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## Towards a Comprehensive Approach to HIV Prevention for People who use Drugs

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### Abstract

Comprehensive HIV prevention interventions are increasingly recognized as critical in the global effort to reduce HIV transmission among people who use injection drugs (IDU). Scientific evidence clearly shows that a variety of biomedical, behavioral and structural interventions can prevent and reduce IDU-driven HIV epidemics, yet social and structural barriers to their implementation remain. This review discusses the scientific evidence on the effectiveness of individual programs for reducing HIV incidence among IDU and how, by integrating individual programs as complements within a comprehensive HIV prevention approach, it is possible to achieve, and to sustain, greater results than those of individual programs alone. The paper concludes with a discussion of a critical research priority; namely, to improve the implementation of comprehensive HIV prevention interventions in settings of prevalent injection drug use, and to overcome the often complex barriers that impede them. Such an effort will require more than research alone, however. It will also require the ongoing commitment of policy makers, public health officials, and the affected communities themselves to employ comprehensive HIV treatment and prevention as the most effective strategy to reduce new HIV infections.

### Keywords

HIV; injection drug use; intervention; prevention; review

### INTRODUCTION

Injection drug use is a major international public health problem. Recent evidence suggests that over 16 million individuals injected an illicit drug in the past year.<sup>1</sup> Outside of sub-Saharan Africa, injection drug use is one of the main drivers of HIV transmission and is responsible for an increasing proportion of new infections in certain areas, including Eastern Europe, Russia, and Southeast Asia.<sup>2</sup> Recent epidemiological studies have found an HIV prevalence of greater than 50% among people who inject drugs in Estonia,<sup>3</sup> Pakistan,<sup>4</sup> and Russia.<sup>5</sup>

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Although IDUs are known to be at a tremendously high risk of HIV infection, the level of global attention and resources directed towards evidence-based HIV prevention for this population remains inadequate.<sup>2</sup> Furthermore, while the past several decades have brought a wealth of knowledge regarding effective, evidence-based prevention programs for IDU, non-evidence based approaches continue to receive greater attention and resources in many settings.<sup>6</sup> For example, evidence demonstrates a strong association between incarceration and increased HIV risk behavior and HIV transmission,<sup>7, 8</sup> yet the primary international response to injection drug use continues to be law enforcement.<sup>9</sup> This global pattern persists, despite evidence that incarceration of non-violent drug offenders does not reduce long term patterns of drug use or result in other documented benefits.<sup>10, 11</sup>

In contrast, effective HIV prevention programs have the potential to prevent the spread of HIV among low-prevalence populations<sup>12</sup> and contain established epidemics.<sup>13</sup> Despite findings on the effectiveness of a large variety of HIV prevention programs, in many countries these interventions have yet to be adopted and implemented in an accessible and equitable manner.<sup>14</sup> The Joint United Nations Program on HIV/AIDS (UNAIDS), UNODC, and the World Health Organization (WHO) recently published a technical guide for countries in an effort to build consensus and set targets for universal access to HIV prevention, treatment and care for injecting drug users.<sup>15</sup> The technical guide emphasizes comprehensiveness and integration as key to produce the most significant and sustained reductions in HIV risk behavior and infections. “Highly active HIV prevention” — that is, a combination of behavioral, structural, and biomedical prevention strategies adapted for specific contexts and based on the best available scientific evidence — is now recognized as the best hope for eliminating HIV transmission worldwide.<sup>16, 17</sup> It is within this framework that our paper reviews effective, evidence-based strategies for preventing HIV among drug-using populations. We also examine the evidence on comprehensive strategies to prevent HIV infection and highlight studies of the benefits of implementing sets of interventions in a sustained and integrated fashion. Finally, we describe known barriers to HIV prevention strategies and suggest specific areas in need of additional research.

## EVIDENCE-BASED INTERVENTIONS

The recently published UNAIDS/UNODC/WHO technical guide describes nine interventions recommended for the prevention of HIV transmission among IDU.<sup>15</sup> The reader will find details on each intervention in the guide so we will not summarize them here, but will instead highlight supportive evidence for the interventions from landmark studies and systematic reviews.

A cornerstone of effective HIV prevention for IDU populations is needle and syringe programs (NSPs). Key studies have demonstrated the ability of NSPs to reduce injection-related risk behavior<sup>18</sup> and HIV incidence<sup>19</sup> among IDU who access these programs. Several reviews have also concluded that the evidence in support of the effectiveness and safety of these programs is incontrovertible.<sup>20,21</sup> There is significant variation in the implementation and delivery of NSPs, however, such that programs with high-level coverage and less restrictive syringe dispensation policies are generally more effective at curtailing the spread of HIV than more restrictive programs<sup>22</sup> and are thus most strongly endorsed by the WHO.<sup>15</sup>

The cumulative evidence demonstrates that opioid substitution therapy (OST) including methadone maintenance therapy (MMT) decreases injection-related HIV risk behavior.<sup>23,24</sup> OST is also associated with improved antiretroviral therapy (ART) adherence and better health outcomes among HIV positive IDU.<sup>25</sup> A recent systematic review concluded that OST reduces injection-related risks and prevents HIV infections; however, only limited

evidence was found to suggest an impact of OST on sexual risk behavior.<sup>26</sup> Case management and other behavioral therapies, particularly in combination with OST, have also been shown to be effective at reducing risk behavior and are thus recommended as HIV prevention strategies.<sup>27</sup>

Expanding access to ART is increasingly recognized as a potentially effective HIV prevention strategy.<sup>28–30</sup> Mathematical modeling suggests that universal voluntary HIV testing in combination with immediate expansion of ART could largely eliminate the transmission of HIV within 10 years.<sup>31</sup> Research has recently demonstrated a strong correlation between decreased community viral load and reductions in HIV incidence among IDU.<sup>30</sup> Given these findings, it is perhaps not surprising that both interventions (i.e., voluntary testing and ART) are now recommended for IDU populations.<sup>15</sup> Systematic reviews have concluded that IDU can adhere to ART equally as well as other populations,<sup>32</sup> and can benefit as well as non-IDU in terms of improved survival.<sup>33</sup> Given the unequivocal individual- and population-level health benefits of ART, universal access to HIV treatment for drug users, whether IDU or not, should be an international public health priority.

The transmission of HIV from IDU to their sexual partners through unprotected intercourse is well documented,<sup>34</sup> underscoring why sexual risk reduction interventions, including condom provision, STI testing, and improved access to other sexual health services are an integral component of comprehensive prevention. A meta-analysis of behavioral programs targeting condom use has shown that such interventions are acceptable to IDU and do lead to sustained decreases in sexual risk activity.<sup>35</sup> These interventions need not operate independently from drug use-focused programming; for example, a comprehensive intervention for drug-using women demonstrated significant reductions in measures of both drug- and sex-related risk behaviors.<sup>36</sup>

Although the technical guide does not refer to community-based outreach as an intervention in and of itself, it is one of the most effective methods for accessing and successfully delivering HIV prevention programs to hard-to-reach IDU.<sup>37</sup> Participation in outreach programs has been shown to reduce the risk of HIV seroconversion among out-of-treatment IDU.<sup>38</sup> Outreach-based interventions have also been shown to reduce HIV risk among high-risk IDU networks.<sup>39</sup>

## TOWARDS A COMPREHENSIVE APPROACH

Drug users and affected communities experience an evolving constellation of risk factors for HIV and other blood-borne pathogens.<sup>14</sup> To effectively address these issues, comprehensive, accessible, and culturally appropriate preventive interventions are needed.<sup>16</sup> Specifically, combinations of evidence-based HIV prevention programs have been shown to result in more significant, sustained reductions in risk behavior and transmission than individual programs operating alone.<sup>15</sup> For example, integrating supplementary HIV prevention services within NSPs has been shown to result in significant public health benefit. A prospective cohort study of IDU in Amsterdam, for example, found that NSP use was associated with reductions in HIV and hepatitis C incidence when combined with participation in methadone therapy.<sup>40</sup> Offering motivational enhancement and contingency management to active NSP users has been shown to improve the likelihood of their enrolment in substance abuse treatment.<sup>41</sup> Integrating drug treatment services with other programs to reduce behavioral risks has also proven to be successful. For example, supervised injecting facilities have been found to reduce syringe sharing among persons who use them;<sup>42</sup> integrating addictions counseling within such facilities has also led to increased uptake of detoxification services.<sup>43</sup> Here again, it is the comprehensive delivery of such

services that leads to the greatest benefits to public health, at both the individual and population level.

Effective HIV prevention should be comprehensive from the perspective of public health, but should also be *intersectoral*, that is, partnered and coordinated with a variety of organizations traditionally outside the health sector. The effective integration of law enforcement with health-focused programs is often considered critical in the development of successful HIV prevention interventions for IDU.<sup>44</sup> Several authors have therefore called for increased coordination of policing and public health initiatives to reduce HIV transmission, emphasizing that these systems work more effectively, and more efficiently, in concert than in an antagonistic manner,<sup>45, 46</sup> but precisely how to achieve such coordination will require further study.

## BARRIERS TO HIV PREVENTION

Structural and social barriers are commonly cited as principal reasons for inadequate access to and implementation of effective interventions for HIV prevention among drug users.<sup>47, 48</sup> For example, social norms can serve as barriers to altering individual risk behaviors, including risky use of syringes and inconsistent condom use.<sup>49</sup> Institutional, legal, and organizational responses also significantly impact the success of comprehensive HIV prevention programs.<sup>48</sup> Some policing practices, including crackdowns, have proven ineffective in decreasing drug use and may in fact hinder HIV prevention efforts by further displacing drug users who are already marginalized and out of reach of public health services.<sup>50, 51</sup>

Addressing social and structural barriers in settings of explosive IDU-driven epidemics is fundamental to the success of universally accessible HIV prevention interventions. Why this is so can be understood through study of the “risk environment,”<sup>48</sup> with its multi-level influences, stimuli, and cues that increase and perpetuate HIV vulnerabilities among IDU. Careful evaluation of the local risk environment is a prelude to successful identification and removal of barriers to HIV prevention services for IDU populations.<sup>52, 53</sup>

## FUTURE DIRECTIONS & CONCLUSION

The evolving and interacting relationships between drug use and HIV transmission necessitate continual adaptation and innovation to sustain effective HIV prevention strategies. For example, in both developed and transitioning countries, stimulants like crack cocaine and methamphetamines are quickly replacing opioids as the most commonly injected drug.<sup>54</sup> Given the established links between HIV transmission and IDU, and between HIV and non-injection stimulant use,<sup>55</sup> adaptive, tailored interventions must be a priority to reach IDU who have begun injecting stimulants. This priority is amplified in view of the treatment challenges for stimulant dependence,<sup>56</sup> which underscore the urgent need for comprehensive psychosocial and substitution therapies.

As the AIDS epidemic continues to evolve, so too should novel interventions to reduce and prevent HIV transmission. This is the capstone of effective public health, i.e., to predict where the epidemic is going and avert its course before it reaches vulnerable populations and new environments. Yet, institutional and political opposition can impede the establishment of evidence-based public health programs. A now classic example of this process is the reluctance of governments to support NSPs,<sup>57</sup> despite official endorsement by U.S. public health organizations and scientists, including the Centers for Disease Control and Prevention.<sup>58</sup> Advocacy by public health professionals, academics, affected communities, and other stakeholders is all-the-more vital to overcome barriers to reduce the

spread of infectious diseases through HIV prevention (and drug treatment) programs for IDU.

In recent years, there has been an increased recognition of the ability of structural interventions to enact large-scale HIV risk behavior change. The fundamental tenet of structural interventions is to modify the social, structural, and physical environment in which drug use and HIV risk co-occur.<sup>47</sup> For example, stable housing is increasingly recognized as an effective structural intervention to reduce risk behavior and HIV transmission among people who use drugs.<sup>59,60</sup> Despite the numerous challenges, empirical studies of the effectiveness of structural interventions to reduce HIV transmission are important, including the consideration of randomized controlled trials of structural interventions for HIV prevention.<sup>61</sup> “Natural experiments” are also useful for identifying population-level impacts of structural interventions. For example, the ongoing monitoring and evaluation of ART expansion strategies should be encouraged in all settings, not only to demonstrate effectiveness but also to facilitate improved implementation and operations research.

Leading international bodies have now endorsed evidence-based interventions for HIV prevention among drug users, yet barriers to their delivery and implementation remain. Given the gaps between the need for and access to HIV prevention services for IDU,<sup>62</sup> even in many countries that do provide these services, an international effort is needed to coordinate and scale up the implementation of these programs. In the absence of an effective AIDS vaccine, such an effort must include an ongoing commitment by researchers, policy makers, public health officials, and other affected communities to comprehensive HIV treatment and prevention as the most effective strategy to reduce new infections.

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