

Analysis of the 2011 *Lancet* study on deaths from overdose in the vicinity of Vancouver's Insite Supervised Injection Facility

Executive Summary

Dr Greg Pike

Director, Southern Cross Bioethics Institute, South Australia

Dr Joe Santamaria

Epidemiologist, previous Dept Head of Community Medicine, St Vincents Hospital, Victoria, Australia

Dr Stuart Reece

Addiction Medicine practitioner, Queensland; Australia

Dr Robert DuPont

First President of the United States' National Institute of Drug Abuse (NIDA)

Dr Colin Mangham

Director of Research, Drug Prevention Network of Canada

Gary Christian

Research Coordinator, Drug Free Australia

In an article published in *The Lancet* on April 18 2011, it was claimed that Vancouver's Insite Supervised Injection Facility, which commenced operations on 21 September 2003, was associated with a 35% decrease in overdose deaths in its immediate surrounding area compared with the rest of Vancouver which had decreases of 9%. However, the article contains serious errors which make that claim unsustainable.

The *Lancet* article's claim that all overdose deaths in Vancouver declined between 2001 and 2005 is strongly influenced by the inclusion of the year 2001, a year of markedly higher heroin availability and overdose fatalities than all subsequent years. A study period starting from 2002 in fact shows an increasing trend of overdose deaths. The higher availability of heroin in 2001 was the subject of two previous journal articles by three of the *Lancet* article's researchers, but was not acknowledged in this current study.

The *Lancet* article's researchers also failed to mention that 50-66 extra police were specifically assigned to the 12 city blocks surrounding Insite since April 2003 which are a significant part of the target area in which the questionable 35% reduction was said to occur. A change in policing such as this could account for any possible shift in overdose deaths from the vicinity of Insite. Remarkably, three of the *Lancet* article's researchers had previously published a detailed analysis of the effects of the changed policing, where they described drug users as 'displaced' from the area around Insite.

The facility is statistically capable of saving just one life per year from fatal overdose, a reduction which would not be detectable at the population level. This estimate is backed by the European Monitoring Centre's methodology and avoids the error of naively assuming overdose rates in the facility match overdose rates in the community.

In their unsubstantiated claim of decreased overdose deaths as a result of Insite's presence, the researchers further failed to mention that 41% of British Columbia's overdose fatalities are not even injection-related, and therefore not relevant to any putative impact Insite may have.

INTRODUCTION

This analysis, which has been completed for two drug prevention organisations, the Drug Prevention Network of Canada and Real Women of Canada, examines the methodology, data, interpretation and conclusions of the *Lancet* article of April 18 2011 by the research team *Brandon D L Marshall, M-J Milloy, Evan Wood, Julio S G Montaner and Thomas Kerr* titled "Reduction in overdose mortality after the opening of North America's first medically supervised safer injecting facility: a retrospective population-based study". The study can be found at <http://www.communityinsite.ca/injfacility.pdf>.

THE LANCET ARTICLE

In an article published in *The Lancet* on April 18 2011, it was claimed that Vancouver's Insite Supervised Injection Facility, which commenced operations on 21 September 2003, was associated with a 35% decrease in overdose deaths in its immediate surrounding area compared with the rest of Vancouver which had decreases of 9%.

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The study's abstract reads:

Methods We examined population-based overdose mortality rates for the period before (Jan 1, 2001, to Sept 20, 2003) and after (Sept 21, 2003, to Dec 31, 2005) the opening of the Vancouver SIF. The location of death was determined from provincial coroner records. We compared overdose fatality rates within an a priori specified 500 m radius of the SIF and for the rest of the city.

Findings Of 290 decedents, 229 (79.0%) were male, and the median age at death was 40 years (IQR 32-48 years). A third (89, 30.7%) of deaths occurred in city blocks within 500 m of the SIF. The fatal overdose rate in this area decreased by 35.0% after the opening of the SIF, from 253.8 to 165.1 deaths per 100 000 person-years ($p=0.048$). By contrast, during the same period, the fatal overdose rate in the rest of the city decreased by only 9.3%, from 7.6 to 6.9 deaths per 100 000 person-years ($p=0.490$). There was a significant interaction of rate differences across strata ($p=0.049$).

Our analysis outlines the considerable errors in the above article which invalidate its findings. Where possible the URL of any referenced abstract, statistics or work is included to enable readers to verify all relevant information for themselves.

UPWARD TREND IN DEATHS SINCE 2002

The *Lancet* article under analysis here cites 9.3% decreases in overdose fatalities for all of Vancouver after Insite's commencement versus 35% decreases in overdose fatalities in the Downtown Eastside (DTES) areas within a 500 metre radius of Insite.

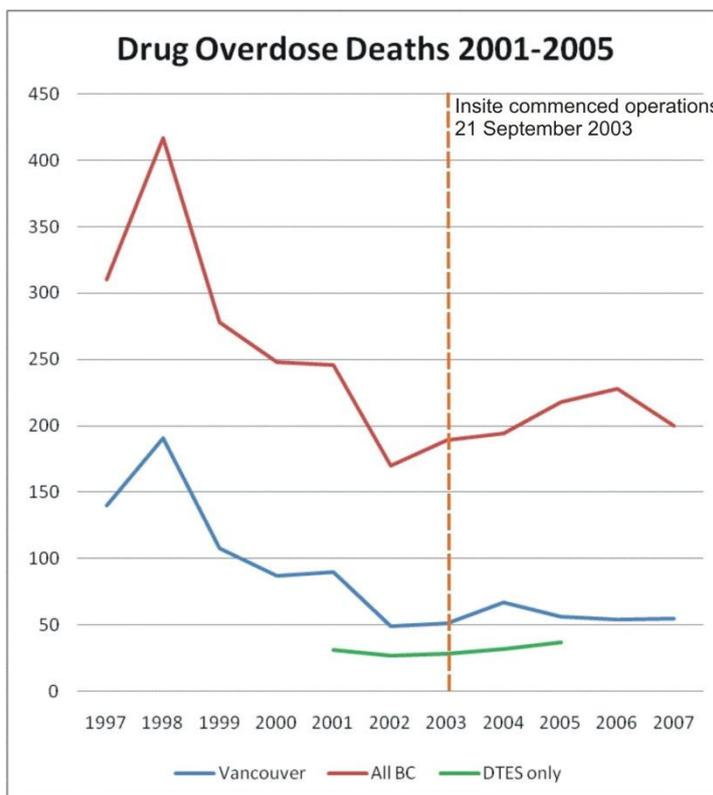
The claims of this article are very curious from the outset, simply because a review of the statistics by the British Columbia Coroner's Service, found at

year of markedly higher heroin availability and overdose fatalities than all subsequent years. A study period starting from 2002 in fact shows an increasing trend of overdose deaths.

<http://www.pssg.gov.bc.ca/coroners/publications/docs/stats-illicitdrugdeaths-1997-2007.pdf> clearly indicates the contrary - since Insite commenced operations on 21 September 2003 illicit drug deaths have very clearly and unmistakably increased, not decreased.

These Coroner's statistics for Vancouver and the entirety of British Columbia can also be compared with the drug death statistics for the DTES, which are found in the Vital Statistics reports (Table 45 in each) published by the British Columbia Ministry of Health for the relevant years at <http://www.vs.gov.bc.ca/stats/annual/>. (We will return to their interpretation later). The official, published statistics from 1997 to 2007 are:

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Vancouver	140	191	108	87	90	49	51	67	56	54	55
All BC	310	417	278	248	246	170	189	194	218	228	200
DTES only					31	27	28	32	37		



As can be seen from the above graph the trajectory of overdose deaths in Vancouver, which are the subject of the *Lancet* article's claimed decreases, is consistent with that of illicit drug overdoses for all of British Columbia. Drug overdose fatalities peaked in 1998 with the availability of plentiful, cheaper heroin, sharply decreasing through to the year 2002, the year before Insite opened, and then exhibiting gradual increases thereafter.

It must be noted that the Coroner's data includes drug overdoses judged to be intentional suicide, homicide or some other undetermined rationale. These make up 8.4% of the BC total. The BC Vital statistics likewise include suicides, homicides and undetermined rationale, but additionally include accidental deaths from the legal use of prescribed drugs.

For the years 2001-2005 the *Lancet* article's researchers elsewhere record 150 drug overdose deaths for the DTES¹ once suicides and unexplained deaths are excluded, however they do not give a breakdown of the number of deaths for the five years totalling to their nominated 150 DTES deaths. Because they have not made this level of detail available it may appear that no judgment can be made regarding increases or decreases in overdose deaths for the DTES. However the Vital Statistics drug-related deaths for 2001-2005 total 155, indicating that there were only 5 suicides or unexplained deaths over the five year period, or on average, just one per year. This indicates that the two datasets are sufficiently close to make the judgment that DTES overdose deaths, exclusive of suicides or unexplained deaths, were trending higher from 2002 on.

Given that there have only been increases in drug overdoses at the community level in Vancouver, despite the presence of the supervised injection facility, the question must be raised as to how the *Lancet* article has found 35% decreases for the area around Insite, and 9% decreases for the rest of Vancouver.

Visually from the above graph, the inclusion of 2001 in the 32^{2/3} month pre-Insite comparison period, with overdose fatalities almost double that of 2002, has the effect of artificially manufacturing a decrease in drug overdose deaths in relation to the comparison period of 27^{1/3} months after Insite was opened.

The higher availability of heroin in 2001 was the subject of two previous journal articles by three of the *Lancet* article's researchers, . . .

It is difficult to ascertain why the *Lancet* article's authors would include the 2001 year in their calculations when it creates a false picture of decreasing overdoses post-Insite. Excluding 2001 would instead have revealed an increasing trend in overdose death rates. One thing is abundantly clear - three of the *Lancet* article's authors were very clear-sighted about the reasons for the higher overdose fatality figures before 2002, as is evidenced in their *Addiction* journal study of 2006 by **Wood E, Stoltz JA, Li K, Montaner JS, Kerr T**, titled 'Changes in Canadian heroin supply coinciding with the Australian heroin shortage'.²

Statements in their *Addiction* article make it clear that 2001 and preceding years belong to a very different drug availability milieu to the years 2002 and after. From their abstract,

Results There was a 35% reduction in overdose deaths, from an annual average of 297 deaths during the years 1998-2000 in comparison to an average of 192 deaths during 2001-03. Similarly, use of naloxone declined 45% in the period coinciding with the Australian heroin shortage. Interestingly, the weight of Canadian heroin seized declined 64% coinciding with the Australian heroin shortage, from an average of 184 kg during 1998-2000 to 67 kg on average during 2001-03. Among 1587 VIDUS participants, the period coinciding with the Australian heroin shortage was associated independently with reduced daily injection of heroin [adjusted odds ratio: 0.55 (95% CI: 0.50-0.61); P < 0.001].

¹ Milloy M-J, Marshal B, Wood E, Montaner J, Kerr T. Burden of illicit drug overdose mortality in British Columbia and the effect of Vancouver's Supervised Injection Facility. See Slide 8 <http://www.bccdc.ca/NR/rdonlyres/850336FA-06F1-4D19-88D6-5223DABF54D2/0/May6BurdenofIllicitDrugOverdoseMortalityinBC.pdf> - we note that all deaths within Vancouver add up to 290 on this slide, which accords exactly with the 290 nominated in the *Lancet* article

² Wood E, Stoltz JA, Li K, Montaner JS, Kerr T. Changes in Canadian heroin supply coinciding with the Australian heroin shortage. *Addiction* 101 (2004) p 689-695 <http://www.ncbi.nlm.nih.gov/pubmed/16669902>

Further, in a 2007 article by *Thomas Kerr, Nadia Fairbairn, Mark Tyndall, David Marsh, Kathy Li, Julio Montaner, Evan Wood*,³ the following statements clearly delineated substantial declines in overdoses amongst the Vancouver Injection Drug Users Study (VIDUS) cohort of drug users from Vancouver's DTES during 2001 along with proposed causes,

As indicated in [Fig. 1](#), the proportion of participants reporting a non-fatal overdose has declined steadily since enrolment, with 21% of individuals reporting a non-fatal overdose in 1997 compared with just 6% in 2004. The most substantial decline occurred during 2001, with the proportion of participants reporting a non-fatal overdose declining from 12 to 5% during this year.

However, it should be noted that there was a decline over time in the proportion of participants reporting non-fatal overdose, with the most substantial decline occurring during 2001. This decline is consistent with other reports indicating a reduction in heroin-related overdoses during this period ([Wood et al., 2006](#)) and suggests that global reductions in heroin supply may have played a role in the declines in non-fatal overdose reported here.

From a study of illicit drug availability in seven Canadian cities⁴ by other researchers,

Moreover, the longitudinal analysis suggested that heroin use had significantly decreased in all sites since 2001 (overall effect -24.9%, $p < 0.001$). Use of cocaine and crack cocaine was also very common across the sites and also decreased over time (-14.1% and -11.7% respectively, $p < 0.001$). Parallel to the above changes, key risk behaviours (e.g., drug injection, needle sharing and overdosing) decreased.

It is evident from the above studies that there were significant, visible changes in heroin availability during 2001, a transition year between the high heroin availability of previous years, and the clearly lower levels of availability from 2002 onwards. While the declines were still in process throughout 2001, the year still exhibited significantly higher overdose fatalities, naloxone administrations and heroin seizures than any of the years 2002 and following.

The Wood et al. study re Canadian/Australian heroin shortage comparisons, despite its shortcomings, (its thesis re drug interdiction had previously been invalidated by the 2005 *Addiction* article by Degenhardt⁵ which reported Australian Federal Police working with police in Thailand to stop heroin supply *at its source*), nevertheless details changes in heroin availability which were again significant enough to prompt the study's faulty hypothesis.

³ Kerr T, Fairbairn N, Tyndall M, Marsh D, Li K, Montaner J, Wood E. Predictors of non-fatal overdose among a cohort of polysubstance-using injection drug users. *Drug and Alcohol Dependence* 87 (2007) pp 39-45 <http://www.ncbi.nlm.nih.gov/pubmed/16959438>

⁴ Fischer B, Rehm J, Patra J, Firestone Cruz M. Changes in illicit opioid use across Canada. *CMAJ* 175 no.11 (2006) pp 1385-87 <http://www.cmaj.ca/content/175/11/1385.full.pdf+html>

⁵ Degenhardt L, Reuter P, Collins L, Hall W. Evaluating Explanations of the Australian "heroin shortage" *Addiction* 100, (2005) pp 459-469 <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.88.9001&rep=rep1&type=pdf>

. . . but was not acknowledged in this current study.

Yet the *Lancet* article's researchers declared that,

Our findings are consistent with the time-series analyses of drug-related deaths occurring after the opening of SIFs in Germany and Australia. However, the German study did not assess the relation between proximity to a facility and overdose mortality within the surrounding environs. Furthermore, an abrupt reduction in heroin supply that occurred during the same period as the Australian facility's opening limited the conclusions that could be drawn from this assessment. *By contrast, we have no evidence that significant changes in drug supply or purity occurred during the study period (our emphasis).*⁶

The inclusion of 2001 in the pre-Insite comparison years, with its Vancouver overdose deaths almost double those of 2002, has the effect of manufacturing the illusion of decreasing overdose deaths when in fact they were increasing. We find it very difficult to imagine that this could have escaped the attention of the *Lancet* article researchers.

POLICING CHANGES A SUFFICIENT CAUSE

The *Lancet* article's researchers also failed to mention that 50-66 extra police . . .

This analysis has already established that overdose fatalities were increasing in the years after Insite commenced operations, and we will later demonstrate that, regardless, no positive impact by Insite on overdose deaths could have been detected at the population level.

However, despite the errors of the *Lancet* article discussed thus far there is every likelihood that overdose fatalities close to Insite since 2003 could have decreased relative to the previously graphed increases for the rest of the DTES and for the rest of Vancouver. The reason for some confidence in this assertion is the major changes in policing and police officer numbers in the immediate area around Insite instituted 6 months before Insite officially commenced operations, with these changes continuing to this day.

Yet, curiously, the *Lancet* article's researchers disclaim any awareness of these well-documented and, in the words of drug users from the area, cataclysmic changes. In listing the possible confounders that might make their thesis of Insite's impact on DTES overdose deaths invalid they state that,

Migration of IDUs (intravenous drug users) out of the study area could also theoretically explain the decrease in overdose mortality rates. However, a previous analysis of Vancouver IDUs showed that migration rates were stable and low throughout the study period, and that active injectors and those at greater risk of overdose tend to remain entrenched in the Downtown Eastside neighbourhood. *Additionally, we know of no changes in policing policy that could have confounded our results (our emphasis).*

The changes in policing which the *Lancet* researchers failed to identify or acknowledge were so significant that they prompted a 2003 Human Rights

⁶ Marshall BDL, Milloy M-J, Wood E, Montaner JSG, Kerr. Reduction in overdose mortality after the opening of North America's first medically supervised safer injecting facility: a retrospective population-based study. The *Lancet* published online, April 18, 2011 web copy p 7 <http://www.communityinsite.ca/injfacility.pdf>

Watch complaint to the United Nations⁷ as well as national, provincial and local governments,⁸ but far more significantly, for the sake of this analysis, it also prompted a 6 page journal article in the Canadian Medical Association Journal in May 2004 titled, 'Displacement of Canada's largest public illicit drug market in response to a police crackdown.'⁹ The article, which was highly critical of the police action, was researched by a team of nine, three of whom are part of the team which researched the 2011 *Lancet* article which so carefully disclaimed any knowledge of changes to policing in the DTES - *Evan Wood, Patricia M. Spittal, Will Small, Thomas Kerr, Kathy Li, Robert S. Hogg, Mark W. Tyndall, Julio S.G. Montaner, Martin Schechter.*

It is important to recognise that this crackdown, for the first 6 months, targeted the four city blocks in the DTES surrounding the epicentre of the open drug market in that area – an intersection of Vancouver streets metres from where Insite now stands.¹⁰ Reproduced below are observations from the May 2004 study on drug user displacement,

Although there has been wide speculation on other impacts of the increased police activity, including anecdotal reports of increased enrolment in methadone programs on the one hand and charges of widespread violation of human rights on the other, the crackdown's effects had not been rigorously evaluated. (p 1551)

The stated goals of the "crackdown" involved "disrupting the open drug market and interrupting the cycle of crime and drug use that marks the streets of the Downtown Eastside. (p 1551)

Since public injection drug use and dealing have historically been concentrated on the corner of the DTES's Main and Hastings streets, we defined the area within a 1-block radius of the corner of Main and Hastings as "the core" and peripheral areas in the DTES as "outside the core. (p 1551)

As Table 2 shows, we found significant increases in reporting that police presence had affected where drugs were used and had led to outdoor (but not indoor) drug use. The latter finding was supported by a significant increase in reporting of a change in the neighbourhood or alley of use because of police presence . . . (p 1553)

As Fig. 1 shows, the total number of used syringes found on the *streets in the core* (panel a) decreased significantly after the crackdown, from a monthly average of **1082** in the 3 months before Apr. 1 to **585** in the 3 months after Apr. 1 (*t* test: *p* = 0.003). However, a significant increase in unsafe disposal of used syringes was observed *outside* the core (panel b), the monthly average total number rising from **784** to **1253** in the same periods (*t* test: *p* = 0.002). We also found that use of the 6 public boxes for the safe disposal of used syringes (panel c) - 4 in the core and 2 outside the core - decreased significantly, from a monthly average total

⁷ <http://www.unhcr.org/refworld/country,,HRW,,CAN,,3f4f594fd,0.html>

⁸ <http://www.hrw.org/node/12330/section/> for a full description of Human Rights Watch observations and actions, particularly section 7

⁹ Wood E, Spittal PM, Small W, Kerr T, Li K, Hogg RS, Tyndall MW, Montaner JSG, Schechter M. Displacement of Canada's largest public illicit drug market in response to a police crackdown. CMAJ May 11, 2004; 170 (10) pp 1551-6 <http://www.cmaj.ca/content/170/10/1551.full>

¹⁰ Wood E, Spittal PM, Small W, Kerr T, Li K, Hogg RS, Tyndall MW, Montaner JSG, Schechter M. Displacement of Canada's largest public illicit drug market in response to a police crackdown. CMAJ May 11, 2004; 170 (10) p 1552 <http://www.cmaj.ca/content/170/10/1551.full>

number of **865** in the 3 months before Apr. 1 to **502** in the 3 months after Apr. 1 (*t* test: $p = 0.018$) (*our emphases*). (p 1552)

Although evidence suggested that police presence made it more difficult to obtain drugs, this appeared to be explained by displacement of drug dealers. Other studies have similarly shown that concentrated police presence tends to displace drug-use activities and associated crime to neighbouring areas. Our results probably explain reports of increased injection drug use, drug-related crime and other public-order concerns in neighbourhoods where activities related to illicit drug use and the sex trade emerged or intensified in the wake of the crackdown. (p 1554)

Our results support anecdotal reports of increased public drug use and displacement of drug users, . . . (p 1555)

. . . were specifically assigned to the 12 city blocks surrounding Insite since April 2003 . . .

It is clear from the above statements that the policing commencing 7 April 2003 removed drug dealers and public drug use from the four block area around where Insite stands today. The removal of the open drug market, associated with less discarded needles on the street, less public injections and less overdose mortality in the area was extended when Insite commenced operations in September 2003, from 50 police¹¹ to 65 police, now covering a 12 block area. Below are statements from Vancouver police,

Yes, four officers per day, 22 hours per day, 7 days per week, for one year from Sept 03 - Sep 04 in the block at all times with cell phone access directly to them by SIS staff. These officers were paid on overtime callout at double time for that whole year. The Vancouver agreement paid for that. At the same time 60 other officers were deployed in a 5-block area and still are to this day. The police took care of public disorder. The SIS enhanced public disorder.¹²

Beat deployment changed a little over the years: 2003 - 4 squads x 16 men = 64; 2004 - 4 x 12 = 48 men; 2009 - 6 x 11 = 66 men. 66 police officers (6 squads of 11) plus 6 sergeants - 72. Keep in mind most squads have one spot empty so we are not really at capacity. BET teams police the area between Gore on the East, Powell, Pender and Abbott Streets.¹³

. . . which are a significant part of the target area in which the questionable 35% reduction was said to occur.

Below is a map of the area of <500 metre radius around Insite studied by the *Lancet* authors, taken from their own Powerpoint presentation on the *Lancet* article's data.¹⁴ Their map indicates the location of overdose deaths within the 500 metre radius area around Insite by bright red dots with those outside the target area appearing with white semi-transparent overlay – Insite is marked by the yellow dot. We in turn have provided a semi-transparent yellow overlay above the 12 block area nominated by police as the BET beat.

¹¹ Wood E, Spittal PM, Small W, Kerr T, Li K, Hogg RS, Tyndall MW, Montaner JSG, Schechter M. Displacement of Canada's largest public illicit drug market in response to a police crackdown. *CMAJ* May 11, 2004; 170 (10) p 1551 <http://www.cmaj.ca/content/170/10/1551.full>

¹² Mangham C2. A Critique of Canada's INSITE Injection Site and its Parent Philosophy: Implications and Recommendations for Policy Planning. *Journal of Global Drug Policy and Practice* Vol 1, Issue 2 - Summer 2007 <http://www.globaldrugpolicy.org/1/2/2.php>

¹³ Correspondence by Vancouver police with Drug Prevention Network of Canada

¹⁴ Milloy M-J, Marshal B, Wood E, Montaner J, Kerr T. Burden of illicit drug overdose mortality in British Columbia and the effect of Vancouver's Supervised Injection Facility. See Slide 32 <http://www.bccdc.ca/NR/rdonlyres/850336FA-06F1-4D19-88D6-5223DABF54D2/0/May6BurdenofIllicitDrugOverdoseMortalityinBC.pdf>



A change in policing such as this could account for any possible shift in overdose deaths from the vicinity of Insite. Remarkably, three of the *Lancet* article’s researchers had previously published a detailed analysis of the effects of the changed policing, where they described drug users as ‘displaced’ from the area around Insite.

26 of the total 89 overdose deaths between 2001 and 2005 located by the *Lancet* article researchers appear outside of the BET patrol area, giving perhaps a safe range of 59-63 deaths within the area heavily policed. Unfortunately, the *Lancet* article researchers have failed to differentiate which of the overdose locations pre-existed Insite’s commencement, which prevents definitive comparisons of the effect of policing on overdose fatalities. Nevertheless, the displacement of drug dealers and public drug use away from this area to the surrounding fringes, noted by three of the *Lancet* article researchers in the May 2004 study does indeed suggest decreased overdose fatalities around Insite by virtue of the changed policing. In our analysis, we can find no reason for the *Lancet* article to assert,

Additionally, we know of no changes in policing policy that could have confounded our results.

Of some importance to this issue, one of our analysis team, Dr Colin Mangham, made these observations in questioning the conclusions of another study by Wood et al. in 2007,

Wood E, Tyndall MW, Lai C, Montaner JG, & Kerr T. Impact of a medically supervised safer injecting facility on drug dealing and other drug-related crime. *Substance Abuse Treatment, Prevention, and Policy*. 2006; 1:13.

As with the previous report, this article makes only a “no harm” claim. It fails to acknowledge or discuss the impact of police activity. In fact, there was a substantial police presence during the period of the study.

It is misleading for any inference to be made that INSITE had any impact on crime or on public disorder. Police presence more than accounts for any changes in either.¹⁵

INSITE AVERTS JUST ONE DEATH PER YEAR

The facility is statistically capable of saving just one life per year from fatal overdose, a reduction which would not be detectable at the population level.

In 2008, the Canadian Government's (Parliament 40) Expert Advisory Committee (EAC), convened to evaluate Insite, also completed an international review of injecting rooms worldwide, becoming only the second extensive international review of injecting facilities after the 2004 European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) review by Dagmar Hedrich.¹⁶ The EAC calculated that Insite, with around 144,000 opiate injections annually at that time, saved just 1.08 lives per year.¹⁷ We note that such a small impact on averted deaths could therefore not be detected in population surveys of overdose fatalities.

This estimate is backed by the European Monitoring Centre's methodology . . .

This estimate accords well with the highly defensible method used in the 2004 EMCDDA review which calculated the number of lives saved by German consumption rooms annually. Hedrich estimated the number of lives saved for the 500,000 opiate injections across all 25 injecting rooms in Germany, calculating that they cumulatively saved 10 lives per year.¹⁸

a. EMCDDA method

The European Monitoring Centre (EMCDDA) 2004 Review of Drug Consumption Rooms <http://www.emcdda.europa.eu/html.cfm/index54125EN.html>, which incidentally is highly supportive of injecting rooms, uses the following method on page 54 to calculate lives saved for all 25 consumption rooms across Germany. It calculates from:

1. known annual overdose mortality rates per 100 dependent heroin users (estimated to be 2%)
2. the number of injections for 100 dependent heroin users per year (1,000 injections per user per year)

Thus 100 dependent heroin users, cumulatively injecting 100,000 times a year between them, will be expected from the review's designated mortality rate to have 2 overdose fatalities annually. 500,000 injections yield 10 expected fatalities averted by the 25 injecting rooms across Germany.

Drug Free Australia has noted that the EMCDDA review's estimated 2% overdose fatality rate seems excessive in light of the EMCDDA's own mortality studies for 5 European countries,¹⁹ (where Germany was not included, but where Spain, with the highest heroin overdose mortality, was still well below 2%).

¹⁵ Mangham C. A Critique of Canada's INSITE Injection Site and its Parent Philosophy: Implications and Recommendations for Policy Planning. *Journal of Global Drug Policy and Practice* Vol 1, Issue 2 - Summer 2007 <http://www.globaldrugpolicy.org/1/2/2.php>

¹⁶ Hedrich D. European Report on Drug Consumption Rooms. EMCDDA (2004) <http://www.emcdda.europa.eu/themes/harm-reduction/consumption-rooms>

¹⁷ See the Expert Advisory Committee's **Executive Summary** vii <http://www.hc-sc.gc.ca/ahc-asc/pubs/sites-lieux/insite/index-eng.php#insite>

¹⁸ Hedrich D. European Report on Drug Consumption Rooms. EMCDDA (2004) p 54 <http://www.emcdda.europa.eu/themes/harm-reduction/consumption-rooms>

¹⁹ EMCDDA, Implementation, follow-up and analysis of cohort studies on mortality among drug users in European Union member States; Lisbon: EMCDDA, July, 1999 /first and second phase reports)

The percentages by country were:

Barcelona - Spain	1.4%
Rome - Italy	0.2%
Sweden	0.7%
Amsterdam - Netherlands	unknown
Vienna - Austria	0.2%

The Canadian Expert Advisory Committee 2008 review http://www.hc-sc.gc.ca/ahc-asc/pubs/_sites-lieux/insite/index-eng.php#insite did not declare the method by which it concluded that 1.08 lives are saved by Vancouver's Insite per year, however the estimate is identical to that found in Andresen and Boyd's cost-benefit study on Insite in 2009 where the method is well described.²⁰ Alternatively the EMCDDA method, used with Canadian data and assumptions, yields the same result. Canadian heroin mortality in 2002/3 was roughly the same as Australia's at 1% (958 deaths from more than 80,000 dependent heroin users)²¹ and mortality percentages for 2006 or 2007 might well be expected to be little changed. Further, the Expert Advisory Committee clearly state their assumption that a typical Canadian heroin user injects 4 times daily,²² a higher average than the 2-3 times daily assumed by the EMCDDA review.

Thus 100 Canadian heroin users will cumulatively inject 146,000 times annually, and the 2007 data of 144,000 opiate injections in the facility (opiates and cocaine are often injected together) might be expected to avert the death of the one injection in 146,000 which would likely have been fatal. (It should be noted that cocaine solely by itself has historically accounted for a very small proportion of deaths in British Columbia).²³

b. Invalid calculations from overdoses in the facility

. . . and avoids the error of naively assuming overdose rates in the facility match overdose rates in the community.

In Drug Free Australia's 2007 and 2010 analyses of the Sydney Medically Supervised Injecting Centre, non-fatal overdose rates reported by heroin users during the years of plentiful heroin supply in Australia were 2.3 overdoses per 10,000 injections, as compared to rates of overdose inside the Sydney injecting centre of 72 overdoses per 10,000 opiate injections over its nine years of operation. This disparity is even more remarkable when it is considered that only 44% of Sydney injecting centre clients had previously overdosed.

Rates of overdose in the Sydney injecting centre which are 32 times higher than clients' documented previous rates of overdose have, on the testimony of ex-clients of the centre,²⁴ been due to a culture of experimentation with cocktails of illicit and prescription drugs, mostly involving heroin. The government-

²⁰ Andresen MA, Boyd N. A cost-benefit and cost-effectiveness analysis of Vancouver's supervised injection facility. *International Journal of Drug Policy* 2010 Jan;21(1):70-6. Epub 2009 May 6. <http://www.educatingharper.com/documents/Costbenefit.pdf>

²¹ Popova S, Rehm J, Fischer B. An overview of illegal opioid use and health services utilization in Canada. *Public Health*. 2006 Apr;120(4):320-8. Epub 2006 Feb 14 p1 <http://www.ncbi.nlm.nih.gov/pubmed/16476455>

²² See the Expert Advisory Committee's **Background** section, 4th paragraph http://www.hc-sc.gc.ca/ahc-asc/pubs/_sites-lieux/insite/index-eng.php#insite

²³ See a useful summary of the BC Coroner's report from the mid-90's before mixing heroin and cocaine was as prevalent <http://www.cannabisculture.com/v2/articles/973.html>

²⁴ Gordon Moyes speech to NSW Parliament Legislative Council Hansard 26 July 2007 <http://www.parliament.nsw.gov.au/prod/parliament/hansart.nsf/V3Key/LC20070626035>, also Andrew Fraser's speech to NSW Parliament, Legislative Assembly 21 October 2010 <http://www.parliament.nsw.gov.au/prod/parliament/hansart.nsf/V3Key/LC20070626035>

funded evaluation in 2003 also speculated that experimentation with higher doses of heroin in the assured safety of the centre may explain the inordinately high overdose rates. Evaluations commissioned by the NSW Government to estimate the number of deaths averted by the Sydney injecting centre uniformly failed to compare client's overdose histories with overdose rates in the injecting centre, naively calculating the number of lives saved from the artificially elevated number of overdoses in the centre prompted by experimentation in safety.

Insite's rate of overdose intervention for the 1,004 that were recorded between 2004 and 2008 was 13 overdoses per 10,000 injections according to a study by *M-J. S. Milloy, Thomas Kerr, Mark Tyndall, Julio Montaner, Evan Wood*, titled 'Estimated Drug Overdose Deaths Averted by North America's First Medically Supervised Safer Injection Facility'.²⁵ Calculations in the Milloy et al. study yielded estimates of between 2 and 12 deaths averted per year in the facility.

However, the researchers' estimates of deaths averted have no plausibility when it is considered that they recorded 28 overdose deaths for the whole of the Downtown Eastside for 2005 and 2006 each, as per Table 2 in their study, while also acknowledging that Insite hosts only 5% of all injections in the entire DTES.²⁶ Their estimate of 2-12 averted deaths per annum were calculated from the 453 of the 1,004 overdoses deemed 'potentially fatal' by the researchers (all, it would seem, attracting naloxone administration), averaging 8.9 administrations per month in Insite, while the rest of the DTES, with 95% of all injections in the area, averaged just 31 naloxone administrations per month in 2002/3, a year with only 30% less overdose fatalities than 2005 and 2006 (Panel B in the Canadian/Australian heroin shortage study indicates around 370 naloxone administrations in the entire DTES during 2002/3 before Insite opened).²⁷ The disparity of so many naloxone interventions in Insite is plainly visible and the explanation that Insite clients are at such a significantly higher risk of overdose than other dependent users in the DTES is neither cogent nor demonstrated.

Estimates of deaths averted, calculated from the number of overdoses within Insite, have no validity while differences between overdose rates within Insite and outside it remain unexamined and highly disparate. Such a naïve approach to estimates, which has been apparent for both the Sydney and Vancouver facilities, should be shunned by political and bureaucratic decision makers.

41% OF BC OVERDOSE DEATHS NON-INJECTION-RELATED

In their unsubstantiated claim of decreased overdose deaths as a result of Insite's presence, the researchers

A further failing of the *Lancet* article is the researchers' non-disclosure of the percentage of overdose deaths in British Columbia which is non-injection-related. It is clear that only injection-related overdose fatalities in the DTES would be relevant to their study of the apparent impact of Insite as a local

²⁵ Milloy M-JS, Kerr T, Tyndall M, Montaner J, Wood E. Estimated Drug Overdose Deaths Averted by North America's First Medically-Supervised Safer Injection Facility. *PLoS ONE*, October 2008 Volume 3 Issue 10 <http://www.plosone.org/article/info:doi/10.1371/journal.pone.0003351>

²⁶ We note that Andresen MA, Boyd N. A cost-benefit and cost-effectiveness analysis of Vancouver's supervised injection facility. *International Journal of Drug Policy* 2010 Jan;21(1):70-6. Epub 2009 May 6. <http://www.educatingharper.com/documents/Costbenefit.pdf> records an estimate of 4,565,000 injections per year for the DTES as a whole

²⁷ Wood E, Stoltz JA, Li K, Montaner JS, Kerr T. Changes in Canadian heroin supply coinciding with the Australian heroin shortage. *Addiction* 101 (2004) p 689-695 <http://www.ncbi.nlm.nih.gov/pubmed/16669902>

further failed to mention that 41% of British Columbia’s overdose fatalities are not even injection-related, . . .

supervised injection facility.

Yet the *Lancet* article’s own researchers do in fact elsewhere declare the percentage of BC overdose deaths which are injection-related in their internet-accessible presentation, ‘Burden of illicit drug overdose mortality in British Columbia and the effect of Vancouver’s Supervised Injection Facility’.²⁸ In this presentation Injection-related overdose fatalities compose 59.5% of British Columbia’s total of 909 deaths between 2001 and 2005,²⁹ leaving 40.5% which are non-injection-related as per the reproduction of Slide 17 from this presentation below:

TABLE 3. Unadjusted logistic regression analysis of factors associated with First Nations status among individuals dying of illicit drug overdoses, province of British Columbia, 2001 – 2005 (n = 909 decedents)

Characteristic	Total 909 (100.0) n (%)	Aboriginal 104 (11.4) n (%)	Odds Ratio	95% Confidence Interval
Injection-related				
No	368 (40.5)	30 (28.8)	1.00	
Yes	541 (59.5)	74 (71.2)	1.79	1.13 – 2.79
Opioids detected				
No	466 (51.3)	54 (51.9)	1.00	
Yes	443 (48.7)	50 (48.1)	0.97	0.64 – 1.46
Cocaine detected				
No	374 (41.1)	42 (40.3)	1.00	
Yes	535 (58.9)	62 (59.6)	1.04	0.68 – 1.57
ATS detected				
No	880 (96.8)	103 (99.0)	1.00	
Yes	29 (3.2)	1 (1.0)	0.27	0.04 – 2.00
Alcohol detected				
No	840 (92.4)	94 (90.4)	1.00	
Yes	69 (7.6)	10 (9.6)	1.35	0.67 – 2.72
Polydrugs detected				
No	598 (65.8)	66 (63.5)	1.00	
Yes	311 (34.2)	38 (36.5)	1.12	0.73 – 1.72

While it entirely probable that the DTES might have a higher percentage of injection-related overdose deaths than the rest of BC, it is just as clear that with such a high percentage of BC deaths not related to injection the DTES will still have a considerable number of deaths which are likewise non-injection-related.

The failure of the researchers to declare that a percentage of deaths are non-injection related or to nominate this percentage for the DTES, then further to calculate all deaths in the DTES as being injection-related when they clearly appear from the BC Coroner data to be otherwise, is inexplicable.

. . . and therefore not relevant to any putative impact Insite may have.

Whatever the percentage of overdose fatalities were between 2001 and 2005 in the DTES, the inclusion of any non-injection-related overdose deaths in a study on a Supervised Injecting Facility’s impact on the community is both invalid and indefensible, falsely inflating the supposed deaths averted.

²⁸ Milloy M-J, Marshal B, Wood E, Montaner J, Kerr T. Burden of illicit drug overdose mortality in British Columbia and the effect of Vancouver’s Supervised Injection Facility. see Slide 17 <http://www.bccdc.ca/NR/rdonlyres/850336FA-06F1-4D19-88D6-5223DABF54D2/0/May6BurdenofIllicitDrugOverdoseMortalityinBC.pdf>

²⁹ It should be noted that the Coroner’s data for British Columbia indicates 932 accidental OD deaths excluding suicide/homicide/undetermined deaths for the period 2001-2005 (British Columbia Coroner’s Service data 1997-2007, <http://www.pssg.gov.bc.ca/coroners/publications/docs/stats-illicitdrugdeaths-1997-2007.pdf>) which differs slightly to the 909 cited by Milloy et al. Nevertheless, where 40.5% of all BC overdose deaths are non-injection-related, the difference of 23 deaths between the two datasets is not refractory to our criticism of the *Lancet* article’s failure.

SHORTCOMINGS OF THE PEER-REVIEWED STUDIES

In this analysis we have demonstrated that the 2011 *Lancet* article on reduced overdoses in the immediate vicinity of Insite had considerable, demonstrable errors. These errors were in its assertions of:

1. decreased overdoses for Vancouver when the Coroner's data indicates incontrovertible increases, achieved by an indefensible, inflated baseline which included 2001, a year of demonstrably higher overdose deaths in Vancouver
2. no detectable policing confounders which might alter their findings when in fact there were extensive changes to policing in the midst of their study's focus years
3. the inclusion of an unspecified number of non-injection-related overdose deaths in the study as relevant to the impact of Insite on the DTES levels of overdose deaths

Once these errors are accounted for the claims for Insite's effectiveness in reducing overdoses fatalities in the Vancouver area, beyond the Canadian Government's Expert Advisory Committee's estimate of one life saved per year, are shown to be entirely without foundation.

At the political level, the *Lancet* study was highly influential, errors notwithstanding. Further, it is not the only influential Insite study which has had demonstrable errors. Previously we referred to an Insite study on reduced crime in the DTES, a finding credited to Insite rather than the additional 50-72 police engaged in the DTES area around Insite. Added to this are the spurious claims by Insite researchers that the facility has impacted HIV and HCV transmission, despite the claim being possible only if ALL injections by those HIV or HCV positive are hosted by Insite, which has rarely been the case.³⁰

Further, these spurious conclusions have been the basis for vastly inflated financial estimates of Insite's supposed cost-savings in terms of comparable costs of drug harm averted for the Canadian tax-payer – all highly influential on politicians but not at all based in factual science. The 2009 Andresen and Boyd cost-benefit study calculated savings to government from 35 supposed HIV/AIDS transmissions averted by Insite annually,³¹ despite the most authoritative international review to date not finding any demonstrated effectiveness of clean needle provision reducing HIV transmission via needle exchanges.³²

These studies have all been peer-reviewed, and yet can be very quickly falsified when exposed to critical scrutiny in perhaps a more adversarial setting than that of peer-review. This may indicate some real limitations in the peer-review processes of medical journals, whereby peer-reviewers may not have the same access to localised observations and data which would falsify the hypothesis they are scrutinising.

³⁰ Mangham C. A Critique of Canada's INSITE Injection Site and its Parent Philosophy: Implications and Recommendations for Policy Planning. *Journal of Global Drug Policy and Practice* Vol 1, Issue 2 - Summer 2007 <http://www.globaldrugpolicy.org/1/2/2.php>

³¹ Andresen MA, Boyd N. A cost-benefit and cost-effectiveness analysis of Vancouver's supervised injection facility. *International Journal of Drug Policy* 2010 Jan;21(1):70-6. Epub 2009 May 6. <http://www.educatingharper.com/documents/Costbenefit.pdf>

³² US Institute of Medicine. Preventing HIV Infection among Injecting Drug Users in High Risk Countries: An Assessment of the Evidence. 2006 <http://www.iom.edu/Reports/2006/Preventing-HIV-Infection-among-Injecting-Drug-Users-in-High-Risk-Countries-An-Assessment-of-the-Evidence.aspx>

We would recommend that politicians and the judiciary would do best in the field of illicit drug policy to advertise for critical comment on peer-review studies, perhaps allowing a month for input, before making decisions based upon them. Drug prevention organisations worldwide have ready access to a significant number of addiction experts and academics who are able to provide excellence in critique.

Related Reading

1. Dr Colin Mangham, A Critique of Canada's INSITE Injection Site and its Parent Philosophy: Implications and Recommendations for Policy Planning. Journal of Global Drug Policy and Practice Vol 1, Issue 2 - Summer 2007
<http://www.globaldrugpolicy.org/1/2/2.php>

Study completed for the Royal Canadian Mounted Police details the numerous, similar methodological flaws and errors in Insite's research base.

2. Gary Christian – Blinded by the Dominant Ideology. Quadrant November 2010 Volume LIV Number 11
<https://www.quadrant.org.au/magazine/issue/2010/11/blinded-by-the-dominant-ideology>

An article exposing the 'selective blind-spots, silences, evasions, exclusions and overstatement' identified in almost every government-funded evaluation of the Sydney Medically Supervised Injecting Centre.

3. Dr Garth Davies, A Critical Evaluation of the Effects of Safe Injection Facilities. Journal of Global Drug Policy and Practice Vol 1, Issue 3 - Fall 2007
<http://globaldrugpolicy.org/1/3/2.php>

Analysis of the existing research on supervised injection facilities worldwide.