



Critique of *Lancet* study of Vancouver's supervised injection site and overdose: Authors' response

In 2011, our research team at the British Columbia Centre for Excellence in HIV/AIDS—University of British Columbia (Vancouver, Canada) published a study in the medical journal *The Lancet* (Marshall et al., [Reduction in overdose mortality after the opening of North America's first medically supervised safer injecting facility: A retrospective population-based study](#). *Lancet*, 2011; 377(9775): 1429-1437) that demonstrated a 35% reduction in overdose in proximity to Vancouver's supervised injection site following the program's opening. The data presented in the study and the methodological approach used were subjected to extensive scientific peer review. This independent review process confirmed the appropriateness of the data and the methods that we employed. Despite this extensive independent review process, REAL Women of Canada and the Drug Prevention Network of Canada (DPNC) recently commissioned a report that critiqued the study. The report has not been subjected to scientific peer review, nor has it been published in conventional academic format. However, this report was used as the basis of a complaint submitted by Mr. Gary Christian of Drug Free Australia to the University of British Columbia.

As authors of the *Lancet* study, we prepared a response to this report and to the complaint forwarded to the University of British Columbia. The complaint was processed according to established university protocol and externally reviewed by a relevant expert. The complaint was found to be [“without merit and not based on scientific fact”](#) and was dismissed.

We also wish to point out that Mr. Christian and co-authors have used similar strategies to call into question the scientific evaluation of the Sydney (Australia) supervised injection site. These critiques have been reviewed by the relevant authorities and found to be baseless. The Australia Medical Association and the Royal Australasian College of Physicians both rejected similar efforts by Mr. Christian and Drug Free Australia to

dispute the science derived from the evaluation of the Sydney supervised injection site.

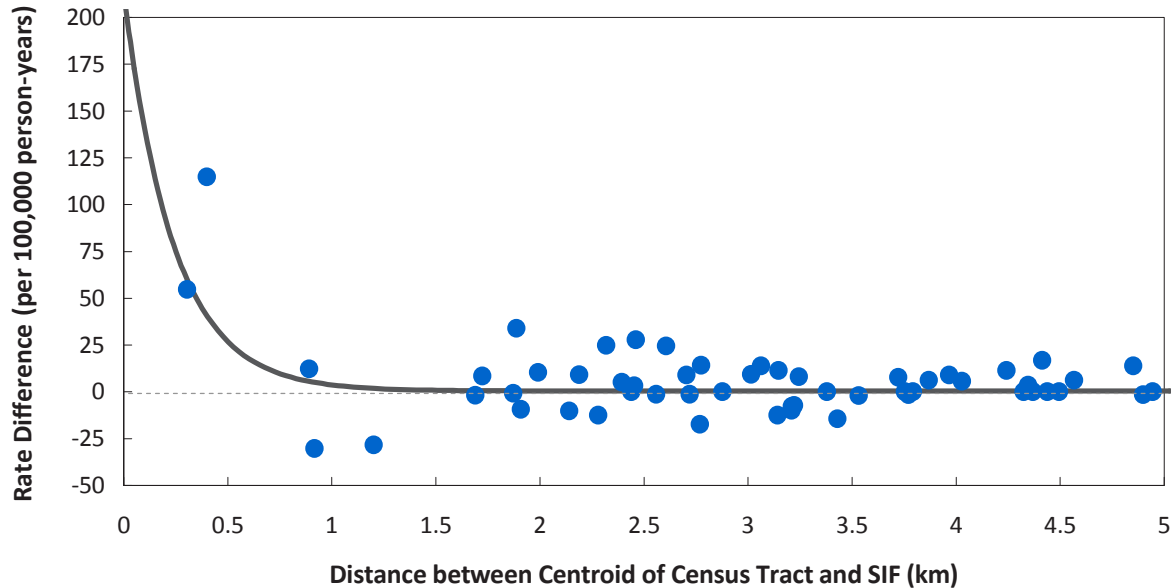
Here, we provide specific responses to points raised by Mr. Christian and co-authors.

1. Trends in overdose deaths: Mr. Christian and colleagues allege that we manipulated data to show that overdose deaths declined in the wake of the opening of Insite (Vancouver's supervised injection site). Using BC Vital Statistics data, they argue that overdose deaths increased rather than decreased during the period considered in our study. This apparent discrepancy is explained by several flaws in their analysis. First, our study in the *Lancet* focused on a defined area of interest in close proximity to Insite that included 41 city blocks, the centroid of each being within 500 metres of the facility. This area was selected on the basis of the high concentration of single-room occupancy hotels in the area and data indicating that 70% of daily Insite users live within this area. Because we hypothesized that Insite would have the biggest effect where most Insite users live, we compared changes in rates of fatal overdose in this concentrated drug use area to changes in rates of overdose in the rest of the City of Vancouver (the control area). However, the data considered in the REAL Women/DPNC report examined the entire Downtown Eastside Local Health Area (LHA)—an area that is much larger and includes approximately 400 city blocks. The problem with this approach is demonstrated in Figure 3 of the *Lancet* study (next page; reproduced with permission), which shows that the largest reduction in overdose deaths was observed in the concentrated drug use area in close proximity to Insite (i.e., within 4 blocks), while the apparent effect of the facility markedly diminishes outside this area.

Crudely considering this much larger 400-block Local Health Area masks the decline in overdoses we observed which, again, was limited to the concentrated drug use area where



Figure 3: Reduction in fatal overdose rates following the opening of Vancouver’s SIF by census tract, January 2001 – December 2005.



Notes: Rate Difference (*RD*) represents the absolute change in fatal overdose rate ($Rate_{pre-SIF} - Rate_{post-SIF}$) prior to and following the opening of the supervised injection facility (SIF) on September 21, 2003. Thus, values greater than one indicate a reduction in the rate during the post-SIF period. Distance (*d*) was measured as the Euclidean shortest path between the centroid of each census tract and the location of the SIF. A nonlinear exponential regression weighted by the total number of overdoses in each census tract was conducted: the best fit (shown in grey) was $RD = 0.40 + 212.4e^{-4.17d}$, ($R^2 = 0.58$).

most Insite users reside. To illustrate the substantial difference in the areas considered by Mr. Christian’s group and our team, we have included a figure (Figure 1, next page) that shows the small area considered in our study (outlined in green) and the Downtown Eastside LHA (outlined in red) that was used in the REAL Women/DPNC report.

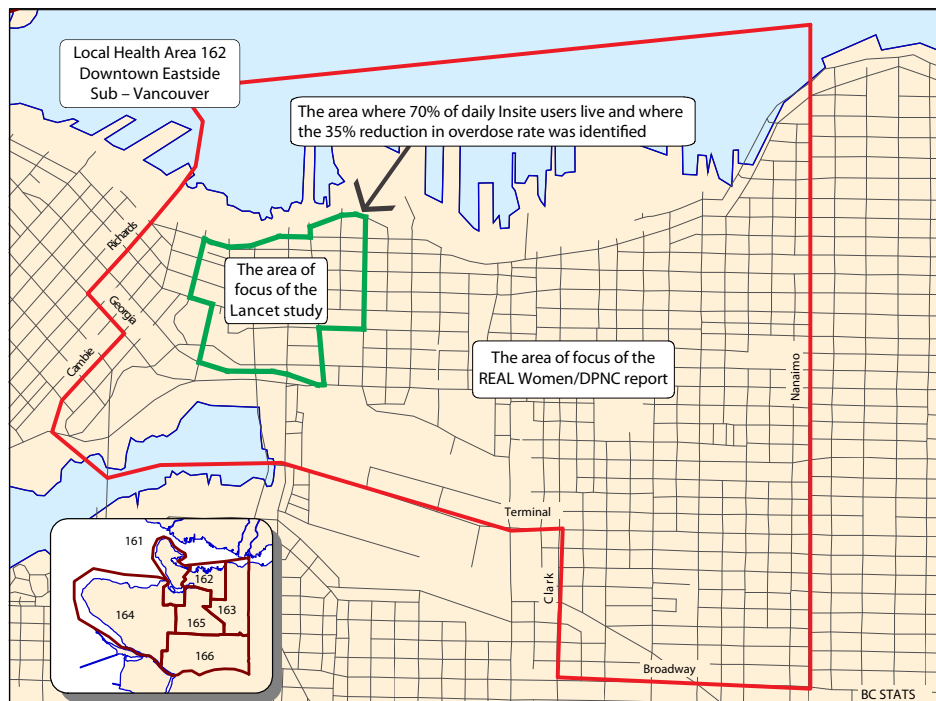
Second, while this issue alone is sufficient to explain the differing findings, another critical methodological issue is that the REAL Women/DPNC report uses crude death counts rather than population-adjusted mortality rates. The adjustment for changes in population size is generally a requirement in any analysis of death rates, given that failure to account for the changing population at risk makes a presentation of the number of deaths very difficult to meaningfully interpret. In

contrast, the *Lancet* study used annual population estimates from Statistics Canada to calculate annual overdose mortality rates. When one considers the much larger geographic area considered in the REAL Women/DPNC report, and the failure of the authors of the report to undertake basic adjustments for the changing population at risk, it is not surprising they found different results.

Lastly, a major strength of the *Lancet* study is the comparison of changes in rates in two adjacent areas. The REAL Women/DPNC critique does not acknowledge that we examined population-adjusted death rates both in proximity to Insite and in the area of Vancouver that is greater than 500 metres from the facility as a quasi-control.



Figure 1. Comparison of geographic regions defined as the area of interest in the *Lancet* article by Marshall *et al.* (outlined in green) versus that referred to by Christian and colleagues (outlined in red, representing the Downtown Eastside Local Health Area).



2. The impact of policing: The REAL Women/DPNC report suggests that a large-scale policing operation may account for the reported decline in overdose deaths in the *Lancet* study, and Mr. Christian alleges that our team was aware of this crackdown and committed an act of omission by failing to mention this crackdown in our study. We are confused by this suggestion for several reasons. First, [documents on the City of Vancouver's website](#) and a [published evaluation of the police crackdown](#) reveal clearly that this policing initiative ended within weeks of Insite's opening and was not ongoing throughout the study period, as the authors of the REAL Women/DPNC report suggest. If this crackdown was the cause of the decline in overdoses after Insite opened, this would imply that: (1) the police crackdown led to an increase in overdose deaths in the area where Insite would later open; and (2) the subsequent decline in overdoses reported in the

Lancet paper occurred because this policing initiative ended. However, various reports and our published study of this crackdown (Wood *et al.*, [Displacement of Canada's largest public illicit drug market in response to a police crackdown](#), *CMAJ*, 2004; 170(10): 1151-1156) demonstrate that this police initiative displaced drug users away from the area where Insite was subsequently located. Hence, it could be argued that the displacement of drug users away from where Insite was located, prior to its opening, could have served to create a conservative bias in the *Lancet* study by reducing overdoses in this geographic area before the facility's opening. This in turn would have made it more difficult to demonstrate a decline in overdose deaths after the facility opened. Second, we also wish to point out that in his effort to describe changes in policing practices, Mr. Christian borrows heavily from an earlier Drug Prevention of Canada report written by his co-author on the



REAL Women/DPNC report, Colin Mangham. It should be noted, however, that the organization that commissioned Dr. Mangham's report, the Royal Canadian Mounted Police, later acknowledged that Dr. Mangham's work "did not meet conventional academic standards." Not surprisingly, Health Canada's Expert Advisory Committee on Supervised Injection Site research chose to ignore Dr. Mangham's report in their review of existing research on supervised injection sites. Further, during a recent Supreme Court of Canada hearing focused on Insite, the lawyers representing the Government of Canada were forced to admit that they did not have any credible research to suggest that Insite was not working (i.e., they did not offer Dr. Mangham's work as evidence).

3. Failure to state the nature of deaths: Mr. Christian alleges that we included deaths that are not relevant to an evaluation of a supervised injecting facility. Below we respond directly to this claim. However, we first wish to point out some problems with the analysis of this issue as presented in the report co-authored by Mr. Christian. The REAL Women/DPNC report uses crude Vital Statistics data, which included all accidental poisonings to define its estimate of overdose deaths, and it did not exclude deaths unlikely to be affected by a supervised injecting facility (e.g., suicides, adverse effects of drugs in therapeutic use). We note that the REAL Women/DPNC critique seeks to call into question the *Lancet* paper's findings using these crude data, and then goes on to argue that the *Lancet* paper's findings cannot be relied upon because they use similarly unrefined death counts. We would argue that you cannot have it both ways. Nevertheless, we acknowledge that determining a cause of overdose death, with certainty, can be difficult. This is particularly true when trying to determine whether an overdose was caused by a particular drug or mode of use. Indeed, there is a vast literature demonstrating that most overdose deaths are the result of poly substance use. We also note that the BC Coroner's records do not routinely indicate the route of consumption, as attending paramedics and other emergency personnel have no way of determining with certainty the cause of death. However, to be absolutely clear, unlike the authors of the REAL Women/DPCN report, we did not use crude data from Vital Statistics, but rather worked closely with the British Columbia Coroner's Office to review toxicology results and

other information contained in death records for all accidental poisonings. These methods are described in detail in the *Lancet* paper. Unlike the approach used in the REAL Women/DPNC critique, our method allowed us to exclude from our analyses all deaths resulting from suicide and other causes that could safely be assumed not to be amenable to change through a supervised injecting facility. Mr. Christian's team's failure to exclude causes of death not amenable to reduction through a supervised injecting facility (e.g., suicides) is another reason for their disparate findings.

Finally, we note that it is possible to select out only those records where injection drug use was noted in the Coroner's case files. When this is done, the reduction in overdose deaths is actually slightly higher. Whereas our report cites a 35% reduction in overdose deaths in the area around Insite, when only those cases where a note in the file suggested that injection drug use was implicated (e.g., a syringe was found near the body of the deceased), the reduction increases to 36%. However, given the limitations in the data noted above, we felt that this type of selection and exclusion based on inconsistently reported data was a less conservative approach. We say this because any misclassification of causes of death would presumably serve to diminish any real effect of the supervised injecting facility, whereas we felt that the alternative (i.e., selecting injecting-related deaths based on incomplete information) could leave us open to criticism that potentially relevant deaths were excluded. Regardless, the above details demonstrate that the reduction in overdose deaths in the area of interest around Insite was not driven by non-injection overdose deaths.

4. The impact of trends in heroin use: The REAL Women/DPNC report includes claims that our group did not acknowledge, in a sufficient manner, changing patterns of heroin use as a possible explanation for the observed decline in overdose deaths. This is false. On page 1434 of our study, we state:

"We noted no differences in the types of drugs implicated in deaths between the two periods within either area of interest. Further, data from a prospective cohort study of IDUs done in the same neighbourhood suggest that drug-use patterns remained largely constant from 2001 to 2005.⁴⁴"

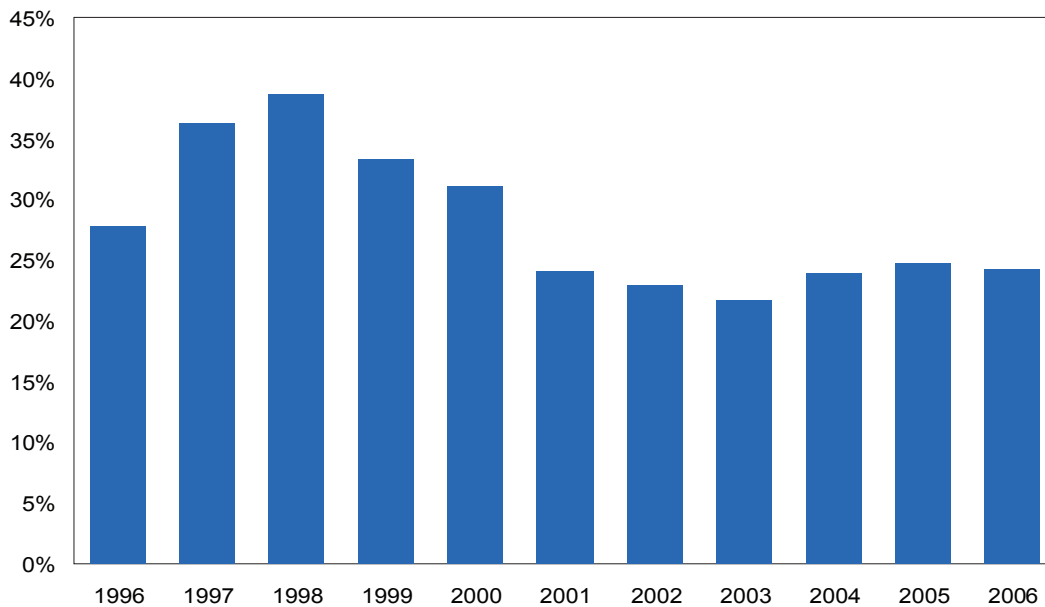


The citation that accompanies these statements (44, above) refers to a report we released in 2009 (*Drug Situation in Vancouver*) that displays the rate of daily heroin injection among injection drug users (IDU) participating in a cohort study of IDU in Vancouver. As shown in a figure from that report (below), although the proportion of IDU reporting daily heroin use declined from 1998 to 2001, the proportion of IDU reporting daily heroin injecting remained stable from 2001 to 2005 (i.e., the period considered in our *Lancet* study).

program—which was specifically designed to reduce overdose mortality—may actually be the cause of the decline in overdose mortality rates that occurred within 500 metres of the facility. Indeed, the *Lancet* study is consistent with reports from various international settings indicating that supervised injection sites are associated with declining overdose mortality.

In summary, we welcome academic debate, but we stand by the data presented in our *Lancet* paper and note that, unlike the report prepared by Mr. Christian and colleagues, our data

Figure 10a: Percent of Vancouver injection drug users reporting daily heroin injection, 1996–2007



We further note that, contrary to Mr. Christian’s claims, our *Lancet* paper goes to great lengths to acknowledge that other factors may have contributed to the observed decline in overdose deaths. In fact, the Discussion section of the manuscript is largely dedicated to a consideration of these issues. We believe a careful assessment of these other factors should lead a reasonable person to conclude that the

and methodological approach were subjected to extensive peer review and published in one of the world’s leading medical journals. The results of our study demonstrate that Vancouver’s supervised injection facility appears to have had a localized yet significant effect on overdose mortality in the area of densely concentrated injection drug use where the facility is located.