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## Systematic review research on needle/syringe programs and opiate substitution programs in low- and middle-income countries

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### Abstract

Persons who inject drugs (PWID) are at an elevated risk for human immunodeficiency virus (HIV) and hepatitis C virus (HCV) infection. In many high-income countries, needle and syringe exchange programs (NSPs) have been associated with reductions in blood-borne infections. However, we do not have a good understanding of the effectiveness of NSP in low/middle-income and transitional-economy countries. A systematic literature review based on PRISMA guidelines was utilized to collect primary study data on coverage of NSP programs and changes in HIV and HCV infection over time among PWID in low- and middle-income and transitional countries (LMICs). Included studies reported laboratory measures of either HIV or HCV and at least 50% coverage of the local injecting population (through direct use or through secondary exchange). We also included national reports on newly reported HIV cases for countries that had national level data for PWID in conjunction with NSP scale-up and implementation. Studies of 11 NSPs with high-coverage from Bangladesh, Brazil, China, Estonia, Iran, Lithuania, Taiwan, Thailand, and Vietnam were included in the review. In five studies, HIV prevalence decreased (range –3% to –15%) and in three studies HCV prevalence decreased (range –4.2% to –10.2%). In two studies, HIV prevalence increased (range +5.6% to +14.8%). HCV incidence remained stable in one study. Of the four national reports of newly reported HIV cases, three reported decreases during NSP expansion, ranging from –30% to –93.3%, whereas one national report documented an increase in cases (+37.6%). Estimated incidence among new injectors decreased in three studies, with reductions ranging from –11/100 person years at risk to –16/100 person years at risk. While not fully consistent, the data generally support the effectiveness of NSP in reducing HIV and HCV infection in low/middle-income and transitional-economy countries. If high coverage is achieved, NSP appear to be as effective in LMICs as in high-income countries. Additional monitoring and evaluation research is needed for NSPs where reductions in HIV/HCV infection among PWID are not occurring in order to identify and correct contributing problems.

### Keywords

HIV; Hepatitis C; needle and syringe programs; opiate substitution programs; low and middle income countries

## 1. Introduction

Persons who inject drugs (PWID) are at elevated risk for blood-borne infection, including HIV and hepatitis C (HCV), and in many developed and developing countries, the prevalence of these blood-borne infections among PWID has surpassed 20% [1]. The purpose of this presentation was to document structural-level needle and syringe programs (NSPs) [2] or opiate substitution therapy (OST) programs that are operational in low and middle income countries (LMICs), and present findings related to changes in blood-borne infection among participants in NSPs and changes in retention of participants over time in OST programs.

We chose to focus on those countries that are defined as low income by World Bank classification. High income countries were not included, as there is an abundance of documentation of the success of NSPs and OST programs in these locations. For this reason, we wanted to compare the success of these high income programs to those implemented in LMICs, as many programs in LMICs have only recently been implemented and may not have adequate resources.

Multi-person use of needles and syringes is one of the most efficient ways of transmitting blood-borne infection among persons who inject, and thus it is imperative that clean injection equipment be made available to those drug users who continue to inject in order to reduce transmission of HIV, HCV, and other blood-borne infections. As some LMICs are documenting HIV prevalence among PWID that has surpassed 20%, it is important to offer services to drug users before HIV prevalence reaches much higher levels.

Through modeling studies conducted on PWID populations, we were able to determine that structural level of NSP services are obtained when at least 10 needles/syringes are available per PWID per year in a respective location. Once an NSP reaches this level of coverage, more noticeable changes can be seen in incidence and prevalence of blood-borne infection over time, especially among new PWID. This has been documented in several studies of NSPs in high income countries including Australia, Canada, the United States, and the United Kingdom.

Opiate substitution treatment is a key component in overdose prevention, reducing illicit opiate use, and risk of blood borne virus infection. Multiple studies have highlighted the success of OST treatment in high income countries, documenting reductions in relapse, overdose, and associated risky drug use behaviors.

## 2. Methods

In order to obtain the necessary studies required for this review, we performed a systematic literature search, utilizing PRISMA guidelines, to collect coverage information on NSPs and OST programs in conjunction with surveillance data or longitudinal cohort data with baseline and follow-up HIV and/or HCV testing, or changes in retention of OST participants over time. NSP studies had to document changes in blood-borne infection through serologic testing of participants; self-report information was not included due to the unreliability in disease reporting among participants. The changes in blood-borne infection also had to be

documented during NSP implementation or scale-up of NSP services; studies that documented changes after the NSP had been fully implemented or before full-scale implementation occurred were not included. There had to be documentation of implementation of or ongoing OST treatment in a sample of drug users, with longitudinal measurements documenting changes in retention of OST participants. We excluded any OST program study that did not utilize buprenorphine or methadone for their OST pharmacologic treatment, or OST program studies that only included participants or individuals from prison or institutionalized settings.

For all of the studies included, coding forms were developed and each study was double checked for accuracy before data analysis. Risk of bias was assessed for each study, utilizing methodology developed from the Cochrane Collaboration of Systematic Reviews.

### 3. Results

A total of 17 countries were represented in the systematic reviews of NSPs and OST programs in LMICs. There were 12 studies that examined NSPs in relation to changes in blood-borne infection, and 63 programs that documented change in OST retention over time. The countries represented in the analysis were Afghanistan, Bangladesh, Brazil, China, Georgia (Republic), India, Indonesia, Iran, Kyrgyzstan, Lithuania, Malaysia, Mauritius, Taiwan, Tanzania, Thailand, Ukraine, and Vietnam.

Among NSP studies, seven of the nine locations that analyzed HIV prevalence showed decreases during and after full implementation of structural level NSPs. Three locations that analyzed HCV prevalence showed decreases, whereas one study reported a stabilization of newly reported HCV cases among NSP participants. Among the national surveillance reports, three of four countries documented decreases in newly reported HIV cases during NSP implementation and expansion, whereas one country saw a slight increase in newly reported cases that was directly correlated with a lowered numbers of syringes distributed during the later years of the NSP.

Opiate substitution therapy programs in LMICs achieved good levels of retention among their participants, similar to studies in high income countries. The retention value overall among OST programs in LMICs was 54.3% after 12 months, above the 50% minimum level documented as a “baseline” for retention success among OST programs. While there was a slightly higher retention level (56.6%) among those on methadone compared to participants that were on buprenorphine regimens (48.3%), the difference was not statistically significant. Additionally, we found that retention among participants was not related to the dosage of pharmacologic substance used, although it should be noted that most of the studies adhered to the World Health Organization guidelines for OST pharmacologic dosages.

NSPs and OST programs are an integral part of HIV harm reduction; they are associated with reductions in overdoses, blood-borne transmission, crime, and associated risky behaviors, along with increased quality of life. If programs are implemented on a large scale, they appear to be as successful in LMICs as they are in high income countries, and as these programs gain wider acceptance, new pilot programs will begin to emerge, as is the case

with new OST programs and NSPs present in locations in Eastern Europe and southeast Asia, where injection related transmission continues to occur at high levels. It will be important to continue to monitor both existing and new programs as they emerge in LMICs, to ensure that the outcomes obtained among participants are comparable to established programs already in place in high income locations.

## References

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