

Scientific and programmatic implications of safer injection facilities for persons who inject drugs illicitly

Salaam Semaan^{1,2}, Haley Stolp², Paul Fleming², Caitlin Worrell², Brittney Baack², Meghan Miller²

¹Centers for Disease Control and Prevention, Atlanta, GA; ²Emory University, Rollins School of Public Health, Atlanta, GA

XIX International AIDS Conference, Washington, DC – July 25, 2012

Abstract

Background: Persons who inject drugs (PWID), particularly those who inject in streets, alleys, and parks, use needles and syringes used by others, or use unclean drug-preparation equipment (cotton, cookers, or water) are at risk for HIV, HBV, and HCV infections. To reduce risk for infectious diseases and improve health outcomes, cities in Australia, Canada, Germany, Luxembourg, Netherlands, Norway, Spain, and Switzerland established safer injection facilities (SIFs) following establishment of legal support. SIFs provide clean injection environments, sterile injection equipment, and clean drug-preparation equipment at the time of injection.

Method: We reviewed and summarized the published scientific evidence (PubMed, EMBASE, PsycInfo) and appraised the programmatic implications of SIFs.

Results: At SIFs, persons can more safely inject drugs that they have purchased outside of the facility. SIF management and staff do not assist in injection. SIFs safely dispose of used equipment and provide on-site counseling, referral to addiction treatment and health services, and overdose emergency assistance. SIFs limit transmission of HIV, viral hepatitis, and bacterial infections, reduce overdose mortality, prevent accidental needle-stick injuries to community members, reduce public nuisance and litter, and improve health outcomes and public safety. As cost-saving and cost-effective interventions, SIFs offer unique and complementary benefits, as compared to other effective interventions (prevention and treatment of drug abuse, syringe exchange programs, non-prescription pharmacy sale of sterile injection equipment, safe disposal programs for used equipment, community overdose prevention programs, prevention and treatment of infectious diseases) which often are not available to all persons who use drugs. Through collaboration with community members, law enforcement officers, persons who inject drugs, service providers, and public health scientists and practitioners, SIFs can meet needs of users and communities.

Conclusions: SIF services, within a multipronged intervention approach, address complex social and public health consequences of injection drug use and ameliorate the negative effects of injection drug use on users and communities.

Semaan S, Fleming P, Worrell C, Stolp H, Baack B, Miller M. (2011). Potential role of safer injection facilities in reducing HIV and Hepatitis C infections and overdose mortality in the United States. *Drug and Alcohol Dependence*, 118, 100-110.

Objective

To identify the scientific and programmatic implications of SIFs for PWID and their communities

Background

Persons who inject drugs (PWID) are at increased risk for infection with HIV, Hepatitis B virus (HBV), and Hepatitis C virus (HCV).

- In the United States ~ 9-16% of PWID have HIV, 2% in Australia, and 10% in the Netherlands.¹
 - Prevalence of Hepatitis C (HCV) is highest among PWID.²
 - Drug overdoses have increased five – fold in the past decade in the U.S.³
 - PWID suffer higher mortality rates due to overdoses.⁴
 - Public injection is common and constitutes a public nuisance.⁵
 - PWID attendance at shooting galleries remain high.⁶
- Australia, Canada, Germany, Luxemburg, Netherlands, Norway, Spain, and Switzerland have established safer injection facilities (SIFs) to reduce risk for HIV, HBV, and HCV and improve health outcomes for PWIDs.



Role of Safer Injection Facilities (SIFs)

- SIFs are sites that provide PWID with a clean injection environment and sterile syringes and drug- preparation equipment.
- SIFs have on-site health care services and emergency care.
- SIFs aim to reduce public injection and risk of infection with HIV, HBV, HCV, other infections, and drug overdose mortality.
- SIF management and staff do not provide the drugs or assist with injection. PWID buy the drugs outside SIFs.
- SIFs serve high risk PWID who are addicted to injecting heroine, cocaine, methamphetamine, or “speedball” (heroin and cocaine combined).

Methods

- We searched PubMed, EMBASE, and PsycInfo for SIF evaluations.
- We reviewed and summarized findings from studies.
- We appraised programmatic implications of SIFs as identified in the literature.

Results:

Educational and Behavioral Outcomes

Authors	Year	Location	Population	Study Design	Findings/Conclusions
Wood, et al. ⁷	2005	Vancouver, Canada	SIF clients enrolled in the Scientific Evaluation of Supervised Injecting (SEOSI)	Prospective cohort	33.5% of SIF users received safer injection education
Kerr, et al. ⁸	2005	Vancouver, Canada	PWID enrolled in the Vancouver Injection Drug Users Study	Cross-sectional	SIF use is independently associated with reduced syringe sharing (AOR=0.30, [0.11-0.82], p<0.02)
Petrar, et al. ⁹	2007	Vancouver, Canada	SIF clients	Cross-sectional	75% reported change in their injecting behavior as a result of SIF use 80% report less rushed injecting; 73% report less outdoor injecting; 56% report less unsafe disposal of needles Consistent SIF use is associated with less often reusing syringes (OR=2.16, [1.48-3.16], p<0.001); less rushed during injection (OR=2.84, [2.14-4.02], p<0.001); less injecting outdoors (OR=2.99, [2.13-4.21], p<0.001); using clean water for injecting (OR=0.15, [0.26-0.89], p<0.001); cooking or filtering drugs prior to injecting (OR=3.02, [2.03-4.49], p<0.001); tying off prior to injection (OR=2.18, [1.70-4.64], p<0.001); safer disposal of syringes (OR=2.22, [1.54-3.20], p<0.001); easier finding a vein (OR=2.78, [1.99-4.10], p<0.001); and injecting in a clean place (OR=3.00, [2.22-4.06], p<0.001)
Stoltz, et al. ¹⁰	2007	Vancouver, Canada	SIF clients	Cross-sectional	46.6% of SIF users received safer injection education SIF users receiving safer injection education were previously at higher risk of injection-related harm Over time the SIF environment promotes the adoption of safer injecting practices within and outside the SIF
Wood, et al. ¹¹	2008	Vancouver, Canada	SIF clients enrolled in the SEOSI	Prospective cohort	84% of those who received a referral attended the referred service Those living in unstable living accommodations and were HCV positive serostatus were twice as likely to receive a brokerage referral to drug treatment 1/3 of those who received a drug treatment referral had not previously accessed any form of drug treatment 43% of clients had injected in public in the month prior to registration
Fast, et al. ¹²	2008	Vancouver, Canada	SIF clients enrolled in the SEOSI	Cross-sectional	SIF users are more often regular injectors (OR = 4.8, [2.7-8.8]), speedball users (OR=2.5, [1.3-4.3]) and anti-HCV positive (OR=3.1, [1.4-7.1])
Bravo, et al. ¹³	2009	Madrid and Barcelona, Spain	Young heroin drug injectors enrolled in the ITINERE study	Cross-sectional	SIF use is independently associated with not borrowing used syringes (OR=3.3, [1.4-7.7])

Canada (Vancouver)

- One-third of SIF users received safe injection education from SIF staff members during one year of service (Wood et al., 2005c, 2008b).
- 75% of SIF users adopted safer injection practices outside of the SIF (Petrar et al., 2007).

Spain (Madrid and Barcelona)

- Use of SIFs was associated independently with higher likelihood of not borrowing used syringes (OR = 3.3, 95% CI: 1.4–7.7)(Bravo et al., 2009).

Health Outcomes (1)

Authors	Year	Location	Population	Study Design	Findings/Conclusions
Salmon, et al.	2007	Sydney, Australia	SIF clients enrolled in the MSC Client Survey and the Australian NPS Survey	Cross-sectional and Prospective cohort	84% of those who received a referral attended the referred service Those living in unstable living accommodations and were HCV positive serostatus were twice as likely to receive a brokerage referral to drug treatment 1/3 of those who received a drug treatment referral had not previously accessed any form of drug treatment 43% of clients had injected in public in the month prior to registration
Salmon, et al.	2010	Sydney, Australia	Suspected opioid-related overdoses attended by an ambulance	Ecological study	68% decrease in ambulance serviced opioid-related overdoses in SIF district compared to 61% ambulance serviced opioid-related overdoses outside the district (z = 9.62, p-value = 0.002)
Kimber, et al.	2009	European SIFs	European SIFs	Cross-sectional	No overdose deaths occurred at SIF and low rate of non-fatal overdoses (range from 1 to 36 per 10,000 visits)

National centres in HIV epidemiology and clinical research, Report no. 3, Sydney, UNODC
Salmon A.M., van Beek L, Arora J, Kaldor L, Maher L. (2010). The impact of supervised injecting facilities on ambulance call-outs in Sydney, Australia. *Addiction* 105, 496-498.

Kimber, A., Doherty, K., Winstock, A., (2009). Survey of drug consumption rooms: service delivery and perceived public health and amenity impact. *Drug and Alcohol Review* 24, 21-24.

Salmon, A., Maher, L., Kaldor, L., et al., (2007). Systemic Healthily Supervised Injecting Centres: Interim Evaluation.

Health Outcomes (2)

Authors	Year	Location	Population	Study Design	Findings/Conclusions
Wood, et al. ¹⁴	2006	Vancouver, Canada	SIF clients enrolled in the Scientific Evaluation of Supervised Injecting (SEOSI)	Cross-sectional	18 percent of SIF users began a detoxification program during the 364 day follow-up Entry into detoxification program is independently associated with SIF use (adjusted relative hazard)=1.72, [1.25-2.38], p=0.001 and contact with the facility's addiction counselor (AOR)=1.98, [1.26-3.10], p=0.003
Kerr, et al. ¹⁵	2007	Vancouver, Canada	SIF clients enrolled in the SEOSI	Cross-sectional	Prevent overdose deaths and manage overdose emergencies
Small, et al. ¹⁶	2008	Vancouver, Canada	SIF clients enrolled in the SEOSI	Cross-sectional	SIF provides access to health care and social services SIF effectively manage injection-related infections
Milloy, et al. ¹⁷	2008	Vancouver, Canada	SIF clients	Cross-sectional	SIF use was not associated with non-fatal overdose (OR=1.05, p=0.73) Between 8 and 51 overdose deaths were averted by SIF between 2004 and 2006
Pinkerton, et al. ¹⁸	2009	Vancouver, Canada	Projected HIV incidence	Mathematical Modeling	SIF prevented an estimated 83.5 cases of HIV
Andresen and Boyd ¹⁹	2010	Vancouver, Canada	Projected HIV incidence and mortality	Mathematical Modeling	SIF prevented an estimated 35 cases of HIV and avoided 3 deaths
DeBeck, et al. ²⁰	2011	Vancouver, Canada	SIF clients	Cross-sectional	Initiation of addiction treatment is independently associated with regular SIF use (adjusted hazard ratio [AHR]=1.33 [1.04-1.72]) and having contact with the SIF addiction counselor (AHR)=1.54 [1.13-2.08])

Canada (Vancouver)

- Weekly use of SIF including contact with SIFs addiction counselors was associated with a more rapid entry into detoxification programs (Wood et al., 2006b).

Australia (Sydney)

- Following the opening of the SIF in Sydney, there was a 68% decrease in the average monthly number of ambulance attendances in its vicinity (Salmon et al., 2010).

Germany (Hamburg, Frankfurt, Hanover, and Saarbrücken), Netherlands (Apeldoorn and Rotterdam), Spain (Madrid), and Switzerland (Basel, Bern, Solothurn, and Schaffhausen)

- No fatal overdoses were reported.
- A majority of respondents perceived that the SIF contributed to a reduction in overdose deaths and events (Kimber et al., 2005).

Community Outcomes

Authors	Year	Location	Population	Study Design	Findings/Conclusions
Wood, et al. ²¹	2004	Vancouver, Canada	PWID in Vancouver	Prospective cohort	SIF establishment is independently associated with reductions in the number of drug users injecting in public (p < 0.001), publicly discarded syringes (p < 0.001) and injection-related litter (p < 0.001). No increase in drug acquisition crime, rates of new IDUs or relapse
Petrar, et al. ⁹	2007	Vancouver, Canada	SIF clients	Cross-sectional	71% indicated that the SIF has led to less outdoor injecting 56% reported less unsafe syringe disposal
DeBeck, et al. ²²	2008	Vancouver, Canada	SIF clients enrolled in the Scientific Evaluation of Supervised Injecting (SEOSI)	Cross-sectional	16.7% of clients reported having been referred to the SIF by the local police 2% learned about the SIF from police Police referral is associated with less work (AOR=1.80, [1.28-2.53]), daily cocaine injection (AOR)=1.54, [1.14-2.08]), and unsafe syringe disposal (AOR)=1.46, [1.00-2.11])
Fairbairn, et al. ²³	2008	Vancouver, Canada	SIF clients enrolled in the SEOSI	Cross-sectional	SIFs provide refuge for women from violence and gendered norms that shape drug preparation and consumption practices
Zurhold, et al. ²⁴	2003	Hamburg, Germany	Drug users, staff members of the CRs, and representatives from the community (neighborhood residents, business people, police, and politicians)	Cross-sectional	SIFs reach the target group of drug users who practice risky behaviors and engage in public drug use SIFs played an important role in the reduction of public disturbances in the vicinity of open drug scenes
Hedrich, et al. ²⁵	2004	European SIFs	N/A	Literature review	SIFs reach the targeted population of long-term addicts, street injectors, homeless drug users, and drug-using sex workers SIFs reduce public injection SIFs have greater impact where there is a political consensus as part of a comprehensive local demand reduction strategy There is no evidence that the operation of a SIF results in a decrease or increase in the number of improperly discarded syringes and needles

Community Outcomes

Canada (Vancouver)

- The neighborhoods around the SIF exhibited decreased public injection and litter (Wood et al., 2004a, 2006a).
- SIFs use was associated with reduced risk for violence against women who inject drugs (Fairbairn et al., 2008).

Germany (Hamburg)

- SIFs have become important alternatives to public drug use.
- Since the opening of the SIFs, public drug use has noticeably decreased (Zurhold et al., 2003).

European SIFs

- SIFs reached older, long-term users some of whom have had no previous contact with substance abuse treatment.
- SIFs attracted particularly PWID who are difficult to reach.
- SIFs suggested that they do not encourage initiation of naive users into injecting drugs (Hedrich et al., 2004).

Estimated Economic Outcomes

Authors	Year	Location	Population	Study Design	Findings/Conclusions
Bayoumi and Zaric	2008	Vancouver, Canada	Simulated population of PWIDs and persons with HIV and HCV	Mathematical modeling	SIF establishment associated with an incremental net savings of ~\$14 million and 920 life-years gained over 10 yrs. SIF establishment and health benefits of SIFs are associated with an incremental net savings of > \$18 million and 1978 life-years gained over 10 yrs. SIF establishment provides a societal benefit in excess of \$6 million per year (after the programme costs)
Andresen and Boyd	2010	Vancouver, Canada	Simulated population of persons with HIV and HCV	Mathematical modeling	SIFs provide an average benefit-cost ratio of 5:1
Pinkerton, et al.	2010	Vancouver, Canada	Simulated population of PWIDs and persons with HIV	Mathematical modeling	SIF saves \$17.6 million in life-time HIV-related medical care costs Savings greatly exceeds in-site operating costs of ~\$3 million per year.

Bayoumi, A.M., Zaric, G.S., 2008. The cost-effectiveness of Vancouver's supervised injection facility. *CMAJ* 179, 1143-1151.

Andresen, M.A., Boyd, N., 2010. A cost-benefit and cost-effectiveness analysis of Vancouver's supervised injection facility. *Int. J. Drug Policy* 21, 70-76.

Pinkerton, S.D., 2010. Vancouver Canada's supervised injection facility cost-savings? *Addiction* 105 (8), 1429-1436.

Canada (Vancouver)

- SIF prevents 35 new cases of HIV and 3 overdose deaths annually, furnishing a societal benefit in excess of CDN \$6 million annually (after accounting for the estimated annual program cost of CDN\$1.5million), and providing an average benefit-cost ratio of 5:1(Andresen and Boyd, 2010).
- SIF was cost-effective by saving CDN \$18 million and 1175 life-years during 10 years, through averting 1517 HIV infections and 68 HCV infections (Bayoumi and Zaric, 2008).

Programmatic Concerns and Solutions

Identification of Concerns	Minimization of Concern
Risks to privacy and confidentiality of SIF users (i.e. protection from losing job, social stigmatization, isolation, criminalization)	Implement procedures and protocols to protect unique identifiers and maintain confidentiality of data
Community beliefs that SIFs: Encourage risky behavior Negatively impact public order Suggest that the society condones drug use	Effectively communicate data from evaluation studies that disprove common myths about SIFs Communicate that the goal of SIFs is to provide secondary prevention to decrease individual and public harm
Negative attitudes towards PWID or the belief that PWID are not deserving of SIF services	Partner with health care providers to decrease stigmatization and disprove misguided beliefs about PWID Engage in a discussion of human rights, medical ethics, social justice and research evidence with the public
U.S. Federal Controlled Substances Act may be interpreted to ban SIFs	Adopt strategies (community consultations, public and political engagement, and program piloting) used in other developed countries to ensure that SIFs are legal and safe to protect the interests of PWID and SIF staff
Belief that funding is better spent on prevention or treating injection drug use (DI)	SIFs are proven to be cost-saving and cost-effective. SIFs provide access to resources for drug treatment and addiction counseling
SIFs may replace other secondary prevention programs (i.e. SIFs, pharmacy non-prescription sale of injection equipment, safe disposal programs, and community overdose prevention programs) SIFs may further marginalize PWID	While SIFs provide unique and comprehensive services, other secondary prevention programs remain crucial to harm reduction initiatives; These programs complement SIF services Work to integrate SIF services into other public health programs

- PWID need to be aware of SIF services, have access to the SIFs in their area, and find them to be an acceptable option.

- Results showed that 85% of PWID in San Francisco would use a SIF, if made available;⁵ 93% of PWID who inject in public in New York City would use a SIF, if made available.²⁶

- SIFs need to be established in public settings that are easily accessible by PWID (e.g., via public transport).

- SIFs need to target high-risk PWID who need SIF services:

- PWID who inject in public, are homeless, are at risk of overdose, work in the sex industry, engage in frequent or unsafe injecting behaviors, at high risk of viral or bacterial infections, or are part of a high-risk network.

- SIFs must serve those who do not have access to other prevention programs.

- SIFs capacity and coverage need to meet the needs of PWID as indicated by local epidemiological data.

- SIFs in Europe, Australia, and Canada provide sufficient evidence for the public health benefits, cost-benefit, and cost-effectiveness of SIFs.

- SIFs provide an environment for PWID to safely inject pre-obtained drugs to reduce blood-borne and bacterial infections and overdose mortality.

- SIFs provide settings and interventions that support safer behaviors.

Programmatic and Scientific Implications

- SIFs provide benefits to local communities by reducing public injection, nuisance, and unsafe disposal of needles.

- Local evaluation studies are needed to assess operational aspects, effectiveness and cost-effectiveness of SIFs for PWID and their communities.

- More rigorous studies are needed to assess long-term benefits.

Conclusions

- PWID are disproportionately infected with HIV, HBV, and HCV and affected by overdose mortality.
- PWID often lack sufficient access to public health services.
- SIFs offer unique and complementary services to meet the needs of high-risk and underserved PWIDs.
- SIFs are worthy of serious consideration by public health providers and policy makers.

References

- R.P., for the 2007 Reference Group to the UN on HIV and Injecting Drug Use, 2008. Global epidemiology of injecting drug use and HIV among people who inject drugs: a systematic review. *Lancet* 372, 1733-1745.
- Institute of Medicine, 2010. Hepatitis and liver cancer: a national strategy for prevention and control of hepatitis B and C. Institute of Medicine, Washington, DC. <http://www.nap.edu/catalog/12793.html> (accessed 1/21/2011).
- Centers for Disease Control and Prevention, 2010. Unintentional drug poisoning in the United States (Announcements: release of issue brief). *MMWR Morb. Mortal. Wkly Rep.* 59, 300-301.
- Degenhardt, L., Bucello, C., Mathers, B., Briegleb, C., Ali, H., Hickman, M., McLaren, J., 2010a. Mortality among regular or dependent users of heroin and other opioids: a systematic review and meta-analysis of cohort studies. *Addiction* 106, 32-51.
- Kral, A., Wenger, L., Carpenter, L., Wood, E., Kerr, T., Bourgois, P., 2010. Acceptability of a safer injection facility among injection drug users in San Francisco. *Drug Alcohol Depend.* 110, 160-163.
- Williams, C.T., Metzger, D.S., 2010. Race and distance effects on regular syringe exchange program use and injection risks: a geobehavioral analysis. *Am. J. Public Health* 100, 1068-1074.
- Wood, E., Tyndall, M.W., Li, K., Lloyd-Smith, E., Small, W., Montaner, J.S.G., Kerr, T., 2005. Do supervised injecting facilities attract higher-risk injection drug users? *Am. J. Prev. Med.* 29, 126-130.
- Kerr, T., Tyndall, M., Li, K., Montaner, J., Wood, E., 2005. Safer injection facility use and syringe sharing in injection drug users. *Lancet* 366, 316-318.
- Petrar, S., Kerr, T., Tyndall, M.W., Zhang, R., Montaner, J.S., Wood, E., 2007. Injection drug users' perceptions regarding use of a medically supervised safer injection facility. *Addict. Behav.* 32 (5), 1088-1093.
- Stoltz, J.A., Wood, E., Small, W., Li, K., Tyndall, M., Montaner, J., Kerr, T., 2007. Changes in injecting practices associated with the use of a medically supervised safer injection facility. *J. Public Health (Oxf.)* 29, 35-39.
- Wood, R.A., Wood, E., Lai, C., Tyndall, M.W., Montaner, J.S., Kerr, T., 2008b. Nurse-delivered safer injection education among a cohort of injection drug users: evidence from the evaluation of Vancouver's supervised injection facility. *Int. J. Drug Policy* 19, 183-188.
- Fast, D., Small, W., Wood, E., Kerr, T., 2008. The perspectives of injection drug users regarding safer injecting education delivered through a supervised injecting facility. *Harm Reduct. J.* 5, 32.
- Bravo, M.J., Royuela, L., de la Fuente, L., Brugal, M.T., Barrio, G., Domingo-Salvany, A., The Itinere Project Group, 2009. Use of supervised injection facilities and injection risk behaviors among young drug injectors. *Addiction* 104, 614-619.
- Wood, E., Tyndall, M.W., Zhang, R., Stoltz, J.A., Lai, C., Montaner, J.S., Kerr, T., 2006b. Attendance at supervised injecting facilities and use of detoxification services. *N. Eng. J. Med.* 354, 2512-2514.
- Kerr, T., Small, W., Moore, D., Wood, E., 2007b. A micro-environmental intervention to reduce the harms associated with drug-related overdose: evidence from the evaluation of Vancouver's safer injection facility. *Int. J. Drug Policy* 18, 37-45.
- Small, W., Wood, E., Lloyd-Smith, E., Tyndall, M., Kerr, T., 2008. Accessing care for injection-related infections through a medically supervised injecting facility: a qualitative study. *Drug Alcohol Depend.* 98, 159-162.
- Milloy, M.J.S., Kerr, T., Mathias, R., Zhang, R., Montaner, J.S., Tyndall, M., Wood, E., 2008. Non-fatal overdose among a cohort of active injection drug users recruited from a supervised injection facility. *Am. J. Drug Alcohol Abuse* 34, 499-509.
- Pinkerton, S.D., 2010. Is Vancouver Canada's supervised injection facility cost-savings? *Addiction* 105 (8), 1429-1436.
- Andresen, M.A., Boyd, N., 2010. A cost-benefit and cost-effectiveness analysis of Vancouver's supervised injection facility. *Int. J. Drug Policy* 21, 70-76.
- DeBeck, K., Kerr, T., Bird, L., Zhang, R., Marsh, D., Tyndall, M., Montaner, J., Wood, E., 2011. Injection drug use cessation and use of North America's first medically supervised safer injecting facility. *Drug Alcohol Depend.* 113, 172-176.
- Wood, E., Kerr, T., Small, W., et al. 2004. Changes in public order after the opening of a medically supervised safer injecting facility for illicit injection drug users. *CMAJ* 171(7):731-4.
- DeBeck, K., Wood, E., Zhang, R., Tyndall, M., Montaner, J., Kerr, T., 2008. Police and public health partnerships: evidence from the evaluation of Vancouver's supervised injection facility. *Subst. Abuse Treat. Prev. Policy* 3, 11.
- Fairbairn, N., Small, W., Shannon, K., Wood, E., Kerr, T., 2008. Seeking refuge from violence in street-based drug scenes: women's experiences in North America's first supervised injection facility. *Soc. Sci. Med.* 7, 817-823.
- Zurhold, H., Degkwitz, P., Verthein, U., Haasen, C., 2003. Drug consumption rooms in Hamburg, Germany: evaluation of the effects on harm reduction and the reduction of public nuisance. *J. Drug Issues* 33, 663-688.
- Hedrich, D., 2004. European report on drug consumption rooms. European Monitoring Centre for Drugs and Drug Addiction. <http://emcdda.europa.eu/> (accessed Dec 18, 2010), pp. 1-96.
- Broadhead, R.S., Borch, C.A., van Hulst, Y., Farrell, J., Villemze, W.J., Altice, F.L., 2003. Safer injection sites in New York City: a utilization survey of injection drug users. *J. Drug Issues* 33, 733-750.

