The cost-effectiveness of Vancouver's supervised injection facility

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Canadian Medical Association Journal
From Canadian Reference Centre database

Abstract

Background: The cost–effectiveness of Canada's only supervised injection facility has not been rigorously evaluated. We estimated the impact of the facility on survival, rates of HIV and hepatitis C virus infection, referral to methadone maintenance treatment and associated costs.

Methods: We simulated the population of Vancouver, British Columbia, including injection drug users and persons infected with HIV and hepatitis C virus. The model used a time horizon of 10 years and the perspective of the health care system. We compared the situation of the supervised injection facility with one that had no facility but that had other interventions, such as needle–exchange programs. The effects considered were decreased needle sharing, increased use of safe injection practices and increased referral to methadone maintenance treatment.

Results: Focusing on the base assumption of decreased needle sharing as the only effect of the supervised injection facility, we found that the facility was associated with an incremental net savings of almost $14 million and 920 life–years gained over 10 years. When we also considered the health effect of increased use of safe injection practices, the incremental net savings increased to more than $20 million and the number of life–years gained to 1070. Further increases were estimated when we considered all 3 health benefits: the incremental net savings was more than $18 million and the number of life–years gained 1175.

Interpretation: Vancouver’s supervised injection site is associated with improved health and cost savings, even with conservative estimates of efficacy.

Supervised injection sites offer a safe and hygienic environment for people to inject their previously obtained illicit drugs under supervision.1,2 Observational studies from the facility in Vancouver, British Columbia, have demonstrated positive effects: a decrease in needle sharing and reuse of syringes, fewer people injecting drugs in public, an increase in referrals to social services and addiction counselling, a decrease in the number of publicly discarded syringes, no apparent increase in police reports of drug dealing or crime, and no observed increase in new initiates into drug use.3–5 Although an expert advisory committee recently concluded that the Vancouver facility has beneficial effects, prominent law enforcement groups have argued that the resources allocated to the facility would be more effectively spent elsewhere.6,7

We used computer simulation to estimate the projected impact of Vancouver’s supervised injection site on survival, rates of HIV and hepatitis C virus infection, referral to methadone maintenance treatment and associated costs. Our goal was to assess the cost–effectiveness of the facility and thus provide important insights into this policy debate.
Results

Effect on the population

Our model estimated that the prevalence of HIV and hepatitis C virus infections among injection drug users would continue to increase (Figure 1). The model also estimated that, with the introduction of the supervised injection facility, the size of the population of injection drug users would increase owing to fewer HIV and hepatitis C virus infections and reduced associated mortality. We calculated that, over the 10-year time horizon, 1191 cases of HIV infection and 54 cases of hepatitis C virus infection would be averted with the introduction of the facility.

Figure 1: Projected change in the prevalence of HIV (top) and hepatitis C virus (bottom) infection among injection drug users in Vancouver with and without the supervised injection facility.

Cost-effectiveness of the supervised injection facility

When we considered decreased needle sharing as the only effect of using the facility, the net costs of treatment of hepatitis C virus infection and of methadone maintenance treatment were higher with the supervised injection facility than with no such facility. The net costs of HIV-related treatment were lower with the facility than without such a facility. The net cost was negative, which indicated that the facility both saved money and improved life expectancy.

When we also considered increased use of safer injection practices and increased referrals to methadone maintenance treatment as effects of using the facility, the cost savings and health benefits associated with the facility were even greater.

For comparability with other analyses, we examined the ratio of costs of operating the facility to the number of cases of HIV and hepatitis C virus infections averted over 10 years. The estimates of the undiscounted cost per case averted were $20,100 for HIV infection and $444,500 for hepatitis C virus infection.

Interpretation

We evaluated the cost-effectiveness of Vancouver’s supervised injection facility and estimated the number of cases of HIV and hepatitis C virus infections that could be averted owing to decreased needle sharing, safer injecting practices and increased referral to methadone maintenance treatment. Our estimate for the base assumption — that decreased needle sharing would be the only effect of the facility — was conservative. On the basis of that assumption, we calculated that the use of the facility would be associated with improved survival and fewer net costs. When we incorporated the other 2 treatment effects, the facility was even more economically attractive. We found that there would be potential cost savings even if a relatively low percentage of injection drug users were to use the facility. Our estimate compares favourably
with those associated with other health care interventions.\textsuperscript{51,52} For context, estimates of the cost–effectiveness of methadone maintenance treatment range from about $5,000 to $20,000 per life–year gained.\textsuperscript{18,53}

The prime determinant of cost–effectiveness in our model was the number of HIV infections averted through decreased needle sharing. When the average number of injections was low or high, the facility was less economically attractive. If the number was low, too few transmissions would occur to make the intervention worthwhile. If the number was high, the risk of transmission would be so high that the facility's impact would be minimal. Sexual transmission of HIV and transmission of hepatitis C virus made relatively minor contributions. One limitation of our model is that we did not include an extended time frame beyond 10 years. Thus, we did not fully account for future costs, which may be particularly important when considering HIV–related therapy. Our finding of a cost of $20 100 per case of HIV infection averted may be instructive in this regard, since the lifetime costs of direct HIV–related care exceeds this estimate, by a factor of about 10.\textsuperscript{54}

Supervised injection facilities exist in over 2 dozen cities in Europe and Australia.\textsuperscript{55–57} An economic evaluation of the safe injection facility in Sydney, Australia, used a cost–benefit approach and estimated that the ratio of benefits to costs may not be favourable at start–up but would probably become so in the future.\textsuperscript{58} A previous analysis of Vancouver's facility indicated a favourable cost–benefit ratio and a cost of $52 000–$155 000 per case of HIV infection averted, which is considerably higher than our estimate.\textsuperscript{6} However, that analysis used a simpler model than ours, it focused solely on cases of HIV infection averted, and it did not account for dynamic transmissions in an epidemic model.

In our base analysis, the prevalence of HIV infection among injection drug users continued to increase over time. This reflected how the incidence of new cases of HIV infection in this population exceeded mortality with combination antiretroviral therapy. The prevalence of HIV infection also increased, although at a reduced rate, when the introduction of the supervised injection facility was considered in the model. The same was true for the prevalence of hepatitis C virus infection. In reality, however, the difference in rates with and without the facility will not be observed, because the "no facility" scenario does not exist in Vancouver. Thus, expecting the prevalence of HIV or hepatitis C virus infection to fall relative to historical controls is too stringent a criterion for evaluating effectiveness. More generally, our observations indicate the challenge of evaluating an intervention without a contemporary control group and underscore the importance of considering intermediate outcomes, such as temporal trends in injecting practices, alongside epidemiologic data.

**Conclusion**

Our analysis indicates that the supervised injection facility in Vancouver is associated with improved health outcomes. These health benefits and cost savings are due in large part to averted cases of HIV infection, even with conservative estimates of efficacy.