that global statistic (WHO, 2013; Vlahov et al., 2010). IDU represent less than 1% of the US population, however in the United States, as of 2010, IDU constitute 8% of incident HIV infections and 16% of those living with the virus (CDC, 2012). An additional 3% of HIV infections were attributed to men who have sex with men (MSM) and also qualify as IDU (Virginia HIV Epidemiology Profile, 2011). The number of people at risk for HIV as a result of injection drug use is even higher when the sexual partners of drug users and their children are included in the equation. It is estimated that injection drug use has either indirectly or directly accounted for over one-third of AIDS cases since the epidemic began in the United States (CDC, 2002; DesJarlais et al., 1995).

As a result of the stigmatization surrounding injection drug use, IDU have and continue to face challenges in obtaining access to HIV prevention services (Vlahov et al., 2010). Worldwide, it is estimated that a mere 5% of IDU have access to prevention services (Vlahov et al., 2010). Harm reduction seeks to increase the percentage of IDU with access to HIV prevention measures. Harm reduction represents an effort to acknowledge drug use as normal instead of punishing the behavior. It looks to equip IDU with tools to empower them as responsible community members with greater control over their own health, as opposed to rejecting them from the society and therefore impeding their access to HIV prevention (MacNeil and Pauly, 2011). The overarching idea behind harm reduction contends that although drug use may be harmful, the diseases that spread as a result of poor injection practices are a much greater threat to IDU and the community as a whole.

A multitude of methods have been developed in an attempt to provide IDU with resources to reduce their risk of HIV transmission, and to treat existing infections, without necessarily discontinuing their drug use. Structural interventions function to remove barriers to, or facilitate access to prevention materials and risk reducing behaviors, thereby directly or indirectly limiting HIV exposure for uninfected individuals and slowing transmission and disease progression in people living with HIV/AIDS (Aidala et al., 2005). Attempts to implement these interventions have been met with a great deal of resistance from politicians, society, and advocacy groups alike. Certain arguments suggest that focusing on drug related risk behaviors will serve to encourage illicit drug use. Others argue that shifting the focus from primary prevention to harm reduction in populations already affected by HIV will take resources from uninfected persons (Gerbert et al., 2008). HIV advocacy groups have even expressed discontent with harm reduction approaches, asserting that intensified scrutiny of the behaviors of HIV-positive people would result in increased stigmatization (Gerbert et al., 2008).

The structural intervention methods included in this review are needle and syringe exchange programs (NSEP) and housing-first interventions (HF). The former method was selected based on the large body of research available. The latter method was selected because it presents a unique approach that involves HIV harm reduction in IDU without focusing explicitly on injection practices. Both methods exhibit distinct benefits and challenges in the reduction of HIV transmission in IDU, and contribute interesting chapters in the ongoing story of harm reduction in the United States. Most importantly, these methods demonstrate the variety of lifestyle and behavioral centered approaches to combating the spread of HIV in one of the virus’ most high-risk populations.

# Methods

A review of the literature was initiated by searches in PubMed. Searches were conducted using the search terms summarized in Table 1, and included only English language peer-reviewed scholarly articles published on or after January 1, 1994. Article titles and abstracts were scanned for relevance and articles were included only if they qualified as reviews or meta-analyses of NSEP or HF related to HIV and IDU. Supplementary primary literature was selected using the references cited in the reviews, as well as through further PubMed searches adhering to the same inclusion criteria as mentioned above.

Table 1. A Summary of Search Terms

Search terms used to generate initial body of literature. Additional restrictions limited results to reviews published in English between 1994-2004.

|  |  |
| --- | --- |
| Search Terms | N (results) |
| ‘harm reduction’ | 758 |
| ‘HIV harm reduction’ | 105 |
| ‘needle exchange’ | 145 |
| ‘syringe exchange’ | 78 |
| ‘housing first’ | 119 |
| ‘HIV housing first’ | 2 |
| ‘HIV housing’ | 29 |

# Results

## Needle and Syringe Exchange Programs

### Background

The sharing of injection materials used by IDU has long been accepted as a risk factor for the contraction of various blood borne infections. Needle and syringe exchange programs have been utilized as a means of harm reduction in IDU since the opening of the first formal opening of an exchange in Amsterdam in 1984 (Vlahov et al., 2001). Although originally intended to reduce the Hepatitis B transmission, the strategy was applied to HIV and Hepatitis C soon after. The provision of sterile injection equipment combats transmission of the blood borne infections by increasing the chances an IDU will have the hardware and knowledge to consistently inject with an uninfected syringe. The first reported evidence of a decline in needle sharing and injection frequency, concurrent with needle exchange, was released from the Amsterdam exchange in 1988, and other European countries began adopting the strategy in response to the growing HIV/AIDS epidemic (Vlahov et al., 2001).

Unfortunately the appearance of HIV/AIDS in the United States coincided with a national adoption of the political movement known as the War on Drugs (Drug Policy Alliance, 2014). Because of the taboo nature of injection drug use, and the opinion that distribution of sterile injecting equipment would only encourage drug use, Americans arrived late to the NSEP game. The first glimpse of the harm reduction approach in the United States came in the form of a former IDU, Jon Parker (PBS Frontline, 2006). Parker began illegally distributing sterile syringes to IDU in New Haven, Connecticut after learning of the success of NSEPs in Europe (PBS Frontline, 2006). The first wave of organized NSEPs opened in Tacoma, New York City, Portland and San Francisco between 1988 and 1989, but these programs received little support and were operated under stringent regulations (Vlahov et al., 2001). There were limitations on the number of syringes a user could obtain from the exchange, and police frequently, if not permanently, monitored the structures out of which the programs were operated.

The following excerpt from a New York Times article from March of 1989 reflects the controversy surrounding early NSEP programs:

Two weeks before Health Secretary Dr. Louis W. Sullivan endorsed local programs that let drug addicts trade their dirty needles for clean ones, a memorandum by a subordinate warned Federal grant recipients that they could lose the aid if they ran such efforts. The memorandum told 41 AIDS programs financed by the National Institute on Drug Abuse that Federal Policy prohibits “any kind of Federal support” for programs that distribute clean needles to addicts to help stop the spread of the deadly virus. (New York Times, 1989)

Other federal funding restrictions were enacted over the course of the late 1980s and early 1990s making it difficult to run NSEPs and conduct further research into NSEPs that had already shown promising results in IDU populations (Vlahov et al., 2001). As a result of the stunted influx of research funds, most evidence in favor of NSEPs came from privately funded studies and initially garnered little attention from the public.

The ban on federal funding of NSEPs was lifted in 2009, by which time a substantial body of evidence had been gathered demonstrating positive outcomes for IDU involved in NSEPs (Sharon, 2009; Vlahov et al., 2001). Although the lift of the ban did not guarantee federal funding to any of the NSEPs in operation, the political message sent in favor of harm reduction practices was considered a victory for public health (Sharon, 2009). The victory was short lived, however, as the ban was reinstated in 2011 (Egelko, 2011). By this time, the majority of NSEPs had adapted ways to operate in the absence of federal funding, but the reinstatement of the ban stifled ambitions for expansion of services (Egelko, 2011). Many states worked around the restriction on NSEP funding by permitting the sale of syringes from pharmacies without a prescription. Although the removal of barriers to syringe distribution from pharmacies should be cited as a progressive measure in reducing blood borne illness transmission, the anonymity afforded to users by NSEPs is lacking in the pharmacy setting, which may deter IDU (Public Health Law Research, 2013).

In addition to providing sterile injection equipment to participants in NSEPs, these establishments deliver services including condoms, pore filters, counseling, and references to outside resources such as clinics, social workers, and drug rehab centers (Hilton et al., 2001; Vlahov et al., 2010). The operators of NSEPs are often counselors, clinicians, or peers who are able to relate to IDU in a supportive manner that encourages the safe practice methodology advocated by the exchange programs. NSEPs and those who work within them function as a refuge from the discrimination faced by IDU in a society that criminalizes and criticizes drug use. As this stigma has frequently been identified as an obstacle to quality health care access, its elimination or reduction in the NSEP environment serves to increase the chances of improved health outcomes for IDU who utilize NSEPs (MacNeil & Pauly, 2011). The improved health outcomes result, in part, from the acquisition of the medical and drug treatment referrals offered by NSEPs (Bowen, 2012).

Today, in the United States, there are approximately 227 NSEPs providing at least a portion of the described services, distributed throughout 31 of the continental states and the District of Columbia (Kaiser Family Foundation, 2013). The geographical concentrations of NSEP states fall on the West Coast and in the North East extending around the Great Lakes up to Minnesota (Kaiser Family Foundation, 2013). As shown in Figure 1, there is a gaping interruption in coverage across the Mid West and in most of the South East.



Figure 1. Map of NSEPs

The map displays states with operating NSEPs as of 2013. Those displayed in yellow lack NSEPs, while the blue areas represent states that currently have functioning exchange programs. (Adapted from the Kaiser Family Foundation Sterile Syringe Exchange Programs map, 2014)

The majority of the NSEPs in the states indicated by the map are found in major cities and metropolitan areas with high population density. There are NSEPs present in rural areas also, but only in a handful of states. The North American Syringe Exchange Network provides a list of North American programs that have permitted the public display of their contact information. Although the list does not contain all of the NSEPs in the United States, it offers a good picture of the places and populations served. Table 2 summarizes the information provided by NASEN.

Table 2. States Containing NSEPs

| State/Territory | # NSEPs Reported | # Urban | # Rural/Suburban |
| --- | --- | --- | --- |
| Alaska | 2 | 2 | 0 |
| Arizona | 2 | 2 | 0 |
| California | 35 | 29 | 6 |
| Colorado | 4 | 4 | 0 |
| Connecticut | 4 | 4 | 0 |
| D.C. | 4 | 4 | 0 |
| Delaware | 1 | 1 | 0 |
| Florida | 1 | 1 | 0 |
| Georgia | 1 | 1 | 0 |
| Hawaii | 1 | 1 | 0 |
| Illinois | 10 | 7 | 3 |
| Indiana | 1 | 1 | 0 |
| Louisiana | 5 | 5 | 0 |
| Massachusetts | 5 | 3 | 2 |
| Maryland | 1 | 1 | 0 |
| Maine | 4 | 3 | 1 |
| Michigan | 7 | 5 | 2 |
| Minnesota | 6 | 5 | 1 |
| Missouri | 1 | 1 | 0 |
| Montana | 2 | 2 | 0 |
| North Carolina | 4 | 4 | 0 |
| New Jersey | 5 | 5 | 0 |
| New Mexico | 49 | 31 | 18 |
| New York | 21 | 18 | 3 |
| Ohio | 2 | 1 | 1 |
| Oregon | 7 | 6 | 1 |
| Pennsylvania | 2 | 2 | 0 |
| Puerto Rico | 3 | 3 | 0 |
| Rhode Island | 2 | 2 | 0 |
| Vermont | 3 | 1 | 2 |
| Washington | 20 | 14 | 6 |
| Wisconsin | 14 | 12 | 2 |

A list of the states containing NSEPs that allow the display of contact information by the North American Needle Exchange Program, the number of reported NSEPs in each state, and the number of urban or suburban/rural NSEPs contributing to the total reported (NASEN: US Syringe Exchange Program Database, 2014).

**Table 2 Continued**

The distribution of NSEPs, according to the available location information, clearly favors urban areas over rural and suburban locations, consistent with many other health services. Although there are injection drug users located in every type of geographic area, the practice is most common in urban settings. According to a 2012 TEDS Report comparing rural and urban substance abuse, urban drug users are more likely to abuse heroin and cocaine, while rural abuse of alcohol, marijuana, and methamphetamine is more common (Substance Abuse and Mental Health Services Administration, 2012). Heroin and cocaine can both be injected and are cited as two of the most common illegal injection drugs among HIV positive persons (Diaz et al., 1994; AIDS.gov, 2014). Methamphetamine (meth) can also be injected, contributing to the danger of HIV transmission posed by its use. Smoking is the most common mode of meth use, however, and its association with HIV transmission is most often a result of the enhanced sex drive and increase in unprotected sexual encounters resulting from the characteristic energy boost felt while high (National Institute on Drug Abuse, 2014). These drug use patterns, which suggest greater injection tendencies among urban drug users, likely influence the placement location of NSEPs. Moreover, placing NSEPs in areas of high population density increases the odds of impacting larger numbers of people, which is important when funding is limited.

### NSEPs and HIV Incidence/Prevalence

A multitude of studies, and reviews of studies, have been published over the lifespan of NSEPs, related to the efficacy of such programs in reducing the incidence and/or prevalence of HIV/AIDS. Researchers have made conclusions all across the board, but an overwhelming majority of the evidence falls in favor of a weak to moderate positive correlation between NSEPs and reduction in HIV transmission. Strength of the evidence associated with HIV infection risk is limited by the difficulty of controlling other risk behaviors, especially sexual risk behaviors, in the study population. Studies have looked into the relationship between NSEP presence and HIV transmission in countries around the globe, all following a similar pattern of support for NSEP efficacy. International studies were considered in terms of the overall evaluation of NSEPs as harm reduction strategies, but for the purpose of this review, only analyses of U.S. programs were given emphasis.

Gibson, Flynn, and Perales (2001) conducted a review including seven longitudinal studies evaluating the effect of NSEP utilization and blood borne virus seroconversion. Of the seven, four were conducted within IDU communities in the United States. Three of the four studies, conducted with IDU in Portland and New York City (2) demonstrate a protective effect of NSEP usage against HIV seroconversion (Gibson, Flynn, & Perales, 2001). The fourth study, conducted in Seattle, Washington, focused on HCV and HBV and shows no effect (Gibson, Flynn, & Perales, 2001).

A study conducted by Heller et al. (2009) cites a 41% reduction in HIV prevalence among New York City IDU from 1990 to 2001, coincident with the expansion of NSEPs. Hurley, Jolley and Kaldor (1997) compared HIV seroprevalence in 29 cities containing NSEPs with seroprevalence in 52 cities without NSEPs. The results were not as drastic as the Heller finding, but a 5.9% yearly average increase in seroprevalence was observed in cities lacking NSEPs while cities with NSEPs experienced an average decrease of 5.8% per year (Hurley, Jolley, & Kaldor, 1997).

A review and meta-analysis conducted by Aspinall et al. (2014) assesses the pooled effect of NSEPs in reducing HIV transmission over data collected from 12 studies. Of the 12 studies, 10 were cohorts, one was case-control, and one was cross-sectional. The meta-analysis found a protective effect was afforded to participants in the included NSEPs, five of which are located in the United States (Aspinall et al., 2014). Of the five U.S. studies, three individually demonstrate a protective effect of NSEP utilization, and two found NSEP users to be at higher risk for HIV infection (Aspinall et al., 2014). In several other reviews citing studies that found NSEP participants to be at a higher risk for HIV than non-participants, the authors reasoned that this was because IDU who utilize NSEP services are typically already high-risk individuals, even compared to other IDU (Palmateer et al., 2010). It was argued that these individuals would exhibit elevated risk for HIV regardless of participation in NSEPs, and that their existing elevated risk is what prompted them to use NSEPs in the first place.

A 2000 review by Coffin cites eight US government studies (National Commission on AIDS 1991; General Accounting Office 1993; University of California for CDC 1993; National Academy of Science 1993; Office of Technology Assessment 1995; National Institutes of Health Consensus Conference 1995; and Department of Health and Human Services 1997 and 1998) which all concluded that there was a reduction in HIV transmission as a result of NSEPs. The review also points out that every one of these eight government-supported studies makes the determination that NSEPs do not increase drug use, contrary to a popular argument against NSEP funding (Coffin, 2000).

### NSEPs and Injection Behavior

As an indirect measure of the capacity of NSEPs to reduce HIV incidence and prevalence rates within the injection drug using community, many studies have concentrated attention on the changes in IDU risk behavior as a result of the provision of NSEP services. Risk behaviors in these assessments include needle and syringe borrowing or sharing, and needle and syringe reuse. The United States and other higher income countries have consistently generated convincing evidence of NSEP driven reduction in risky injection behaviors (Dutta et al., 2012). A 2010 review by Palmateer et al. cites evidence from 43 studies pertaining to NSEP impact on IDU risk behavior. Reductions in self-reported needle and syringe sharing and reuse were demonstrated in 39 of the 43 studies (Palmateer et al., 2010). The reduced risk behaviors reported in the studies were all associated with NSEP utilization at an association rating of moderate or strong (Palmateer et al., 2010). Gibson, Flynn, and Perales (2001) cite evidence from four cross-sectional studies of U.S. IDU populations showing decreases in borrowing and lending of syringes coincident with an increase in NSEP presence or distribution volume. The same review cites three observational studies in San Francisco (2) and New York City in which IDU who had recently participated in NSEPs were less likely to borrow or lend syringes than IDU who had not participated in NSEPs (Gibson, Flynn, & Perales, 2001).

Positive effects on injection behavior have been shown to increase when sterile syringe availability is less restricted. Researchers in Vancouver, British Columbia observed a significant decline in the rates of syringe borrowing and lending following a NSEP policy change emphasizing syringe distribution rather than an exchange-only strategy (Kerr et al., 2010). Kerr et al. (2010) reported a nearly 11% decline in syringe borrowing, and a 12.3% decrease in syringe lending over a five year period surrounding the policy change. Drach et al. (2011) provide additional support for the concept of increasing distribution in lieu of cut and dry exchange in a pilot program based in Portland, Oregon. Compared to a baseline distribution evaluation made of the original 1-for-1 exchange practice, the pilot program doubled its distribution volume, increased the number of dirty syringes turned in and expanded distribution networks after relaxing restrictions on syringe distribution (Drach et al., 2011). According to Heller (2009) and based on the findings of the eight government studies discussed above, it is reasonable to assume that an increase in clean syringe circulation indicates a reduction in reuse of unsterile injection materials, and an increase in safe injection practice, rather than an increase in drug injection frequency.

A 2010 *Lancet* review offers that the effect of NSEPs on the reduction of HIV incidence is likely proportional to the volume of sterile syringes entering circulation, as more IDU are able to avoid the use of dirty injection material (Degenhardt et al., 2010). Conversely, arguments can also be made in favor of a strict exchange policy as they function to reduce the number of used syringes in circulation by requiring IDU to turn them in.

**3.2 HOUSING FIRST PROGRAMS**

### 3.2.1 Background

Among IDU, individuals classified as homeless have demonstrated a quicker HIV sero-conversion rate than users whose housing situation is considered stable, and therefore comprise an inimitable risk group for which additional harm reduction tactics must be employed (Milloy, Marshall, Montaner, & Wood, 2012). Looking at housing as a risk factor independent of injection drug use, the HIV seroprevalence among homeless and marginally housed is 5-10 times higher than that of the stably housed population (Milloy, Marshall, Montaner, & Wood, 2012; Aidala et al., 2005; Kidder et al., 2007). HAART access and adherence is poor in the homeless population, compared with HIV positive individuals in permanent, stable housing (Milloy, Marshall, Montaner, & Wood, 2012). Adherence is an even greater challenge for homeless IDU, as their drug use can lead to incarceration, negative interference with HAART, and an inability to maintain a treatment schedule (Kerr et al., 2005). In addition to deficient HAART utilization, marginally housed persons have low contact with the healthcare system in general, despite high rates of disease (Milloy, Marshall, Montaner, & Wood, 2012). As a result of their disconnectedness to the healthcare system, they are less also likely to make use of specific risk reduction services (Aidala et al., 2005; Aidala et al., 2007). Included in these risk reduction services are NSEPs and drug rehabilitation programs. Homeless IDU are more likely to share injection equipment, and have a higher rate of injection than those in stable living situations, characteristics likely associated with their lack of access to and use of risk reduction services (Dickinson-Gomez et al., 2011).

Weir et al. (2007) describes housing as a fundamental determinant dictating which social and physical risk factors make up an individual’s environmental risk profile. The lack of housing characterizing homeless and marginally housed persons creates their unique environmental risk profile. These individuals are challenged daily with exposures not experienced by the stably housed population; including hard drug use, sex exchange, communal sleeping arrangements, inclement weather, and the street violence associated with the low income areas in which homeless and unstably housed people are typically located (Cisneros, 2007; Milloy, Marshall, Montaner, & Wood, 2012; Aidala et al., 2005). Individuals without a permanent, stable living arrangement lack a safe place to store their belongings, which may include medication, clean syringes, condoms, and other harm reduction materials (Weir et al., 2007). Not having a secure place to sleep also hinders the ability to sustain stable intimate relationships, increasing the likelihood that a marginally housed individual will engage in sex with multiple partners or trade sex for other commodities (Aidala et al., 2005; Weir et al., 2007). Shooting up in public places becomes increasingly common when people lack permanent housing, and sterile injection procedures become a low priority.

Housing first (HF) programs seek to mitigate the health threats faced by homeless and marginally housed individuals by prioritizing stable housing over all other treatment aims (Hawk and Davis, 2012). These programs, like NSEPs, embody the harm reduction ideal of supporting any positive change in a person’s lifestyle to achieve better health, rather than mandating sobriety. Although supportive housing programs have been used for decades, HF systems take on a different approach than that which has been traditionally used. Formerly established methods, such as the Continuum of Care model, work on a step-by-step process where the aim is to gradually transition homeless into independent housing over time to ensure readiness. One component of the readiness, as defined by the traditional supportive housing approach, is abstinence or sobriety from substance use (Hawk and Davis, 2012). The HF school of thought promotes immediate permanent housing, after which other health and social needs can be more effectively addressed (Hawk and Davis, 2012). Once a person is housed, HF programs provide support in the form of counselors, social workers, career services, and linkages to health and rehabilitation services (Hawk and Davis, 2012). Through the combination of these services, and the removal of barriers to health maintenance present on the streets and in shelters, housing interventions establish an environment facilitating HIV prevention (Degenhardt et al., 2010).

Pathways to Housing is generally credited with being the first HF model, established in New York in 1992 (United States Interagency Council on Homelessness, 2013; Pathways to Housing, 2014). The Pathways model, which has been applied in over 40 U.S. cities, as well as abroad, is built around the goal of ending homelessness first, then reducing substance abuse and poor health outcomes (USICH, 2013; Pathways to Housing, 2014). The model uses a scattered-site approach to avoid clustering too many units together and prevents the creation of a housing program atmosphere (USICH, 2013; Pathways to Housing, 2014). The strategic avoidance of clustering units has been advocated in past studies examining community acceptance of supportive housing programs, and increases the degree of integration experienced by participants. At the core of each program is a multi-disciplinary Assertive Community Treatment (ACT) team, which, composed of social workers, medical professionals, and substance abuse counselors, functions to provide support to residents after they have secured housing within the program’s units (USICH, 2013). HF programs modeled after the Pathways system typically also have some version of an ACT. Figure 2 maps the states with HF programs that utilize the model exemplified by Pathways to Housing.



Figure 2. Map of Pathways' Housing First

A map of states harboring communities engaged in Pathways’ Housing First. The blue shaded states contain Pathways’ model HF programs, while the yellow states either lack HF programs or have an alternative version supportive housing. (map created using HF location information provided by Pathways to Housing: Housing First in the U.S., 2014)

Similar to the national distribution of NSEPs, the states of the Mid West stand out as a large cluster devoid of HF programs. Keeping in mind that the map only applies to states with supportive housing systems that use the HF model originated by Pathways, the pattern of absence of harm reduction programs in the Mid West is still noteworthy. A possible explanation for the absence of HF programs in the yellow states of the Mid West is provided by the Housing Opportunities for Persons With AIDS (HOPWA) *Housing Innovations in HIV Care* publication (2012). This summary of the program and its accomplishments since 1992 contains a description of how HOPWA sponsored housing assistance programs are funded, and where the most and least funding is distributed. Formula funding accounts for 90% of the money allotted to programs by HOPWA, and is dependent on the number of AIDS cases and total population in the locality (HOPWA, 2012). The remaining 10% of funds are competitively awarded to programs based on innovative practices or accommodations for special populations (HOPWA, 2012). Not surprisingly, states in the middle of the country receive the least amount of formula funding compared to other geographical regions. According to the report, in 2012, Montana, Wyoming, North Dakota and South Dakota received no formula funding whatsoever. This does not mean that these states are without provisions for the homeless. The U.S. Department of Housing and Urban Development’s *2013 Continuum of Care Homeless Assistance Programs: Housing Inventory Count Report* contains state by state information indicating that every state in the U.S., regardless of HOPWA funding, provides some form of permanent supportive housing (HUD, 2013). The relatively low reported numbers of total “beds” classified as “permanent supportive housing” in the aforementioned states may be a result of low funding, or may simply reflect a lack of necessity compared with densely populated metropolitan areas and coast line states (HUD, 2013).

The United States Interagency Council on Homelessness provides snapshots of HF programs in Alameda County, CA, Seattle, WA, Chicago, IL, and a statewide program in Rhode Island, citing them as examples of the multi-faceted positive impact achievable using the HF model of permanent supportive housing. Notable findings of studies evaluating each of the programs included high retention rates for participants, decreased hospitalization and incarceration rates, large cost-savings, and reduction in viral load for participants with HIV (USICH, 2013). The Rhode Island program saw an 80% retention rate after one year of the program and $1.45 million in total year savings as a result of reduced jail, ER, and shelter usage, even with the price of supportive services accounted for (USICH, 2013). Seattle’s DESC HF program saw a 74% retention rate after one year, a 30% decrease in participant hospital visits, and $4 million in tax payer savings attributed to reductions in health and crisis system costs (USICH, 2013). An 18-month study of the Chicago Housing for Health Partnership program found that HF program participants required fewer hospitalizations and ER visits than study participants who received other forms of housing support (USICH, 2013). This same study found that HIV positive participants included in the HF group were twice as likely to achieve undetectable viral loads as HIV positive patients receiving other forms of housing support (USICH, 2013). Finally, the HF program participants in Alameda Co., California achieved an 83% decrease in new incarcerations and a 94% decrease in days spent homeless over the 2006-2010 time period (USICH, 2013).

The cost-savings, alleviation of stress on the health and crisis systems, and reduction in incarcerations and homelessness are all positives outcomes of HF programs on the communities in which they are implemented and the homeless populations they serve. Considering the strong association between injection drug use, HIV, and homelessness, these positive outcomes function also as predictors of the value HF programs are capable of imparting as HIV harm reduction strategies specific to IDU.

### 3.2.2 Housing-First and Injection Behavior

As with NSEP efficacy measures, injection behavior has been used as an indicator of the effect of HF programs on HIV transmission among IDU. It should be noted that even among IDU who already have HIV, a positive change in injection behavior is beneficial in reducing transmission rates within the community as these individuals are less likely to pass the virus on to someone else. The majority of the studies investigating injection behavior changes look at housing status transition, and not specifically at HF programs. Since HF programs exemplify a transition from homelessness to housing stability, however, the results of these studies have been applied as predictors of the outcomes ensuing from HF implementation in parallel populations.

A study conducted by Weir, et al., examined the relationships between five housing indicators related to stability and support and four HIV risk behaviors (2007). Two of the HIV risk behaviors—hard drug use and needle sharing—were specifically relevant to IDU. The housing indicators evaluated were objective stability, subjective stability, supportive housing, number of residences in the last 6 months, and need for housing services (Weir et al., 2007). It was determined that study subjects who lived in a housing situation classified as “objectively unstable” had higher odds of hard drug use than those whose situation was “objectively stable” (Weir et al., 2007, S33). Individuals who experienced improvements in their “objective housing stability” demonstrated lower odds of hard drug use than individuals whose status did not change over the course of the study (Weir et al., 2007, S40). Subjects who moved from “subjectively stable” to “subjectively unstable” housing arrangements became five times more likely to share needles and syringes (Weir et al., 2007, S40). Supportive housing environments demonstrated a substantial impact on drug use and injection practices. Those who were initially classified as excluded from supportive housing were three to five times more likely to use hard drugs and share needles compared to the subjects involved in supportive housing (Weir et al., 2007). Subjects who transitioned into supportive housing over the course of the study saw a great reduction in odds of hard drug use (Weir et al., 2007). There is a possibility that this reduction was a result of sobriety requirements upheld by some supportive housing systems. Additional factors that could impact this behavior, however, include access to rehabilitation services, and social norms promoted in these housing situations (Weir et al., 2007). This possibility should be considered in favor of HF programs, as participation in these is not contingent on drug cessation and therefore would not experience a reduction in risk behavior in line with the former explanation.

Aidala, et al., completed an analysis of a pooled interview data set taken from HIV positive medical and social service clients, in which housing was evaluated as a contextual factor impacting HIV risk behavior (2005). Baseline rates of risk behaviors indicated that the odds of hard drug use and needle sharing within the 6 months prior to assessment were three to six times higher in those who were homeless compared to those with stable housing (Aidala et al., 2005). Comparisons between HIV positive persons with unstable housing (not completely homeless) and those with housing stability also demonstrated a difference in drug risk behavior. Subjects with stable housing demonstrated drug use and needle sharing rates as low as 1/3 those of unstably housed subjects at baseline (Aidala et al., 2005). Even after adjusting the primary evaluation model to add controls for demographics and health service utilization, the same dose response effect was observed, where each increasing level of housing stability was associated with a decrease risk behavior (Aidala et al., 2005). The same study also looked at changes in drug risk behavior after a change in housing status. The odds of recent drug use in the 23% of the study population whose housing status improved was approximately half that of the group whose housing status was unchanged (Aidala et al., 2005). When drug use, injection, and needle sharing behaviors were looked at in combination, risk decreased by 11.4% in subjects who experienced housing improvement and only by 3.8% with no housing change (Aidala et al., 2005). Conversely, no change in housing was associated with an 8.7% increase in drug risk initiation, while risk increased by 4.4% in those with a housing improvement (Aidala et al., 2005).

### 3.2.3 Housing-First and Prevention Service Utilization

Since housing-first programs, by definition, focus on getting homeless and marginally housed persons off the streets and into permanent housing before meeting other health and treatment needs, the proportion of participants who actually connect with health services upon housing attainment can vary. Ideally, in order to maximize the positive outcomes for those who participate in supportive housing, 100% of clients would become connected with, and remain in, health services. Although that number is idyllic, it is not likely realistic at the present. As an alternative indicator of efficacy, researchers have looked for an increase in usage of health and treatment programs by individuals involved in supportive housing programs, compared with baseline usage or the utilization by homeless persons. Specific to IDU and people living with HIV/AIDS, these services can range from drug rehabilitation to non-emergent medical care to anti-retroviral treatment programs.

A study conducted by Aidala et al. examined the relationship between housing status and connection to HIV care, and found that the receipt of housing assistance directly and independently contributed to improved access to HIV medical care (2007). Based on the analysis of interview data from a collection of persons living with HIV/AIDS in New York City, the interview participants experiencing homelessness or housing needs were significantly less likely to be receiving medical HIV care than those without housing needs (Aidala et al., 2007). The same group was also found to be about 1/3 as likely to have entered into medical HIV care over time, compared to those without housing needs (Aidala et al., 2007). Participants not initially receiving medical care were two times as likely to enter into medical HIV care once they received housing assistance, compared to PLWHA who did not receive housing assistance (Aidala et al., 2007).

A review by Milloy, Marshall, Montaner, and Wood (2012) cites evidence from several studies that specifically shed light on the role of housing on HAART adherence in illicit drug users. Two of the studies, one in the United States and one in Canada, identified homelessness as a barrier to HAART treatment (Milloy, Marshall, Montaner, & Wood, 2012). Another study, conducted among IDU in several sites in the United States, determined that stable housing was associated with HAART uptake and adherence (Milloy, Marshall, Montaner, & Wood, 2012). Notably, the same review cites a Pittsburgh case study in which 69% of residents in a harm reduction housing program were able to achieve undetectable viral loads (Milloy, Marshall, Montaner, & Wood, 2012).

A 2004 study conducted by Tsemberis, Gulcur, and Nakae compared HF to the continuum of care housing support model in terms of treatment/service utilization, housing attainment and perceived consumer choice using a sample of homeless individuals in New York City (Tsemberis, Gulcur, & Nakae, 2004). The study found that members of the experimental group (those enlisted in the HF program) were less likely to make use of substance abuse treatment programs than those in the continuum of care control group (Tsemberis, Gulcur, & Nakae, 2004). The finding is not surprising considering the mandatory sobriety or substance abuse treatment required by the continuum of care housing model that is not required in the HF model. A more surprising finding, however, was that HF program participants, despite lower participation in treatment programs, were not found to exhibit significant differences in substance use compared with the control group (Tsemberis, Gulcur, & Nakae, 2004). This suggests that even without requiring abstinence or substance abuse program participation, the HF model achieved comparable success in limiting substance use. Additionally, the HF participants had significantly faster transitions from homeless status to stably housed status than the continuum of care participants, and reported more time spent in stable housing than the control group (Tsemberis, Gulcur, & Nakae, 2004). These results, as well as the 80% housing retention rate seen in the experimental group, speak to the advantage of HF models over traditional supportive housing that require treatment program utilization. The HF participants, despite lower utilization of services, were still able to retain housing and maintain substance abuse rates similar to their counterparts in the control group. The voluntary nature of program participation offered by HF programs and the enhanced feeling of consumer choice imparts more independence to residents, which may be critical to its success.

# Discussion

Over the course of the past several decades, IDU have presented distinct challenges to public health workers attempting to curb the spread of HIV. It has been difficult to acquire the necessary political and community support and funding to implement strategies effective in the IDU population. As a result of legislative bans, NSEPs must function without federal funding, and HF programs compete for funds with arguably less effective housing provisions. Demonstrating the efficacy of programs that do manage to receive or produce funding has also presented obstacles. The transient and elusive nature of the IDU population, especially those classified as homeless, compromise the ability for any control over research studies. Self-report biases and the ethics involved in comparing treatment and control groups also undermine the ability to derive strong evidence from the studies of this population. There continues to be made available, however, more and more convincing research in support of the practice of harm reduction strategies in dealing with HIV in substance users.

This review has cited evidence from several pieces of literature that function to provide said support. Looking at the United States alone, a significant body of investigation has yielded results in favor of the use of NSEPs and HF programs to ameliorate injection behavior, which, when practiced poorly, is the chief element in HIV transmission in IDU. NSEPs and HF programs provide linkages to care and rehabilitation services, which, though not mandatorily imposed, have demonstrated effectiveness in reducing or maintaining levels of substance abuse. Participation in NSEPs and HF programs has been associated with increases in HAART uptake and adherence, enhancing the prognosis of HIV positive IDU. HF programs are extremely effective at reducing homelessness, which has a well-documented association with both HIV and injection drug use, and results in demonstrated cost-savings to the communities involved.

Until there is a cure for HIV, structural interventions that successfully reduce the spread of the virus provide the best options for the health and wellness of those with lifestyle factors that put them at great risk for HIV. These programs must be as inclusive as possible, and should provide accommodations for persons currently living with the virus as well as those at risk. NSEPs and HF programs demonstrate both of those principles by maintaining policies that welcome participants with minimal stipulations. The fortification of participant autonomy displayed by NSEPs and HF programs gives these programs an advantage over more stringently regulated efforts and emphasizes the harm reduction principle of consumer choice. They exemplify the principles of harm reduction by encouraging any improvement that will benefit the health of the participant as well as the community, and benefits to both have been substantiated in the literature.

Although it is difficult to definitively tie NSEPs and HF programs with a reduction in HIV incidence/prevalence, both harm reduction strategies have exhibited repeated consistent effects on risk factors contributing to HIV transmission in IDU. These harm reduction strategies have achieved positive outcomes without substantial government funding, and within a population society has outcast as a lost cause. The success of NSEPs and HF programs in the United States should be taken as proof that harm reduction is a veritable HIV prevention and control approach and provide stimulus for the expansion and intersection of these types of programs. No single approach can possibly succeed in surmounting all of the obstacles presented by HIV/AIDS, but the combined effects of a variety of harm reduction approaches can certainly make a significant impact on the virus in a special population like IDU.

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