International Journal of Drug Policy 21 (2010) 70–76

Contents lists available at ScienceDirect

International Journal of Drug Policy

journal homepage: www.elsevier.com/locate/drugpo

Policy Analysis

A cost-benefit and cost-effectiveness analysis of Vancouver's supervised injection facility

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ARTICLE INFO

Article history:
Received 2 June 2008
Received in revised form 27 January 2009
Accepted 27 March 2009

Keywords:
Supervised injection facility
Insite
Cost-benefit analysis

ABSTRACT

Background: A supervised injection facility (SIF) has been established in North America: Insite, in Vancouver, British Columbia. The purpose of this paper is to conduct a cost-effectiveness and cost-benefit analysis of this SIF using secondary data gathered and analysed in 2008. In using these data we seek to determine whether the facility's prevention of infections and deaths among injecting drug users (IDUs) is of greater or lesser economic cost than the cost involved in providing this service – Insite – to this community.

Methods: Mathematical modelling is used to estimate the number of new HIV infections and deaths prevented each year. We use the number of these new HIV infections and deaths prevented, in conjunction with estimated lifetime public health care costs of a new HIV infection, and the value of a life, in order to calculate an identifiable portion of the societal benefits of Insite. The annual costs of operating the SIF are used to measure the social costs of Insite. In using this information, we calculate cost-effectiveness and benefit-cost ratios for the SIF.

Results: Through the use of conservative estimates, Vancouver's SIF, Insite, on average, prevents 35 new cases of HIV and almost 3 deaths each year. This provides a societal benefit in excess of $6 million per year after the programme costs are taken into account, translating into an average benefit-cost ratio of 5.12:1.

Conclusion: Vancouver's SIF appears to be an effective and efficient use of public health care resources, based on a modelling study of only two specific and measurable benefits—HIV infection and overdose death.

Introduction

Some uses of illicit drugs are causing many nation-states to reconsider previously accepted principles of public health. With injectable use of illicit drugs and often corresponding life-threatening diseases (HIV/AIDS and hepatitis B/C), the question of whether or not state health care should create programmes for the safer provision of drugs and related materials to drug users (needles/syringes, cleaning kits, condoms, etc.) has emerged.

The possibilities in this realm range from needle/syringe exchange programmes (NEPs), to medically prescribed drug substitution, and, more recently, to the provision of supervised injection or consumption facilities. However, the provision of drugs and related materials faces a number of challenges. If the state health care system provides illicit drugs and/or materials to facilitate drug consumption, some critics argue that drug use may increase. This increase may occur through the recruitment of new IDUs and/or the increasing usage of existing IDUs, leading to a greater level of drug use in the communities that provide such services. There is, however, no evidence of such increases occurring where governments have established these programmes (Des Jarlais, Friedman, Choopanya, Vanichsenis, & Ward, 1992; Lurie et al., 1993; Vlahov & Junge, 1998; Watters, Estilo, Clark, & Lorvick, 1994).

Additionally, some argue that these programmes may be in direct violation of state and/or federal laws: the possession of a needle/syringe without a prescription is illegal in a number of U.S. states (Kaplan & O'Keefe, 1993). In the case of SIFs, exemptions from state and/or federal law may be required for operation. For example, the Vancouver SIF, Insite, currently has such an exemption from Canada's Controlled Drugs and Substances Act (Vancouver Coastal Health, 2007), allowing users to consume at a specific location without arrest. The British Columbia Supreme Court recently ruled that Insite should remain open (PHS Community Services v. Attorney General of Canada, BCSC, 2008). Irrespective of this finding, however, the legal operation of these programmes may be considered state-sanctioned illicit drug use, considered unacceptable by some governments.

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doi:10.1016/j.drugpo.2009.03.004

Many of the issues raised by these kinds of programmes cannot be resolved in this article, but there remains one issue that can be addressed: whether or not a SIF creates a net economic benefit for society. This kind of programme may be a benefit for illicit drug users, but public funds are not always able to be allocated simply because one group within the larger population benefits from that programme. Scarce resources in public health care must be allocated based on some form of economic efficiency. For example, given the choice between two alternative programmes for responding to illicit drug use, and assuming that health outcomes are the same for each programme, the programme with the least cost should be chosen.

If the net benefit to society from Insite is positive, then we may consider SIFs one of the many public health care options for IDUs. To date, there have been no published cost-effectiveness or cost-benefit analyses of SIFs. This article provides the first such evaluation of Vancouver's SIF, Insite. The SIF in Vancouver opened in September of 2003. This facility is the first SIF in North America, located in Vancouver's Downtown Eastside, an area known for its high incidence of HIV infection. This urban neighbourhood is the most impoverished in Canada, with an IDU population estimated at 5000 (Wood et al., 2006). We calculate the number of new HIV infections and deaths prevented using mathematical modelling and secondary data. The dollar costs of illness and deaths avoided are calculated and compared to the operational costs of Insite.

Methods

In order to perform a cost-benefit and cost-effectiveness analysis of Vancouver's SIF, there are a number of methodological issues that must be considered: operational costs of the facility, the number of HIV infections and overdose deaths prevented, the costs of treating HIV infections, and the economic value placed on the deaths prevented. Where possible, numbers specific to Vancouver are used in the analysis, but when these are not available, numbers widely used in the medical and public health literatures are employed. We chose to employ conservative parameter values, in order to calculate the lower bound of benefits in all cases. We do undertake a sensitivity analysis, however, through employing the different mathematical models found within the existing literature.

The operational costs of Insite

The annual operational cost (2007) of the SIF portion of Insite has been cited as $1.5 million (CTV News, 2008, an interview of Dr. Thomas Kerr, Principal Investigator, Insite). Operational costs of Insite have also been set at $2 million (CBC News, 2003) and $3 million (Health Canada, 2008), but these other cost estimates included such services as addiction counselling and case management, the provision of primary healthcare, public health screening (immunisations and diagnostics), addiction and housing services, education, and peer counselling. We use the $1.5 million figure for two reasons: first, it only considers the operational costs of the SIF portion of Insite; and second, the source is the Principal Investigator contracted by Health Canada to evaluate Insite.

The medical cost of a new HIV infection

The lifetime medical cost of a new HIV infection has been estimated with a large range of values: US$50,000 (Kaplan & O'Keefe, 1993) to US$200,000 (Chen et al., 2006; Holtgrave & Pinkerton, 1997; Pinkerton & Holtgrave, 1998)—details of the breakdown of medical costs are provided in these references. Because the impact of new HIV infections prevented is critical to establish the cost-effectiveness and benefit-cost ratios, the lifetime medical cost of a new HIV infection must be chosen with care. Two further concerns for this analysis must be acknowledged. First, it can be argued that an IDU population is less likely to take full advantage of the medical system, in contrast to an "average" citizen, whether this restraint is self-imposed or not (Laufer, 2001). And second, the lifetime medical costs of treating a new HIV infection may be different in Canada from the United States. In order to address the first concern, more conservative (i.e., lower) lifetime medical costs of a new HIV infection are employed. With regard to the second concern, estimated lifetime medical costs of treating a new HIV infection are obtained from both Canadian and U.S. sources.

There are two cost-benefit analyses in Canada that report lifetime medical costs of new HIV infections. Gold, Gafni, Nelligan, & Millson (1997) use CDN $100,167 (1991 dollars), based on Grover et al. (1993). This estimate uses the expectation of just over 10 years of survival with HIV/AIDS. Jacobs et al. (1999) use CDN $150,000 (1998 dollars) based on Albert and Williams (1998). This latter estimate of the lifetime medical costs of a new HIV infection assumes a 17-year survival with HIV/AIDS. In the U.S., Holtgrave and Pinkerton (1997) and Pinkerton and Holtgrave (1998) estimate an intermediate cost of a new HIV infection (US$195,188) and a low cost (US$87,045). These authors suggest that this latter low cost is appropriate for IDU populations that are expected to use medical resources less intensely than the average citizen. As such, we use this lower figure here. If we convert figures from these studies into 2006 Canadian dollars, the following estimates of lifetime medical costs are: $132,000 (Holtgrave & Pinkerton, 1997), $179,000 (Jacobs et al., 1999), and $154,000 (Gold et al., 1997). We chose to use $150,000, a value slightly lower than the median value, based on an anticipated lower cost treatment of an HIV infection for IDUs.

More recent methods of HIV/AIDS treatment include the very successful multidrug combinations Highly Active Antiretroviral Therapy (HAART). Despite being highly effective, HAART treatment regimens are intensive, and treatment uptake and adherence tends to be poorer among IDUs than other patient groups with HIV infection (Lert & Kazatchkine, 2007). If IDUs do use such a treatment, however, it will obviously produce greater costs than the figure used above: based on a 10 year survival rate, the lifetime cost of HAART per patient was US$160,000 in 2001 (Chen et al., 2006). If we convert this figure into 2006 Canadian dollars, the lifetime medical cost of HAART are calculated at more than $250,000. Though the most recent changes in the Canada–United Stated exchange rate and decreased costs of HAART drugs may have decreased the HAART figure, it is most certainly greater than the $150,000 figure used in the analysis. Accordingly, the lifetime medical cost of a new HIV infection used in the analysis below is considered an underestimate of the actual lifetime medical costs, providing conservative estimates of the benefits from Insite. However, if the reader considers the HAART programme treatment costs more appropriate, the benefit-to-cost ratios reported below should be multiplied by 1.67.

Value of a prevented death

Miller, Cohen, & Wiersema (1996) calculate the value of a prevented death as US $3 million, 1993 dollars–CDN $5 million, 2006 dollars. Approximately one-third of this cost is tangible: lost wages/productivity and medical costs, with the remaining two-thirds lost quality of life. Therefore, if we only consider tangible costs, the value of a prevented death is approximately $1.67 million. Alternatively, considering contingent evaluation employed by Cohen, Rust, Steen, & Tidd (2004), the value of a prevented death is in excess of $10 million. However, one could argue there is little lost productivity or lost wages flowing from an IDU death. In fact, one might argue that such a death would save public health care resources.

This reality raises ethical concerns with respect to the provision of services such as NEPs or SIFs: do we have a real regard for those of