# Literature Review

## Effectiveness of Safer Smoking Programs: Why it is important to distribute safer smoking supplies to those who smoke crack cocaine

### Background: Crack cocaine use in Canada

Numerous studies conducted in Canada over the past 15 years indicate that crack cocaine use is on the rise. A study of people who use drugs in five Canadian cities (Vancouver, Edmonton, Montreal, Toronto, and Quebec City) found that 55% of participants had smoked crack in the past 30 days (Fisher et al. 2006). A Canadian surveillance report of 794 people who inject drugs found that 52% of the sample had also smoked crack cocaine in the last six months (Public Health Agency of Canada, 2006). In another longitudinal study among a cohort situated in Vancouver BC, the proportion of participants who reported daily crack use over a nine year period, increased from 12% in the first 3.5 years, to 27% in the next 3 years, to 40% in the final three years of the study (DeBeck et al. 2009).

> ***"Crack use …is becoming increasingly prevalent among Canadian street drug users"*** *- Fischer et al, 2006*

> ***"Among stimulant users, smoking crack is becoming the preferred method of drug administration over snorting and injecting due to its low cost, ease of ingestion and efficiency..."*** *-Leonard et al., 2011*

Many studies demonstrate fairly consistent characteristics of people who use crack cocaine. In a sample studied by Ivsins et al. (2011) people who use crack were characterized by unstable income (100%), reliance on government income assistance (81%), dealing drugs for support (58%), and being unstably housed (71%). The vast majority had legal problems (87%) and about half (52%) rated their health as 'fair' or 'poor'. Fischer et al. (2006) demonstrated similar findings, namely that crack cocaine users were less likely to be housed permanently, had no paid work in the previous month, and were more likely to engage in illegal activities such as sex work or drug dealing when compared to those who were non crack-users. Fischer et al. (2006) referred to people who use crack as the "marginalized of the marginalized" given the fact that compared to those who misuse other substances; those who engage in crack use have higher risks of social exclusion. Despite these unfortunate findings, Persaud et al. (2013) bring another perspective to crack cocaine use. In their qualitative research study of people with long term crack cocaine use, the research team found that for some, smoking crack was a form of 'controlling chaos' and provided a safer route of drug administration than injection drug use which was seen as having a higher risk of acquiring infectious diseases.

Despite the increase of crack cocaine use in Canada and the marginalization of people who use crack cocaine, harm reduction programs are targeted to those who inject drugs. This creates a missed opportunity to reduce harms associated with crack cocaine use (*see objective 1 below*) and connect people who smoke crack cocaine to health and social services.

### Objectives

This literature review will provide Needle Syringe Programs (NSPs) in Ontario with information regarding:

1) **The harms associated with unsafe crack cocaine smoking practices**
2) **Best practice recommendations about supplies for safer crack smoking**
3) **The effectiveness of safer smoking programs**
4) **The findings from a survey conducted by Ontario Harm Reduction Distribution Program (OHRDP) of interest for safer smoking programs or programs currently underway in Ontario; and**
5) **Program implementation and considerations**

This literature review will help NSPs understand 1) why OHRDP will be offering safer smoking supplies to programs and 2) the importance of providing these supplies to service users.

## Methods

A literature review was used to inform this report. The databases used were Medline, PsychInfo, Embase, Global Health**,** Ovid Healthstar**,** Health & Psychosocial Instruments, & the Cochrane Collaboration. Keywords searched were: safe inhalation, inhalation equipment, inhalation supplies, effectiveness, and crack kits. Material was also identified using a snowball search method using Google Scholar and articles suggested by key informants to account for the novelty of the topic and the likelihood that the research question has not yet been comprehensively indexed. Grey literature was incorporated due to relevancy regarding program design considerations. No limit was placed on country, year or language. This resulted in 14 studies reviewed, 3 of which were revealed via snowball sampling methods. References from commentaries were not included in the scientific review of results. All studies except three were conducted in Canadian settings.

OHRDP's 2013 Environmental Scan was used to inform objective 4 (survey of interest for safer smoking programs or programs currently underway in Ontario).

## Results

### *Objective 1: The harms associated with unsafe crack cocaine smoking practices*

**Overview of findings**

- Non-injection drug use has emerged as a risk factor for communicable diseases (Macias et al., 2008).
- Smoking crack is an independent risk factor for HIV sero-conversion among those who use drugs intravenously (DeBeck et al., 2009).
- Hepatitis C virus has been found on crack pipes, and if shared, could be a route of hepatitis C transmission (Tortu et al., 2004).
- Sharing equipment used for crack smoking has been shown to be independently associated with hepatitis C infection (Macias et al., 2008).
- A high proportion of people who smoke crack report having used another person's equipment (Ivsins et al., 2011).
- Limited accessibility to safer smoking supplies leads to shared drug smoking paraphernalia (Ti et al., 2011; Persaud et al. 2013).

*Harms and Risks of Smoking Crack Cocaine:*

There is evidence that HIV, HBV, HCV, pneumonia, and tuberculosis can be passed to others when crack smoking supplies are shared (Boyd et al., 2008; Fischer et al., 2007; Malchy et al., 2011). There are two health risk behaviours among people who smoke crack that may lead to the transmission of infection and/or injury:

*1) Sharing smoking supplies despite cuts, burns, oral sores or blisters; and*
*2) Using sharp and damaged supplies that can wound the user (Ivsins et al. 2011).*

Both behaviours create the opportunity for infected blood or saliva to be passed from one person to another. Furthermore, sharing supplies is an extremely common practice among those who engage in crack smoking. It has been reported that at minimum, 50-90% of the crack smoking population has used another person's supplies (Ivsins et al., 2011).

Most studies confirm that crack cocaine smoking is a risk factor (through association) for sero-conversion of HIV and HCV. The associations found are mostly noted as 'possible' due to participants' recall bias regarding past intravenous drug use and misuse of multiple substances. There are two major studies that contribute to our understanding that transmission of disease is highly plausible. In 2004, Tortu et al. found the presence of hepatitis

C virus on crack smoking supplies, and Macias et al., (2008) confirmed in their study that infected blood or saliva on crack smoking supplies could cause HCV to be transmitted if supplies are shared since there can be enough HCV RNA in blood coming from open sores, as well as in saliva, to be passed to another (this was established after extrapolating the work of Hermida et al., 2002). These findings may explain why some non-injection drug users, with no identified source of exposure, were infected with HCV (Kingston-Riechers, 2001). Other smoking supply components (*see objective 2*) in addition to the 'crack pipe' have been linked to the transmission of HCV. Sharing the inhalation tube (the mouthpiece) has also been found to be significantly associated with HCV infection.

> ***"Blood (from oral ulcerations) or saliva contamination of inhalation equipment could transmit quantities [of HCV] sufficient to surpass the critical threshold…necessary for productive infection"*** *-Macias, et al., 2008*

> ***"Those who engage in crack use often use damaged inhalation equipment, and share this with others despite having open wounds"*** *-Ivsins et al., 2011*

Regarding HIV, DeBeck et al., (2009) conducted a longitudinal study of over 1000 injection drug users (IDUs) who were HIV-negative at enrollment. In this particular study, it was found that smoking crack was an independent risk factor for HIV sero-conversion. Furthermore, with increased time engaging in crack smoking, increased risk of HIV seroconversion was seen with hazard ratio of 1.28 during the first study period, 2.27 in the second and 4.01 in the third (DeBeck et al., 2009). Overall, incidence of HIV infection among the participants was 2.7 (95% CI 2.2-3.1) per 100 person years, which meant that 13.1% of the participants became HIV positive during the 9.3 year study period. It was acknowledged that participants likely had more HIV positive people within their social networks, elevating the risk of HIV infection among these participants.

*HIV/HCV and STI and other risk considerations:*

Crack cocaine smoking has been associated with an increased risk of sexually transmitted infections (STIs). Shannon et al. (2008) created gender risk profiles comparing injection drug users (IDUs) who used crack with those who were classified as "never injectors". Higher rates of HIV and HCV were found among the "dual users"; however, researchers demonstrated that women IDUs who engage in crack use, engage in sexual networks with higher risks. The risks of transmitting HIV and HCV through unsafe sexual practices have long been established, as has been the fact that exchanging sexual acts (including oral sex), for substances (including crack), is a practice often employed when the individual has no other means to pay. Shannon et al. (2008) demonstrated that the strongest association with dual use was trading sex for drugs or money, and that women "dual users" are significantly more likely to exchange sex for drugs and money while intoxicated - putting them at an overall greater risk to contract an STI. In the same study, Shannon et al. (2008) demonstrated that HCV prevalence among those who engaged in crack use was 43%.

Malchy et al., (2011) make reference to evidence that indicates that pneumonia and tuberculosis can also be contracted when inhalation equipment is shared.

*Barriers to Safer Crack Smoking:*

The social, political, economic and physical environment all play a role in risks associated with smoking crack cocaine. This literature review focuses largely on strategies to mitigate the physical risk environment. People who smoke crack consistently report sharing crack pipes, a clear route of transmission of disease (Ivsins et al., 2011). This has been attributed to the limited availability of safer smoking supplies and/or confiscation of supplies by police (Ti et al., 2011; Persaud et al. 2013). Leonard et al. (2011) note that by increasing the accessibility of harm reduction supplies, sharing of drug smoking paraphernalia decreases. This is also supported by the work of Persuad et al. (2013) who also suggest that the way of mitigating the physical risk environment is by increasing safer crack smoking supply distribution.

***Objectives 2: Best practice recommendations about supplies for safer crack smoking***

To reduce the transmission of disease and prevent injury from makeshift equipment, safer smoking programs may offer the following supplies to those who engage in crack smoking.

**Overview of best practice safer smoking supplies**

**Stems (crack pipes):** Stems are used to channel vapors. Borosilicate glass "Pyrex®" stems are a safer alternative to regular glass stems because they are more resistant to heat and do not break as easily.

**Screens (metal):** Provide a barrier on which pieces of crack are placed and then heated. In community, steel wool or Brillo® is commonly used; however, pieces of steel wool products break off and when inhaled can burn lips and cause pulmonary problems if ingested.

**Push Sticks**: Are used to push screens into place within the stem. Wooden push sticks are preferred over metal because they are less likely to crack or chip stems.

**Mouthpieces:** A small length of vinyl tubing that covers the stem and prevents saliva and/or blood from being passed onto others when individuals use their own mouthpiece. Mouthpieces also prevent burns to lips that may be caused by heat conduction, and cuts from sharp stems.

**Alcohol swabs:** To clean equipment after use and to clean hands and surfaces before use. Please remember that cleaning supplies with alcohol swabs do not sterilize supplies or make them safe for sharing.

***Optional items:***

**Lighter:** Are a safer alternative to matches because a person is less likely to burn themselves. Malchy et al. (2011), also state that not having one's own "light" is also associated with unsafe circumstances (e.g. forced to share crack or experience harassment from others).

**Bandages:** To cover/protect open wounds.

**Condoms/Lubricant:** To encourage safer sex practices.

**Information/resource cards:** Offer harm reduction tips and a list of local resources relevant to the population.

*Commonly used terms: crack kits, safer crack use kits, or safer inhalation kits are used to make reference to the package of supplies that is distributed in a safer smoking program.
** This information is adapted from: the Harm Reduction Journal (Boyd et al., 2008), the Canadian Journal of Public Health (Malchy et al., 2011), and the Best Practices Recommendations for Canadian Harm Reduction Programs (Strike et al., 2013).

Up until 2014 in Ontario, the distribution of safer smoking supplies varied among programs as a result of there being no established provincial distribution program. The programs that have been distributing safer smoking supplies have been sourcing and purchasing their own supplies. According to best practices, supplies that should be made available include borosilicate glass stems, food grade rubber/vinyl mouthpieces, wooden push sticks and metal screens. These are the products now available to order through OHRDP by Ontario's 36 core NSPs.

There may be reluctance among service users to use screens as opposed to Brillo®. Boyd et al. discovered that only 42% of survey respondents who received safer crack kits used screens while 91% indicated that they usually or always use Brillo®. Reynolds et al., (2011) found similar practices among their study participants as did Ivsins et al., (2011). Brillo® is easy to manipulate when packing a stem; therefore, despite the fact that Brillo® disintegrates and is sometimes inhaled, service users prefer to use it. This indicates that this particular behaviour might be difficult to change. Some crack kits have had info cards explaining the dangers associated with using Brillo® (Boyd, et al., 2008). Demonstrating and offering hands-on practice on how to insert screens was found to be effective at increasing the frequency of which participants used the screen (Boyd et al. 2008).

***Objectives 3: Effectiveness of safer smoking programs***

**Safer Smoking Program Findings:**

- There was a decrease in sharing previously used supplies and an increase in using safer supplies following the implementation of safer smoking programming in Ottawa (Leonard et al., 2011; Medd et al., 2011).
- The proportion of study participants sharing pipes "every time" fell from 37% to 13% (Leonard et al., 2007).
- Smoking from a previously used pipe declined from 65% to 53% ($p<0.01$) (Leonard et al., 2011).
- The frequency of re-using a stem decreased from 288 times down to 40 times, 11 months after safer smoking programming was implemented (Leonard et al., 2011).
- Using metal pipes (as opposed to glass stems) decreased by 29%, the use of inhalers (as opposed to mouthpieces) by 27%, the use of pop cans (as opposed to glass stems and mouthpieces) by 27%, and using car antennae (as opposed to wooden push sticks) from 7% to 1%. All declines were found to be highly statistically significant (Medd et al. 2011).
- In 2006 at the 1 year evaluation point after the safer smoking programming was implemented in Ottawa, almost 94% of participants had accessed the safer smoking program (Leonard et al., 2007).
- Offering safer smoking supplies can create the opportunity to engage the sub-population who use crack through existing health services including income assistance, addiction treatment and health care (DeBeck et al., 2009).
- Contact with people who use crack by way of distributing safer smoking supplies presents the opportunity to teach people who use crack about safer smoking and crack use practices (Boyd et al. 2008).

This literature review highlights the need for safer smoking programs. Seven studies focused directly on the efficacy of such programs and initiatives. In one study conducted in Vancouver in 2007, qualitative interviews were completed with those who received safer smoking supplies. It was found that those surveyed had an interest in reducing harms associated with crack smoking practices (Boyd, et al., 2008). Participants in Boyd's study employed safer smoking practices by modeling what others were doing and what they had seen. Using brass screens instead of Brillo® was one example. Between demonstrations from outreach staff and peers, and hearing about the fact that screens are safer to use than Brillo®, participants reported that they used screens more often, especially so when the message and demonstrations were repeated (Boyd et al., 2008).

Another cross-sectional survey was done before and after safer smoking kits were distributed among recipients in Vancouver. The purpose of the study was to examine how the kits were used and to see what effects distributing the kits had on behaviours and crack-smoking practices. The authors indicated that 71% of the post-survey participants confirmed that they had received a kit. Among those who received a kit, stems and lighters were used by 98% of respondents and mouthpieces were used by 79%.

Three studies focused on evaluating the implementation of safer smoking programming in Ottawa in 2005. Each study investigated whether or not unsafe crack-smoking practices (e.g. sharing supplies or using unsafe supplies) declined following the enactment of the program. Interviewing and a cross-sectional design were the methods used. A significant decline in sharing was demonstrated in the first study (37% pre-implementation to 13% 12-months post, $p=0.001$). What was highlighted was the decline in injecting behaviour given the availability of safer smoking supplies. A supplementary increase in crack use via inhalation was also found; however, because a decrease in injection drug use had accompanied this change, researchers indicated that this was a positive behaviour given numerous other risks associated with intravenous drug use (Leonard et al. 2007). In another study it was found that smoking from a previously used crack pipe declined from 65% to 53% ($p<0.01$) (Leonard et al., 2011). In the same study, frequency of re-using a stem before discarding it was shown to decline as well. Two months after the implementation of the programming, participants reported re-using a glass stem 288 times; however, eleven months post-programming implementation, participants reported re-using a glass stem 40 times before throwing it away.

> ***"Many people who engage in crack use were aware that sharing paraphernalia carries the risk of spreading diseases"*** -Ivsins et al., 2011

> ***"Many attributed their reduction in injection frequency and increase in crack smoking to the new availability of safer crack-smoking supplies"*** *-Leonard et al., 2007*

In a study by Medd et al., 2011 based in Ottawa, the use of metal pipes (as opposed to glass stems) declined 29%, the use of inhalers (as opposed to mouthpieces) dropped 27%. Using pop cans (as opposed to glass stems and mouthpieces) dropped 27%, and using car antennae (as opposed to wooden push sticks) dropped from 7% to 1%. Overall, the use of unsafe equipment declined at a highly statistically significant level ($p<0.001$). It was concluded that the safer smoking program in Ottawa demonstrated effectiveness at reducing harms associated with crack use, and the need to continue implementing and evaluating this program was suggested by all researchers and their affiliates (Leonard et al., 2007; Leonard et al., 2011; Medd et al., 2011). Access to the program increased significantly during the 12-month study period, with 94% of participants indicating that they, or a person on their behalf, had accessed the program (Leonard et al., 2007). This was taken as an indicator that the safer smoking programming was meeting the previously unmet needs of the population engaging in crack use.

In another study, which took place in Victoria BC, benefits and barriers to safer smoking program implementation were assessed through interviews. Eligibility criteria for this study included crack use on at least half of the 30 days prior to the interview and crack use for longer than 6 months. Benefits revealed were categorized as: health, economic and social level benefits. Health benefits included a decreased need to share after having received a crack kit. Economic benefits included a decreased need to engage in sex work to be able to buy supplies. Social benefits included a decreased need to become hostile or physically aggressive with another person who engaged in crack use, when both had their own supplies to use. Another benefit revealed, at the societal level, was that increased access to equipment resulted in fewer participants having to vandalize property to make crack smoking supplies. (Ivsins et al., 2011)

Ti et al. (2011) conducted research regarding factors that were associated with accessing stems with two established study cohorts in Vancouver. Over a third (33%) of their study participants related difficulty gaining access to stems. What was more concerning was the fact that this was reported in places where the participants could access stems at either a low cost or for free if supply was available. The factors associated with difficulty in access were sharing stems ($p=0.01$), access to services ($p=0.02$), police presence ($p=0.01$) and sex trade involvement ($p=0.03$). These findings indicated that difficulty accessing stems is a strong predictor of having to share. The findings also support what has been stated previously: that those who engage in crack use experience barriers to many services, especially in this case, as "services" were defined to include any harm reduction, counselling, housing, police or health service. The authors hypothesized that this finding was likely due to stigmatization this group faces, referencing numerous other studies that support this notion. The fact that the presence of police interfered with access to pipes was unsurprising to the researchers.

***Objective 4*: *Findings from a survey conducted by OHRDP of interest for safer smoking programs or programs currently underway in Ontario***

OHRDP conducts annual surveys with its 36 core NSPs across Ontario to ensure that distributed supplies are meeting community needs and current trends. In the most recent Environmental Scan conducted in 2013, these sites were asked several questions about safer smoking; 33 of the 36 sites answered the section on safer smoking.

**Results of the annual survey:**

- 88% (29/33 sites) stated that they saw a need to distribute safer smoking supplies.
- 74% (23/31 sites) indicated that they required information on risks associated with crack smoking.
- 49% (16/36 sites) indicated that they would consider distributing safer smoking supplies.
- 36% (12/33 sites) indicated that they were already in the process of distribution.
- Of the remaining seven NSP's that indicated they would not distribute safer smoking supplies, they explained that they could not due to financial and political barriers.

**Comments from respondents as to the importance of distributing smoking supplies:**

"The safer crack smoking equipment program is very limited as it is run solely on donations and is not supported or funded by Public Health"
"There is an increase in the amount of safer smoking going out through the NSP. Ordering of supplies has doubled in the past year"
"The need to stop the spread of blood borne diseases"
"Common sense"

The results of this survey are not unexpected. OHRDP is helping to meet the fiscal needs of safer smoking programs by supplying safer smoking supplies free of charge to the 36 core NSPs. The need for educational resources has also been identified through the 2013 Environmental Scan. OHRDP is helping to meet the education needs by having produced a manager's resource along with service user's resources on safer smoking. Currently, there are at least 14 programs supplying safer inhalation supplies in some capacity in Ontario (either a core NSP or satellite site). As OHRDP roles out the safer smoking program, staff at the 36 NSP sites will be key players in implementing the program at a local level.

***Objective 5: Program implementation and considerations***

Program model:

- In a harm reduction model, safer smoking supplies would be made available in a non-judgmental manner. The ways in which supplies are delivered might vary depending on program resources; however, the supplies can be offered through harm reduction programs such as needle and syringe programs, methadone clinics, or outreach workers who are either professional or peer. Outreach services are commonly employed, as they are known to be effective at reaching vulnerable populations such as those who engage in crack use (Ti et al., 2011).

Supplies:

- As of July 2014, OHRDP will be providing safer smoking supplies: borosilicate glass stems (crack pipes), brass screens, wooden push sticks, food grade vinyl mouthpieces, and alcohol swabs. Other supplies that sites may consider purchasing on their own include: lighters and bandages.

- Some programs provide condoms and lubricant with safer smoking supplies. Malchy et al. (2011) noted that condoms provided in the crack kits were used by 59% of the survey respondents. Harm reduction programs and outreach teams often distribute condoms, though the majority of the kit-recipients indicated that they had used the condoms that were provided with the safer smoking supplies specifically. Including condoms and/or other items that protect against STIs is a consideration for program design.

Kits vs. individual pieces:

- Pre-packed kits can be beneficial and may encourage recipients to use all components needed for safer smoking. Leonard et al. (2007) discovered that distribution of complete kits decreased during their study period; however, accessing individual pieces of equipment increased which included screens, mouthpieces and glass stems (2007).

Size of supplies:

- The need to be vigilant about police detecting equipment on the person was expressed as a concern in the study conducted by Boyd et al. (2008). Participants admitted that they would throw equipment away if it was not practical and useable (e.g. push sticks that were conspicuous and could not be transported easily, were discarded by participants).

Information cards:

- Just under three quarters of survey respondents in the study conducted by Malchy et al. (2011) indicated that information cards listing local resources were useful. In the study conducted by Boyd et al. (2008) those who received the cards indicated that they either used them or gave them to a peer in need of resources listed. Literacy levels of the population and amount of information would need to be considered as well as font size for those in need of glasses.

> ***"…When distribution of harm reduction equipment is part of a comprehensive program within a spectrum of health services, risk behaviours decline significantly..."*** *-Malchy et al., 2011*

Other high-risk populations:

- Shannon et al (2008) found women who engage in crack use experience increased exploitation, violence and vulnerability compared to their male counterparts. Ti et al. (2011) also demonstrated that females are more likely than males to have difficulty accessing stems. Shannon et al. (2008) discussed higher risks associated with STIs and HCV among women; therefore, offering gender-specific harm reduction programming is important. This could include efforts to discuss STI prevention with women who engage in crack use.

- Youth are another vulnerable sub-population. Younger populations report being taken advantage of by those engaging in crack use who are older, or those who sell crack cocaine (Reynolds, et al. 2011). Reynolds et al. (2011) also discovered that younger crack cocaine users were more likely to engage in risk behaviours such as sharing crack pipes. Leonard et al. (2007), also discuss that many studies indicate that injection drug users under age 30 engage in stem sharing as well. An additional effort to support the needs of youth is another consideration when implementing this type of programming.

- Those who engage in crack use discuss the ever-present need to move continuously from one place to another, given the vigilance of police patrolling (Ivsins, et al., 2011). This finding impacts the amount of time outreach efforts will have to spend with potential clientele.

Other concerns:

- Accessibility: location, hours and availability were the main reasons why participants in some studies had difficulty accessing safe smoking equipment (Ti et al., 2011). This study also discussed the need to ensure resources are available at night, due to the fact that sex trade work was associated with difficulty in accessibility.

- Police interference was reported as an issue, primarily in accessing equipment (Ivsins et al., 2011; Ti et al, 2011). Participants in the Ivsins (2011) study discussed the fact that police often break or confiscate crack pipes, and that sometimes those who engage in crack use cannot have supplies on them due to conditions of probation or parole. Capacity building with service providers and authorities, and tackling general political resistance, may be an important component of safer smoking program success. For more information about safer smoking kit distribution and the law, please see the September 2008 Canadian HIV/AIDS Legal Network Report: Distributing Safer Crack Use Kits in Canada.

- A few participants felt it was disrespectful for those distributing safer smoking supplies to demonstrate how to load a pipe, especially when the person who used crack had pride associated with their use (Boyd et al., 2008). Consideration in best ways to build rapport will be an essential component of program success.

## Conclusion

**There are many benefits to supplying safer smoking supplies, which are summarized below:**

Individual level

1. Decreases in risky health behaviours
- With the availability of safer smoking supplies one can decrease the frequency of sharing supplies.
- There is some evidence that the availability of safer smoking supplies might reduce the frequency of injecting (Leonard et al., 2007; Persaud et al., 2013; Reynolds et al., 2011)
- If condoms and lubricant are made available as part of safer smoking kits, this can decrease risk of STI transmission.

2. Increases in positive health behaviours
- The ability to provide brief intervention counseling and/or referrals when offering safer smoking supplies to a person can increase the likeliness that they might decide to get tested for STIs, HIV, and HCV.
- The person may also choose to access other health services outlined on resource cards if they are made available as part of an entire kit.

3. Psychological impact
- The act of making safer smoking supplies available was found to impact some study participants positively as they reported feeling cared for by this simple gesture (Boyd, et al., 2008).
- Providing harm reduction interventions can lessen feelings of social exclusion, shame, low self-esteem and feelings of marginalization.

Population level

4. Community/Society/Population impacts
- Decreased transmission of communicable diseases associated with crack use in a community where safer smoking programs exist, translates into less risk of disease transmission within the larger community.
- Safer disposal of crack supplies can take place at sites or with outreach workers resulting in lessened associated risks within the community at large.
- Incidences of vandalism, theft and physical violence associated with acquiring makeshift equipment may decrease when safer smoking supplies are made available (Ivsins et al., 2011).
- Given the high incidence rates of HIV and HCV among those who engage in crack use (Shannon et al., 2008), preventing disease from distribution of safer smoking supplies may reduce costs to our healthcare system.

All information shared in this literature review exemplifies causes to intervene specifically with those who engage in crack use by way of a safer smoking program. Supplies that are essential for safer smoking need to be available and accessible. Furthermore, Fisher et al. (2007) pointed out that there is a disparity between interventions for substance users based on the drug that is used. He stated that there is a "focal bias in interventions in favour of IDU" and that there has been no therapeutic intervention made available to those who engage in crack smoking comparable to NSPs in Canada, or heroin prescription programs. He states that "safer crack kit" interventions, as "rudimentary" as they are as preventative interventions, have not been given the opportunity to demonstrate their effectiveness.

> ***"Despite this widespread prevalence of smoking crack among Canadians who inject drugs, the HCV and HIV related prevention needs of crack smokers have largely been ignored in the development and implementation of harm reduction programmes for people who inject drugs"*** *-Leonard et al., 2007*

*Limitations*

Most studies in this review used a cross-sectional design; therefore temporality and thus causation could not be assured. Surveys and self-reported data were often methods of data collection used in the studies implicating the fact that findings were subject to social desirability bias. However, there is strong evidence that self-reported information among illicit drug users has high validity (Fisher et al., 2008). This also implies that the findings were underestimates of some of the reported risk behaviours, meaning that in some cases, results reported would be strengthened.

The majority of studies were conducted in Vancouver's downtown eastside, one of the poorest neighbourhoods in Canada (Boyd, et al., 2008). Vancouver has been found to have the highest proportion of people who use crack among illicit drug users (Fischer et al., 2008). Therefore, results of such studies can reliably be generalizable only to the study area. Findings of studies conducted in Ottawa might have more generalizability to other Ontario communities. This can be taken as an indication of the need for a situational assessment of areas local to the 36 core NSPs in Ontario. Such an assessment can highlight opportunities and barriers that might exist in the implementation of safer smoking programming.

It should also be noted that many injection drug user cohort studies engage with participants who also smoke crack. In those cases, the applicability of the findings to people who only smoke crack (and do not inject) are unknown and caution should be taken when extrapolating findings to this group (Webb & Bain, 2011).

Snowball sampling methods was employed to recruit study participants in all studies reviewed. This technique results in non-probability samples (Groves et al., 2009). However, due to the established fact that the majority of people who misuse drugs are hidden in society, this selection method has been proven as highly effective at obtaining a representative sample among this particular population (Watters et al., 1989).

This literature review was completed within a limited time period; therefore, this could have restricted the amount of associated literature and reports that could be incorporated in the discussion regarding efficacy of safer smoking programs.

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