

Characteristics of Regular Crack Use in mid-sized communities (Nanaimo, Campbell River and Prince George) in British Columbia – Implications for Public Health and Interventions

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REPORT

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Summary

Crack use is increasingly prevalent in Canadian cities, and reported to be associated with extensive other harmful drug use, physical and mental health problems, social marginalization and criminal justice involvement. Systematic secondary prevention and/or treatment interventions for crack use are currently limited in availability and demonstrated effectiveness. Despite the increased prevalence of crack use, research on street drug use in Canada currently focuses mainly on injection drug use and/or use in large urban centres. In this context, this study's objective was to characterize drug use, health, socio-economic characteristics and intervention needs of people who primarily use crack cocaine in three mid-sized communities in British Columbia, namely Nanaimo, Campbell River and Prince George. Study participants were recruited with the help of local service agencies, and assessed between June and November 2008 based on a study protocol involving quantitative, qualitative and biological measures. The two former were collected by way of an interviewer-administered anonymous questionnaire; the latter consisted of the collection of salivary samples for human immunodeficiency virus (HIV) and hepatitis C virus (HCV) antibody status testing. A total study sample of n=148 was assessed in the three study sites. Based on the various characteristics assessed, the majority of the study sample: reported unstable housing/homelessness; relied on social benefit payments for income generation; were under current criminal justice supervision; were poly-drug users, using other drugs like alcohol, cannabis, or opioids; reported their health status to be 'fair' or 'poor'; reported physical and mental health problems; were HCV positive; had used crack for at least ten years; frequently shared crack use paraphernalia; obtained crack pipe paraphernalia from makeshift (e.g., metal or glass) items; currently use social and health services; would use a safe consumption site (SCS) if such a facility was offered in their locale. Qualitative data documented that most respondents experience severe problems associated with their crack use, and feel that treatment options need to be improved in availability, accessibility and quality. Obtaining appropriate materials for crack use paraphernalia is a challenge for people who use crack in locations where crack pipe distribution is not available; many individuals who use crack see the need for and possible benefits from such programs or possible SCS facilities being implemented. Participants also elaborated on the dynamics behind crack paraphernalia sharing, which can occur for a variety of reasons. Overall, our study documents crack use as a prevalent street drug use activity in the study associated with extensive social, health and drug use risk which currently are not sufficiently effectively addressed by the existing interventions at the street/community levels. Given the epidemiologic extent of crack use in the study sites and elsewhere in BC, and the extensive risks and harms associated with this form of street drug use, concerted attention to and delivery of targeted interventions for this public health problem is urgently required.

1. Background

Epidemiology of Crack Use in Canada

Over the last decade, evidence has indicated that crack use is a highly – and in many places increasingly – prevalent drug use phenomenon among street-drug use populations in cities, although with considerable local variations. The most recent I-Track study (2006), examining injection drug user (IDU) samples in multiple sites (Edmonton, Regina, Quebec City, Sudbury, Toronto, Victoria and Winnipeg) reported that 65.2% of the total study sample had also used crack in non-injection form (i.e. smoking) in the past 6 months, with local site prevalence rates ranging from 32.0% of the sample in Regina to 88.8% in Toronto (Health Canada, 2006). The overall prevalence appears to represent an increase from an earlier I-Track study phase (2004), which indicated that 52.2% of the sample (assessed in Toronto, Regina, Sudbury and Victoria) had used crack in non-injection form (smoking) in the last 6 months (Health Canada, 2004). Furthermore, in the 2006 I-track study report, when asked which drug they had used by non-injection route most often in the last 6 months, 18.4% of participants mentioned crack, and only alcohol (16.7%) and marijuana (16.8%) were reported as comparably common (Health Canada, 2006). Recent data from the OPICAN study, a Canadian multi-site cohort of person who use illegal opioids and other drugs assessed in five cities (Toronto, Montreal, Quebec City, Edmonton and Vancouver) documented that 54.6% of baseline participants had used crack in the past 30 days, with the vast majority reporting oral use (smoking) as the main route of administration (Fischer et al., 2005a). The OPICAN study however indicated high differences in local prevalence rates for crack use, ranging from 3.4% in Quebec City to 86.6% in the Vancouver sample (Fischer et al., 2005a).

Furthermore, available data on crack use in British Columbia (BC) confirms that this behaviour is pronounced in this province, notably among people who use drugs in Vancouver where the bulk of street drug use epidemiology is being conducted. Data reported by the Canadian Community Epidemiology Network on Drug Use (CCENDU) showed that in the Vancouver site crack use (smoking) had increased from 35% to 55% between 1998 and 2000 (CCENDU, 2003). In addition, the Community Health and Safety Evaluation (CHASE) Project, which looked at drug use and health status of marginalized residents in Vancouver's Downtown Eastside (DTES), found that crack cocaine was the most commonly used illegal drug in the DTES of the city. In a sample of over 3,500 individuals from the DTES, recruited from 2003-2004, 55% of individuals reported using crack cocaine and 29% of the sample reported everyday/most day use of the drug (Boyd et al., 2008; Chase Project Team, 2005). Finally, data from the Vancouver Injection Drug Use Study (VIDUS), a cohort of 1,603 individuals who use injection drugs repeatedly assessed since 1996 has shown a massive increase in crack use, with 7.4% of the sample ever using crack at baseline assessment in May of 1996, to 42.6% of the sample by the end of the study period in June of 2005 (Werb et al., 2008).

Socio-demographics of Crack Use

People who use crack cocaine have a 'distinct social profile' (Malchy et al., 2008) when compared to other drug using groups. Research has identified a number of socio-demographic characteristics specific to persons who use crack cocaine. Crack use is often associated with poverty and homelessness (Corneil et al., 2006; Haydon & Fischer, 2005; Fischer et al., 2005b). A study of dual-users (crack smokers who also inject) based in Vancouver found that the vast majority of the participants (77%) were living in unstable housing, including in shelter/hostels, transitional housing, single room occupancy hotels and on the streets (Shannon et al., 2008). Correspondingly, housing has been identified as an important social determinant of health status among people who use drugs and other high risk groups and is associated with a variety of physical and mental health problems in these populations (Hwang, 2001; Palepu et al., 1999). Furthermore, individuals who use crack tend to report high rates of unemployment or exclusion from legal income generation opportunities (Cross et al., 2001). One study found that 61% of people who used crack had been unemployed for an average of 3 years prior to recruitment (Harocopos et al., 2003). Crack cocaine has been found to be prevalent among marginalized and deprived populations, i.e. the homeless poor, sex workers, mentally ill, and IDUs (EMCDDA European Monitoring Centre for Drugs and Drug Addiction, 2007). Individuals who frequently use crack have been severely marginalized not only within general society, but also within networks of individuals who use drugs (Fischer & Coghlan, 2007; Cross et al., 2001). Finally, research evidence suggests that person who use crack orally are characterized by distinct risks, harms and problems which span the health, social, economic and legal domains. These will be discussed in the sections below.

Crime and Income Generation

While an association between illegal drug use and crime has been widely established, multiple evidence has shown that the association between crack use and crime is particularly pronounced in a number of different ways. A meta-analysis of 30 studies, measuring effect size (using both the fixed effect and random effect models and calculating a range), found that the odds of offending were highest among those people who used crack compared to other drug use populations. This relationship held true across a range of offence types, including robbery, burglary, prostitution and shoplifting (Bennett et al., 2008). In Canada, the multi-site OPICAN study found that person who used crack reported significantly higher levels of crime and criminal justice involvement; specifically they reported more property crime, arrests, and imprisonment than non-crack using groups (Manzoni et al., 2006; Fischer et al., 2005b). A UK based study of in-treatment individuals who used drugs found that people who used crack had the highest levels of drug expenditure and were involved in the most crime (Best et al., 2001). Similarly, *Gossop et al.*, found that at the 4 to 5 year follow-up results showed that levels of acquisitive crime were higher for crack using individuals than for persons who used heroin (Gossop et al., 2002). Finally, in an older study by *Goldstein et al.*, the researchers found that in New York City 32% of all homicides and 60% of drug-related homicides were related to crack cocaine (Goldstein et al., 1989). However, these

researchers found that most drug related homicides were attributed to the drug market and the violence that surrounds it, rather than to the pharmaceutical properties of the drug itself, turning individuals violent (Goldstein et al., 1989).

Income generation for people who use crack cocaine is often unstable and frequently relates to criminal activity. In the VIDUS study, daily use of crack cocaine has been found to be independently associated with illegal/prohibited income generation. In particular, frequent crack use was found to be a statistically significant predictor of the amount of illegal income earned, with individuals who use crack everyday reporting having earned 197.4% more income from prohibited sources, than those in the sample who did not use crack regularly (DeBeck et al., 2007). In line with this, a US study found that persons who use crack when compared to other drug using individuals, reported the highest levels of criminal activity, especially with respect to drug dealing; 85% of the men and 71% of the women made 1,950 or more drug sales over a 90 day period (Inciardi & Pottieger, 1994). Another study from New York City found that people who used crack frequently had a significantly higher odds ratio for participation in non-drug illegal income generation, which included burglary, cons, stealing, and sex work (Cross et al., 2001). Earlier US studies found that the majority of crack using samples rely on illegal activities like prostitution, drug dealing, theft, and/or street hustles as their primary source of income (Baumer et al., 1998; Inciardi, 1995). Research has found a significant link between crack cocaine use and property offences in many metropolitan areas (Manzoni et al., 2006; Cross et al., 2001; Baumer et al., 1998). A meta-level US study found that cities with high rates of crack use were more likely to have experienced an increase in robbery rates and a decrease in burglary rates. The researchers attributed this to the individuals' who use crack need for immediate funds, easily gained through spur-of-the-moment robberies, and a lack of patience and planning time needed to accomplish more sophisticated burglaries (Baumer et al., 1998).

(Poly)drug Use Profile of People Who Use Crack

Street-based individuals who use crack typically engage in "poly-substance" use, using several types of legal and illegal drugs. These individuals also have histories of/or are currently injecting drugs and usually are heavy drinkers (Shannon et al., 2008; Smart, 1991). A survey of street-entrenched persons who used crack cocaine in Vancouver found that cocaine (37%), heroin (36%), and cannabis (20%) were also frequently used (Malchy et al., 2008). Furthermore, a study from Dayton, Ohio found similar results in that cocaine (59.7%), alcohol (37.7%) and cannabis (12.1%) were the most common co-dependencies among crack using individuals (Falck et al., 2004). A study looking at females who used crack found that the majority used a number of other substances in addition to crack cocaine, including alcohol; however their patterns of use were closely related to their levels of crack-cocaine use (Daniulaityte et al., 2007). A study of homeless adults in Toronto (n=368) found that 69% of those who use crack reported using at least one other drug regularly other than marijuana. The most commonly used drugs for this study population include: marijuana (60%), cocaine (52%), oxycontin (25%), morphine (18%), heroin (14%) and other opiates (25%) (Khandor & Mason, 2008). Finally, in a study of lifetime crack cocaine and heroin use (by injection) *McBride et al.*,

found that those who used crack more than once a day in the past 6 months were more than twice as likely to also use alcohol, marijuana, and amphetamines more than once a day (McBride et al., 1992).

Many people who use cocaine also use alcohol excessively. A study conducted by *Fischman & Johanson* found that between 60% and 90% of persons who abuse cocaine also abuse alcohol (Fischman & Johanson, 1996). Another study found that 85% of those participants who met the criteria for cocaine dependence also met the criteria for alcohol abuse (Regier et al., 1990). In addition, in a sample of 298 treatment-seeking persons who use cocaine, 62% had a lifetime history of alcohol dependence (Carroll et al., 1993). Several factors may support the strong relationship between cocaine and alcohol dependence. Evidence shows that some individuals who use cocaine will use alcohol to negate cocaine withdrawal symptoms, will use more cocaine when impaired by alcohol, and that for some persons who use cocaine alcohol enhances or extends the cocaine euphoria (EMCDDA European Monitoring Centre for Drugs and Drug Addiction, 2007; Pennings et al., 2002; Carroll et al., 1998; Jatlow et al., 1991). Furthermore, some research findings have shown that alcohol may be a trigger for or predictor of cocaine use, and may in fact act as a barrier to recovery from cocaine addiction (Usdan et al., 2001). Several studies have found that alcohol use is a major factor in the relapse of cocaine abuse after treatment (Rawson et al., 1995; Rawson et al., 1991). The physiological effects of many drugs increase when they are used in combination, rather than on their own, thus increasing the risks, dangers, and harms posed to the person using. In this case, alcohol and cocaine combination increases the heart rate with greater than additive effects, as well as raises blood pressure and blood levels of cocaine (Gossop et al., 2006; Pennings et al., 2002). Such findings have definite implications for crack use as well.

Evidence also shows that crack using poly-drug users engage in risky drug use behaviours at higher levels than their non-crack using counterparts. In a Toronto-based study a significantly higher rate of people who use crack (30%) said that they injected drugs in the past year, when compared with those individuals who did not use crack (7%) (Khandor & Mason, 2008). Another study found that crack using persons tended to participate in risky injection practices (i.e. needle sharing) at higher rates than non-crack using persons (Johnson et al., 2002). Crack use has also been found to be a predictor of injection drug use initiation, especially in younger people who use drugs (Roy et al., 2003; Irwin et al., 1996).

Risks/prevalence of Infectious Diseases among People Who Use Crack

Research indicates that people who use crack are at an increased risk of a multitude of health problems. People who use crack have been found to be at an elevated risk for contracting HCV, HIV, and various other sexually transmitted infections (STI) (Leonard et al., 2006; Millson et al., 2003; Roy et al., 2001; Marx et al., 1991). A systematic review of studies focusing on non-injection drug users and HCV found that the prevalence of HCV in never-injecting drug users (NIDU) ranged from 2.3% to 17% (a conservative estimate based on only those studies which were least likely to misclassify NIDU) (Scheinmann et al., 2007). Furthermore, a multi-site US study found that the

prevalence of HIV infection among people who smoked crack (15.7%) was 2.4 times that of non-smokers (5.2%) (Edlin et al., 1994). A study of in-treatment individuals who used drugs found that the prevalence of HIV was highest among women (23.6%) and men who used crack (17.8%) compared to men and women who did not use crack cocaine (7.4% and 7.3%, respectively) (Metsch et al., 1999). Finally, a study looking at both IDUs and crack smokers found that HIV infection rates among the two groups were 12.7% and 7.5% respectively, demonstrating higher than normal rates of HIV in crack using persons (Kral et al., 1998).

Research evidence has also found an association between crack smoking and STI. Historically, evidence linked STI increases to the crack epidemic in the 1980s, where rates of STI were significantly higher among people who used crack than those who did not (Rolfes et al., 1990; Fullilove et al., 1990). Recently studies are demonstrating similar findings. One such study found that crack smokers had the highest rates of gonorrhea (62%) and syphilis (22%) of all drug using individuals in the study (49% and 17% respectively) (Maranda et al., 2004). An earlier study confirmed these findings revealing that women who smoked crack reported the highest rates of STI (74.5%), followed by men who smoked crack (65.6%), while men and women who did not smoke crack had much lower rates (43.6% and 33.1%, respectively) (Metsch et al., 1999). A study of 407 in-treatment individuals who used drugs revealed that those whose drug of choice was crack were more likely to report previous STI than those whose drug of preference was not crack. This was especially true for syphilis (8.6% vs. 2.6%), chlamydia (6.5% vs. 2.2%) and herpes simplex 2 (61.0% vs. 35.8%) (Ross et al., 2002). In addition, in a New York based cohort of 372 sexually active inner-city women who had no history of injecting, researchers found that 61% of people who used crack/cocaine had an STI, as opposed to 34% of non-crack/cocaine using individuals (DeHovitz et al., 1994).

HCV, HIV and STI rates among persons who use crack are primarily driven by a variety of indirect risk behaviours (e.g., risky sexual practices, sex work, sex for drugs, risky injecting) which this population tends to engage in (Ross et al., 2002; Logan & Leukefeld, 2000; Ward et al., 2000; Ross et al., 1997b; Inciardi, 1995; Edlin et al., 1994). Research has found that people who use crack are more likely than other drug using individuals to engage in risky sexual activity, including having multiple sex partners, inconsistent condom use, unprotected anal sex, and sex under the influence of drugs (Lejuez et al., 2005). A study comparing crack and heroin using individuals found that the crack-only group had significantly higher sexual risk behaviour scores than the heroin-only group (Lejuez et al., 2005). Moreover, an analysis of in-depth interviews with people who use crack in one US city showed that sexual activity involving multiple anonymous partners often takes place within the context of crack use (Balslem et al., 1992). Another US-based research study revealed that crack smokers were less likely than those that injected only to use condoms or other barriers when engaging in sexual activity (Booth et al., 1993). Finally, a 2004 study found that there were significant positive associations between crack use and number of sexual partners regardless of type of sexual activity asked about (Maranda et al., 2004). One research study revealed that almost 1/3 of men and 89% of women in the sample of crack using persons had had 100 or more sex partners within the last 30 days before study recruitment (Inciardi,

1995). Furthermore, a study by *Diaz & Chu* found that crack smokers continued to engage in risky sex behaviours even after learning that they were HIV positive (Diaz & Chu, 1993).

Exchanging sex for drugs and risky injection practices are two other behaviours that have been linked to crack use. Evidence from one US study revealed that, after controlling for a range of variables, people who used crack currently were over five times more likely than non-crack using individuals to exchange sex for drugs or money (Archibald et al., 2003). Research has shown that females who use crack are significantly more likely than those individuals who use other drugs (e.g. opiates) to trade sex for drugs (Edlin et al., 1992). A study of African American drug using persons revealed that a history of crack use significantly predicted the trading of sex for money and/or drugs (Baseman et al., 1999). Finally, trading sex for drugs was found to increase not only unsafe sexual behaviour, but also risk of contracting STI. In one US study, females who used crack who traded sex for drugs reported having 13 times more sexual partners a month than those that did not trade sex for drugs, and they were also significantly more likely to report a history of STI (Logan & Leukefeld, 2000). There are also strong links between crack use, injecting drug use and risky sexual behaviour. People who both use crack and inject drugs have been found to be more likely to engage in sex with multiple partners, trade sex for drugs, have unprotected sex, and have sex with other IDUs (Hoffman et al., 2000). One study found that crack only smokers and crack smoking injectors were more likely than those who only injected cocaine to report multiple sex partners and exchanging sex for drugs. As a result of these high risk behaviours, condom use is of particular importance, however in this same study it was found that more than 80% did not use a condom during sex (Booth et al., 2000).

Although injection continues to be the foremost path of infection for these diseases, some research evidence has pointed to the possibility of HCV infection through the sharing of contaminated oral crack smoking paraphernalia (Fischer et al., 2008; Tortu et al., 2004; Roy et al., 2004; Faruque et al., 1996). The high incidence of oral sores and wounds, coupled with the fact that the sharing of crack use paraphernalia is common within the subcultural dynamics surrounding oral crack use (Malchy et al., 2008), creates the very distinct risk of HCV infection for those individuals who use crack orally. Studies have shown that chronic cuts, wounds, blisters, burns and open sores on the lips and inside the oral cavity are common among people who use crack, facilitating the transmission of infectious disease in the context of risky sexual or drug use practices (Haydon & Fischer, 2005; Porter et al., 1997; Inciardi, 1995). As well HCV transmission in non-injection drug using populations has also been linked to tattooing (Howe et al., 2005) and unsafe sexual behaviours (Gyarmathy et al., 2002). However, oral crack use continues to be a significant risk factor; *Roy et al.* (2001) found that among their street youth sample from Montreal (n=437), crack use was an independent predictor of HCV infection, even after controlling for injection drug use, tattooing, and other risk factors (Roy et al., 2001). Finally, due to their frequent lip and mouth injuries, people who use crack may be at an increased risk of HCV and/or HIV transmission through unprotected oral sex (Porter & Bonilla, 1993). Oral sex is the type of sex most often associated with sex for drug transactions because it is less complex and can be performed quickly in any

accessible space (Ross et al., 2002; Porter et al., 1997). *Porter et al.* (1997) found in their sample of crack smokers that over half of the respondents (55%) had lip injuries, with 80% of those being burns to the lips and mouth (Porter et al., 1997). In a group of female prostitutes from New York City, researchers found that among those women who have no history of injection drug use and perform mainly fellatio with their clients, 23.9% of those who used crack were HIV positive compared with 16.7% of female non-smokers (Wallace et al., 1997).

Physical/Mental Health Problems

Individuals who use crack represent a high-risk street-based drug using population commonly characterized by severe physical and mental health problems. Research data suggest that crack cocaine using persons are considerably more likely to report poorer overall physical health status than the general population and than other drug using groups. People who use crack were found to experience disproportionately higher rates of health problems, when compared with data from the general population (National Health Interview Survey (NHIS)) in one US based study, with two-thirds of the sample reporting one or more current physical health problems (Falck et al., 2003). Specifically, the not-in-treatment crack smoking sample (n=430) experienced acute health problems at a rate of 152.6 conditions per 100 person/year, meanwhile the NHIS comparison group had a rate of 144.3 acute conditions per 100 person/year (Falck et al., 2003). Findings from the Canadian multi-site OPICAN study also indicated that participants involved in crack use had a higher prevalence of self-reported physical health problems than non-using participants (Fischer et al., 2006a).

Due to the detrimental physical effects of crack cocaine use, which include increased body temperature, heart rate, and blood pressure, as well as constricted blood vessels, abuse of this drug has been linked to a variety of physical health complications involving cardiovascular, pulmonary, neurologic, psychiatric, gastrointestinal, and dermatologic symptoms (Cornish & O'Brien, 1996; Smart, 1991).

Cardiovascular problems have been commonly cited among people who use crack due to the vaso-constriction effects of the drug (Bigi et al., 2008; Falck et al., 2003). Several studies have also shown an increased incidence of strokes in individuals who smoke crack (Cornish & O'Brien, 1996; Daras et al., 1994). *Irak and Rajput* (1998) report that cocaine associated neurovascular events, e.g. strokes, are common and fatal (Irak & Rajput, 1998). As well, other heart and blood vessel related problems have been reported in crack cocaine abusers including cardiac arrest, ventricular arrhythmias, coronary vasospasm, myocardial ischemia, myocardial infarction, and cardiomyopathy (Hsue et al., 2007; Cornish & O'Brien, 1996; Smart, 1991).

Pulmonary problems are a key complication reported by crack cocaine using individuals. Difficulty breathing commonly arises from the use of unsafe crack smoking equipment. People who use crack often use brillo or steel wool, as filters in their pipes (Malchy et al., 2008; Fischer et al., 2008). When heated, these products can disintegrate and the particles can be inhaled causing mouth, throat and lung damage (Porter et al., 1997; Porter & Bonilla, 1993). Other pulmonary complications found in crack using persons include clinical manifestations of airway injuries (Suhl & Gorelick, 1988)

(including upper airway burns from crack pipe screen ingestion (Ludwig & Hoffner, 1999)), pulmonary edema and hemorrhage, pneumothorax, pneumomediastinum, pneumopericardium (Haim et al., 1995; Meisels & Loke, 1993), asthma (Rao et al., 1990; Rebhun, 1988)) and persistent episodes of bronchospasm (Kissner et al., 1987). One research study found that 32% of habitual crack using participants reported persistent wheezing and difficulties breathing while using crack (Suhl & Gorelick, 1988).

Moreover, risky practices such as crack pipe sharing or “shotgunning” (which is the act of one person blowing crack smoke into another person’s mouth (Perlman et al., 1999) can increase the risk of pulmonary infection transmission e.g. tuberculosis (TB) (McElroy et al., 2003; Howard et al., 2002). Several studies have found that crack cocaine use is independently and significantly associated with an elevated risk of tuberculosis (McElroy et al., 2003; Howard et al., 2002; Leonhardt et al., 1994). A New York based study looking at a sample of dually diagnosed in-patients (i.e., mental and substance use disorder), found that patients who had used crack cocaine within the 30 days prior to admission were 3.53 times more likely to test positive for TB than those who did not use crack (Taubes et al., 1998). Another study has revealed that crack use and its particular socio-environmental conditions can increase the spread of TB. The high flow of human traffic and close contact in enclosed environments common to many ‘crack houses’ (places where crack is procured and used), coupled with the coughing induced by smoking crack, likely facilitates the rapid dissemination of TB (Leonhardt et al., 1994).

In addition, people who use crack cocaine experience other well-known effects of this stimulant such as appetite and fatigue suppression (Garrity et al., 2007). If these effects are prolonged and repeated, which often happens as a result of the ‘bingeing patterns’ of use (National Institute on Drug Abuse (NIDA), 2005; Dackis & O’Brien, 2001; Inciardi, 1995; Waldorf, 1991), this may lead to severe nutritional and sleep deficiencies. It is common practice among many crack using persons to use crack during ‘binge’ periods for as long as the drug is available or affordable, during which sleeping and eating are not priorities (Inciardi, 1995; Waldorf, 1991). Ensuing nutrition problems take their toll health. One study found that people who use crack were 10 times more likely to report dental problems than a similarly aged comparison group from the general population (Falck et al., 2003).

Along with the physical health problems, mental health problems are disproportionately prevalent among crack using individuals. Research data show a high level of self-reported or diagnosed mental health problems for people who use crack, including antisocial personality disorder (ASPD), major depression, and paranoia (Falck et al., 2004; Kleinman et al., 1990). *Falck et al.*, found that in a not-in-treatment crack cocaine using group, the most common nondependency disorders were antisocial personality disorder (ASPD 24%), depression (17.8%), and posttraumatic stress disorder (PTSD 11.8%) (Falck et al., 2004). Research from New York City, based on a sample of treatment-seeking cocaine abusers (76% of whom were mostly smoking crack), showed that 47% of patients had lifetime depressive disorders and 58% suffered from antisocial/passive-aggressive/borderline/self-defeating personality disorders (Kleinman et al., 1990). Several studies have also found that when compared to primarily heroin

using groups, crack/cocaine using individuals have a higher prevalence of personality disorders (Craig & Olson, 2006; Flynn et al., 1995; Mirin et al., 1991). Crack cocaine use itself, can cause feelings of restlessness, irritability, and anxiety, and extended use can lead to periods of paranoid psychosis (National Institute on Drug Abuse (NIDA), 2005).

Crack Use-specific Practices and Risk Behaviours

Studies have shown that chronic cuts, wounds, blisters, burns and open sores on the lips and inside the oral cavity are common among people who use crack, which again may facilitate the transmission of infectious diseases in the context of risky sexual or drug use practices (Haydon & Fischer, 2005; Porter et al., 1997; Inciardi, 1995). One study found that crack smokers were more than twice as likely to report having had oral sores in the last 30 days than those individuals who did not smoke crack (10% vs. 4.5% respectively) (Faruque et al., 1996). Oral sores are facilitated by the often unsafe materials from which makeshift crack pipes are fashioned. Regularly, pipes are made from materials such as glass bottles, tubes or fragments that can splinter, chip, or break due to the heat or from scraping resin off of the sides of the pipe creating the potential for cuts or wounds in and around the oral cavity (Fischer et al., 2008; Leonard et al., 2008; Porter et al., 1997). Other materials used to construct crack pipes include broken or twisted pop cans which can have sharp edges, and other metal instruments (such as car antennas or metal piping) that can potentially cause harm (Fischer et al., 2008; Leonard et al., 2008; Porter et al., 1997; Waldorf, 1991). The intense heat generated when crack is smoked and conducted by glass or metal pipes (Porter & Bonilla, 1993) facilitate sores, burns, or blisters in the mouth area (Haydon & Fischer, 2005; Porter et al., 1997). Crack using persons who predominantly use metal pipes have a higher frequency of lip and mouth injuries than those who use glass pipes. The metal stem may cause injuries right from the first time that it is used compared to the glass pipe which typically leads to injuries after breakage from repeated use (Porter et al., 1997).

The social dynamics of crack use dramatically increase the risk of disease transmission. Paraphernalia sharing is not only a common and acceptable practice among crack smokers, it is also positively reinforced in this subculture (Malchy et al., 2008; Haydon & Fischer, 2005; Porter et al., 1997). An Ottawa based study found that 72% of the crack smoking participants reported sharing a pipe to smoke crack at least once in the last 6 months (Leonard et al., 2008). Research based in Vancouver found that 79% of their crack using sample had shared a crack pipe in their lifetime (Malchy et al., 2008). Another Vancouver based study found that many participants often smoked in small groups that shared equipment (Boyd et al., 2008). In addition, this study also found that due to a lack of private space and safe housing, crack smoking often occurred outdoors and was often rushed in an effort to avoid police adding to the level of risk of pipe sharing (Boyd et al., 2008). A New York based study, looking at heavy crack smokers who frequented a needle exchange facility, found that two thirds of their sample shared crack smoking devices, with approximately half respondents almost always sharing their paraphernalia (Porter et al., 1997). Moreover, in this sample 10% of participants reported having seen someone share a crack stem with blood on it, with this being an underestimate according to the researchers (Porter et al., 1997). This study also found

that age played a role in sharing, in that younger individuals were more likely to share crack pipes; 61% of those less than 30 years old reported sharing crack pipes versus 41% of those who were 40 years or older (Porter et al., 1997). Finally, crack pipe sharing is associated with increased likelihood of other risky practices including selling drugs for sex, using pipes with splits and cracks, and experiencing burns or lesions (Malchy et al., 2008).

Social/Health Care Service Utilization

While access to social and health care services is highly important for street-based drug using persons, such access is often particularly difficult for those people who use crack who represent the 'marginalized among the marginalized' population of illegal drug using persons (Fischer & Coghlan, 2007). For example, the constant need to acquire drugs, especially in the case of crack cocaine, causes people who use this drug to have difficulty in keeping appointments or adhering to therapeutic interventions (Drumm et al., 2003; Chitwood et al., 1998; Friedman, 1994). In a Miami based study of chronic drug using individuals, including crack cocaine smokers, it was found that getting to health care facilities for preventative services that are not acute was not a priority as "the rock always came first" (Drumm et al., 2003). Only when a health condition became so severe that it was unmanageable would drug using participants seek medical attention, usually in the form of Emergency Room (ER) visits (Drumm et al., 2003). Furthermore, stigma or fear of disapproval or rejection by service providers often functions as an insurmountable barrier even when health services are made available (Poland et al., 1993; Gerbert et al., 1991). *Drumm et al.* found that people who used drugs felt rejection from health care providers when they ignored their needs or refused to offer appropriate care, causing a general dissatisfaction and a future barrier in seeking the use of those services (Drumm et al., 2003). The social stigma and discrimination attached to crack use, reinforced by derogatory terms like "crack head," alienates and disconnects these extremely vulnerable individuals from needed social and health supports (Rae et al., 2005).

As a result, individuals who use crack have been found to be less likely to make use of health and social services. Evidence from the Canadian multi-site OPICAN study showed that people who used crack were less likely to have a regular health care physician, relying mainly on walk-in-clinics where available. This suggested that crack using individuals had less stable health care access than non-crack using persons (Fischer et al., 2006a). Furthermore, research data from the US indicates that crack use seems to be an inhibitory factor particularly for women in the utilization of health services. While women who used crack were significantly less likely to seek medical services, crack use did not appear to affect men's overall use of health services, with crack using men actually being slightly more likely to use ER services than men who did not smoke (Metsch et al., 1999).

Research evidence shows that chronic drug using individuals frequently draw on costly Emergency Room services and other forms of acute care, with reports showing that ER use is 30% greater in persons who chronically use drugs than in casual or non-using individuals (French et al., 2000). More specifically, a study of medical care

utilization among cocaine using individuals from Toronto, Ontario found that the frequency of medical visits in the last 12 months tended to be higher if the participant had reported also using crack (Ottaway & Erickson, 1997). Moreover, a US study of not-in-treatment crack smokers also found high levels of Emergency Room visits, with a range from 53.5 to 76.7 per 100 persons per year during the study, compared to only 33.6 ER visits per 100 persons per year for a similarly matched group of individuals from the general population (from the 1996 Ambulatory Medical Care Survey) (Siegal et al., 2006). This study found that the most common reasons for ER visits among people who use crack cocaine were for treatment of injuries/poisonings (29.5%), musculoskeletal problems (11.5%), and respiratory problems (11.2%) (Siegal et al., 2006).

Treatment and Public Health Interventions

Despite mounting evidence of the distinct harms surrounding oral crack use, current prevention efforts and treatment services in Canada continue to be focused primarily on IDUs (Shannon et al., 2008). Few services provide support uniquely for crack using individuals, and there is less harm reduction information, services, education, and access to safe equipment for this population (Boyd et al., 2008). Moreover, after two decades of research, there is still no well established, effective pharmacological treatment for cocaine/crack dependence (Gorelick et al., 2004; Kleber, 2003). In principle there are four pharmacological approaches that may be useful in the treatment of cocaine dependence: substitution treatment (which would suppress withdrawal symptoms); antagonist medication (which would suppress the reward/high of cocaine use); modulation treatment (to reduce craving); and cocaine pharmacokinetics (to suppress the amount of cocaine reaching the brain) (Gorelick et al., 2004). However, in practice no medication has been found to effectively treat cocaine dependence, and more than forty medications have been investigated over the past twenty years (Castells et al., 2007; Grabowski et al., 2004; Kleber, 2003). A few promising medications to lessen cocaine withdrawal symptoms have included amantadine, bromocriptine, carbamazepine and desipramine, however the positive results of early double-blind trials have not always been replicated on further examination (Withers et al., 1995). A more recent approach has been using disulfiram to increase dopamine levels indirectly. However in spite of some positive results among co-dependent users (alcohol abusers, patients on methadone), further testing in non-co-dependent populations is necessary (Kleber, 2003). Furthermore, research findings have not yet supported the use of full agonists for treating stimulant abuse and addiction (Gorelick et al., 2004). Thus far, there is no pharmacological treatment for cocaine/crack dependence that is analogous to methadone treatment for opiate dependence.

In spite of the lack of pharmacological treatment for cocaine/crack addiction, a few interventions have been initiated and have met with varying degrees of success and with significant resistance from the political sphere, the general public, and from law enforcement officials (Haydon & Fischer, 2005). One such prevention/intervention measure is the distribution of safer crack use kits (SCUK). These kits contain sterile smoking equipment, and although there is some local variation in kit content, they

usually consist of a pyrex glass tube, rubber mouthpiece, metal screen, as well as other 'harm reduction' articles such as condoms, Vaseline, and information about available social and health services in the area (Boyd et al., 2008; Leonard et al., 2008; Haydon & Fischer, 2005). Overall, policy support has been lacking on this issue and very limited research is available to determine the efficacy of this type of intervention (James, 2007). By increasing the availability of clean smoking equipment, the safer crack use initiatives aim to decrease crack pipe sharing and as a result, to decrease transmission of diseases (Boyd et al., 2008; Leonard et al., 2008; Haydon & Fischer, 2005). Along with the obvious health benefits of distributing crack smoking paraphernalia, SCUK distribution has the added potential benefit of bringing previously 'hidden' and marginalized crack using populations in contact with various health and social services (Boyd et al., 2008; Haydon & Fischer, 2005). In one Vancouver based study, almost all of the participants acknowledged the need for harm reduction tools and demonstrated a willingness to participate in future safer crack programs (Malchy et al., 2008). Although usually met with much resistance, safer crack use initiatives have been implemented, even if sporadically, in a number of Canadian cities including Winnipeg, Toronto, Montreal, Guelph, Halifax, Ottawa, as well as in a few BC cities, including Vancouver, Victoria, Prince George, and Nanaimo (James, 2007; Symington, 2007). However, since June 2007 both the Ottawa City Council and the Vancouver Island Health Authority (for Nanaimo) have shut down their SCUK programs. In Ottawa, negative media portrayal, opposition from the Chief of police, and a newly elected mayor cancelled the program after 2 years of service and in spite positive evaluations (O'Byrne & Holmes, 2008; James, 2007; Symington, 2007). A study by Leonard and colleagues found that the practice of pipe sharing had decreased significantly after the SCUK program was introduced in Ottawa (Leonard et al., 2008). As well, this study showed a shift to a less harmful method of drug ingestion (from injecting to smoking) due to the increased availability of crack smoking paraphernalia (Leonard et al., 2008). The SCUK program in Nanaimo, BC was in operation for less than one year and was suspended due to persistent opposition and pressure from some residents groups and city councillors (James, 2007; Symington, 2007). SCUK initiatives continue to be controversial and are predominantly unavailable throughout Canada. Furthermore, the International Narcotics Control Board (INCB) criticized Canada for allowing SCUK programs in its 2007 report, suggesting that these initiatives contravened the international control treaties (Boyd et al., 2008).

Another intervention measure with a possible focus on crack use are supervised consumption sites (SCS). Based on the concept of safe injection sites (SIS), which provide a safe and clean environment for IDUs to consume their pre-obtained illegal street drugs in the presence of professional staff (Kimber et al., 2003), SCS are broader in nature and provide safer drug use facilities also for non-injection drug using persons, e.g. crack and other drugs consumed by inhalation. SCS facilities were first established in the 1980's and some 70 or more currently operate in several European countries (James, 2007). While the original SIS were limited to injection use, spaces for non-injectors have been added increasingly over the past few years in response to the growing presence of non-injection drug use in many European cities (Fischer & Allard, 2007). Currently, SCS facilities including facilities for crack cocaine smokers have been implemented in the

Netherlands, Germany, and Switzerland (Fischer & Allard, 2007; EMCDDA European Monitoring Centre for Drugs and Drug Addiction, 2007). The Vancouver Insite facility put forward a proposal for an expansion of the SIS facility for crack use, however the exemption was not granted, thus no such service exists in Canada (Haydon & Fischer, 2005). SCS for oral drug use aim to reduce the risks associated with consumption through inhalation including: paraphernalia sharing, using broken/harmful smoking equipment, using in poorly ventilated areas, violence and rushed use out on the street (Shannon et al., 2006; De Jong & Weber, 1999). Safe inhalation facilities can be beneficial in addressing concerns of public order as well by for example reducing discarded smoking paraphernalia in the community and decreasing the existence of public drug use (van der Poel et al., 2003; Stoever, 2002). SCS also have the potential to increase contact between hard to reach drug use populations and primary care, addiction and social services (Shannon et al., 2006; van der Poel et al., 2003). Finally, crack cocaine dependence is characterized by exaggerated compulsive consumption behaviour, and persons who use this drug continuously suffer from restlessness, extreme tension, paranoia and physical exhaustion (EMCDDA European Monitoring Centre for Drugs and Drug Addiction, 2007; National Institute on Drug Abuse (NIDA), 2005), putting crack using individuals at greater risk of becoming victims of harm, theft and violence if they are left to 'crash' or 'come down' on the street. SCS can provide a safe and calm environment for resting, minimizing victimization of this vulnerable population (EMCDDA European Monitoring Centre for Drugs and Drug Addiction, 2007). Besides the unsuccessful efforts for to establish an SCS in Vancouver, recommendations for SCS including people who use crack have been put forward in Victoria, BC (Fischer & Allard, 2007). Research shows that there is not only a substantial need for education and preventive intervention programming in the crack using population, but also an overwhelming interest in it on the part of people who use crack. In one Vancouver based study, almost all of the participants acknowledged the need for harm reduction tools and demonstrated a willingness to participate in future safer crack programs (Malchy et al., 2008).

2. Methods

The objective of this study was to assess the socio-economic, drug use, health characteristics of individuals who use crack regularly as well as their support/treatment utilization/needs characteristics in three select mid-sized communities on Vancouver Island and on the BC mainland, namely: Nanaimo, Campbell River, and Prince George. Assessments were conducted successively in the three study locations between July and November 2008. Study participants were recruited from existing local crack using populations utilizing the assistance of pertinent local social and health service agencies and peer recruiters with good active contacts in the local crack using population in the respective study sites, specifically for the distribution of relevant study and contact information. A total of 148 participants were included in the overall study sample (Nanaimo: n=70; Campbell River: n=37; Prince George: n=42).

Well known and centralized service agencies in each of the study sites were used for the purpose of study locations, providing study personnel with a screening and waiting room area, and a private confidential interview room. The fieldwork in each of the three sites was conducted by two trained field researchers and a staff worker recruited from local agencies for the purpose of recruitment and research support. Upon contacting the study (in-person at the study location), potential participants were screened for eligibility following a pre-set screening protocol. Eligibility requirements required that all participants must (1) be at least 16 years of age, (2) be regular crack cocaine smokers (“regular” defined as “having used crack on at least half of the last 30 days”), (3) be willing to participate in the study protocol, and (4) not be intoxicated at the time of the assessment. One of the study personnel would engage in a brief conversation with potential study participant, asking key questions to verify eligibility, and if the study applicant was found to be eligible, the assessment was either conducted immediately thereafter or an appointment was scheduled.

Assessments in each of the study locales were conducted in private space provided for the purpose of this study by local community-based agencies, specifically: AIDS Vancouver Island (AVI) in Nanaimo, AVI in Campbell River, and the Prince George Needle Exchange in Prince George. Prior to the study assessment, the research assistant outlined the study objectives, explained the various components and procedures of the assessment, and clarified key matters of anonymity and confidentiality. Participants provided informed verbal consent for participation in the study on the basis of this information. The study protocol was conducted anonymously (i.e. no personal information was collected) and each participant was given a unique study code and identifier for potential follow-up and data processing and internal linking purposes. The study assessment consisted of 1) a one-on-one interview based on a standardized questionnaire including closed and open-ended questions and 2) a self-administered saliva sample collection for HIV and HCV antibody testing. The face-to-face interviews were conducted by one of the two trained field researchers, in an interview space (a closed room), ensuring privacy and confidentiality. The study assessments lasted an average of 45-60 minutes and the questions focused on socio-demographics, drug use history, risk behaviours and health and social service utilization.

The saliva sample for HIV and HCV antibody detection was collected using the OraSure® Oral Specimen Collection Device, which the participants self-administered by placing the cotton-swab-like collecting device into their mouths, to obtain a small amount of saliva. This sample was then inserted into a test-tube filled with a preserving liquid. The test-tubes were then labeled with the participants' previously assigned unique study code and stored in the refrigerator for shipment and subsequent laboratory testing at the BC Centre for Disease Control, Vancouver. After completion of the various study assessment components, participants were given an honorarium of \$20 and if requested, they were provided with additional information about locally available social, health and treatment services. This study was approved by applicable research ethics boards, including the Joint University of Victoria/Vancouver Island Health Authority (VIHA) Research Ethics Sub-committee and the Northern Health Research Review Committee.

After completion of data collection, the data were entered into a standardized data entry shell by the study's research assistants. Oral fluid HIV and HCV antibody screening was performed at the BC Centre for Disease Control as reported elsewhere. Previous validation of the OraSure® Oral Specimen Collection Device confirmed high sensitivity for both the HIV (96.4%) and HCV (94.6%) antibody testing methods (Buxton et al., 2009; Judd et al., 2003). The quantitative data was initially analyzed by appropriate descriptive statistics and stratified by location, using SPSS. Descriptive analyses were conducted using basic counts, percentages, means, medians, standard deviations, and ranges. This was done for individual cities and combined across all sites. Differences across study sites were tested for significance using chi-square tests with accompanying adjusted standardised residuals for categorical variables and ANOVAs for continuous variables. Missing values were not imputed. The qualitative data was manually reviewed and coded according to emerging themes and issues, jointly identified by the study's research assistants.

3. Results

Socio-demographics, income generation and criminal justice involvement [see Table 1]

Two-thirds (63.5%) of the sample were male; Nanaimo had the highest proportion of males (75.7%) and Prince George had the lowest (48.8%). Respondents were fairly evenly spread out across the age groups, ranging from 20 to 50 years and over. The majority of the total sample reported non-stable housing status, i.e. their current housing situation was either unstable/temporary (26.4%) or they were homeless (33.1%). A minority (40.5%) reported that their current housing situation was stable. When asked what income sources they utilized, the largest majority (85.8%) reported that they drew income from a variety of social or income assistance programs (e.g., disability, welfare, pension, unemployment benefit programs). Sex work as well as soliciting, panhandling, binning activities (45.9%) were reported as the second most common income source, employed by almost half the sample. Illegal drug dealing activities were also frequently reported (39.9%). In both the Campbell River and Prince George sites, half of the sample (48.6% and 51.2%) reported that they had been arrested in the past year. Based on the arrest rate for the past 30 days in the Nanaimo sample (24.3%), we assume that the per annum rate there was at least as high as in the two other sites [Note: Due to a technical error, a different measurement period for the 'arrests' item was used for Nanaimo ('in the past 30 days' as opposed to 'in the past year'), and thus site results for this variable cannot be aggregated]. Among the reasons for arrests, property offenses (36.4%) and drug-related offenses (29.1%) were cited most commonly. About three quarters of the sample (73.5%) reported that they were currently under some form of criminal justice supervision or restraint, e.g. probation, parole, bail orders.

Drug use and related risks [see Tables 2 and 3]

Besides crack use, study participants reported the use of a variety of other psychoactive substances for the period of the last 30 days prior to their assessment. Most common was alcohol, used by almost three quarters (70.3%) of the total sample, followed by cannabis in its various forms (59.5%). Both prescription opioids (excluding heroin or methadone; 50.0%) and cocaine (47.3%) were consumed by about half of the study sample. Cocaine use was significantly more common in Campbell River and less common in Nanaimo. Heroin (32.4%), benzodiazepine/barbiturate (25.7%) and amphetamine (18.9%) use were reported by substantial minorities of the sample. Among the drugs reported, those individuals who used heroin (72.9%) prescription opioids (54.1%) and cocaine (50.0%) indicated that 'injection' was the primary route of administration for the respective substance.

Overall, just over two out of five study participants (43.9%) were current injectors, i.e. reported injection drug use activity in the past 30 days. This proportion was highest in Prince George and lowest in Nanaimo. The mean and median number of injection days (in the last 30 days) among injectors was substantially higher in Campbell River than in the two other sites. Half of the total sub-sample of current injectors stated that they averaged 1 to 2 injecting episodes per injection day. The Campbell River sub-

sample had the highest proportion of injectors (52.9%) indicating an average of 5 or more injection episodes per injection day. Just over one in ten (12.7%) of the participants who reported involvement in injection drug use indicated that they had shared a needle or syringe with someone else in the past 30 days.

Infectious disease and overdose [see Table 3]

About one third (37.8%) of the total sample had engaged in unprotected sex in the 30 days prior to assessment. 9.5% (14 out of 148) of the total sample tested positive for HIV antibodies, and 58.8% (87 out of 148) tested positive for HCV antibodies. Less than one in ten (7.5%) of the total sample self-reported that they had ever tested HIV positive, and half of the total sample (49.7%) self-reported that they had ever tested HCV positive. About two thirds (63.6%) of participants who self-reported HIV positive status indicated that they ever received treatment for HIV, and just over one in ten (13.9%) of the participants who had self-reported HCV positive status indicated that they had ever received treatment for HCV. A small minority of the total sample (4.1%) stated that they experienced a drug-related overdose in the past 30 days prior to assessment.

Physical and mental health [see Table 4]

The majority of the sample (52.4%) described their physical health as 'fair' or 'poor'. Two thirds of the total sample (64.9%) stated that they experienced physical health problems in the last 30 days. This rate was higher in Nanaimo than in the other study sites. 'Pain' was the most common physical health problem. A slightly smaller proportion of the total sample (58.8%) stated that they had experienced mental/emotional health problems in the past 30 days. In the majority of cases (74.1%), these consisted of mood problems, e.g. symptoms of depression or sadness.

Crack use indicators [see Table 5]

The median length of crack use was 10 years (mean: 10.9). The median number of crack use episodes per crack use day across the total sample was 20 (mean: 29.6). Four out of five participants (79.1%) reported that they had shared crack use paraphernalia (e.g., crack pipes) with others in the past 30 days. Close to half (44.3%) of those who indicated any paraphernalia sharing stated that they had done so on more than 20 occasions in that time period. When asked where they obtained the materials for their crack use paraphernalia, the largest proportion of respondents (49.3%) replied that these were assembled from makeshift items (e.g., pop cans, glass bottles or inhalers). About one third (34.5%) stated that they purchased hardware parts (e.g., water piping) in a store; others obtained their crack use paraphernalia from other persons who used drugs (29.7%), friends or partners (20.9%) or their drug dealer (12.8%). Virtually all (97.6%) respondents from Prince George indicated that they had obtained crack use paraphernalia from the local crack pipe distribution program. About one in five participants (21.6%) of the total sample indicated that they had oral sores or wounds present in the past 30 days. The median number of days in which oral sores were present was 9.2 (mean: 5.0).

Social, health and treatment service utilization and needs [see Table 6]

Virtually all participants (95.3%) reported that they had used some form of social service (e.g., drop-in, shelter or food-bank) in the past 30 days. Health services were utilized by 65.5% of respondents, street health services by 58.8%, and addiction treatment services by 33.1%. When asked whether they would use a 'supervised consumption site' (SCS) for their drug use if one was available in their local site, three quarters of the total sample (77.6%) affirmed that they would use of such a facility. This proportion was lower in Campbell River than in the two other study sites. When asked about a list of possible factors that might influence their utilization of an SCS facility, the following factors were rated as 'very important' or 'important' by at least four out of five respondents: that the SCS would have basic health care services available (95.3%); that the SCS would make referrals to addiction treatment (94.6%); that the SCS facility's hours of operation were convenient for people who use drugs (90.7%); that needle exchange services were integrated into the SCS facility (89.1%); that the SCS would offer basic social services (85.2%); the use of the facility would be anonymous (82.7%); that the location would be close to local drug use areas (81.4%); and that individuals who use drugs could access/make use of the SCS facility as often/for as long as they wanted (81.2%).

Qualitative data on crack use

Qualitative data was collected on several aspects of behaviours, dynamics, outcomes and intervention specifically for crack use. Key themes are summarized below.

Role & initiation of crack use: Across all sites, crack was the primary drug for participants in this study. Many described that they were initially introduced to crack use through their immediate social networks, where in many instances they would be offered to try crack for free. Several explained that they were originally mainly involved in cocaine use, and either saw crack use as an opportunity to get away from injection or nasal administration of cocaine, or were attracted to it because it was cheaper.

Positive/Negative aspects of crack use: About one third of the total sample stated explicitly that there was absolutely nothing positive for them about crack use and that they used it because they were seriously 'hooked' on or 'addicted' to it. A substantial number of respondents explained that they used crack primarily as a physical or emotional 'crutch', painkiller or stimulant, e.g. to help them 'to get things done' or to deal with feelings or symptoms of depression, loneliness, sadness, anxiety, stress or severe/chronic physical pain. In this context, numerous respondents described that the 'good part' of crack use was the initial buzz, euphoria or high occurring immediately at the beginning of a use episode (i.e., the first few seconds to maximally the first couple of minutes). A vast majority of the total sample elaborated on various negative consequences or problems associated with crack use. More than half of the sample explained that crack use gave them severe physical or mental health problems. Specifically, respondents stated that they experienced problems with their lungs or breathing, sores or burns in their mouth areas, scabs and lesions, dental problems (e.g., tooth decay), loss of appetite, weight loss, nutritional problems, sleep deprivation and dehydration. Several respondents specifically described how the physical 'coming down' from the initial crack use euphoria, and the onset of withdrawal, was extremely unpleasant. Furthermore, people struggled with the constant 'jonesing' or 'tweaking', as well as the 'unstoppable urge' or 'insatiable craving to use' linked to a sense of 'loss of control' over crack use. On the mental health side, people mentioned paranoia, hallucinations or psychotic symptoms, depression, tension, suicidal thoughts, anger, feelings of violence and aggression, memory loss or a state of 'brain death', and emotional instability as results of crack use. The majority also indicated that crack use had caused them severe personal relationship problems, e.g. resulted in the loss of contact with family members or led to the break-up of an intimate relationship or personal friendships. A further majority explained that crack use had led to serious financial problems, since it caused them to miss work or lose paid employment altogether and/or that crack use consumed all their financial assets and resources, made them lose their home or personal belongings, resulted in heavy debt loads, and forced them to engage in crime or sex work as their main income source. Further negative aspects cited were: a loss of pride, dignity, self-respect, spirit, charisma and motivation associated with crack use; the fact that 'crack use completely takes over your life' and they needed to spend all their time and energy on using or hunting for crack; they needed to lie, steal, scam in order to obtain crack, and consequently became involved in

crime and the criminal justice system; the label and stigma of being a 'crackhead'; the 'unpleasant and scary company' they need to keep to find money or drugs; and the fact that they are regularly at risk of being robbed or assaulted due to their involvement in crack use.

Crack pipe materials: Vast majorities of respondents in Nanaimo and Campbell River indicated that their crack pipes were made mainly from metal components, commonly makeshift pieces that were found or bought in hardware stores. These included: metal sockets, plumbing pieces, threaded pieces of steel, parts of light fixtures, car parts, pop cans, TV parts, umbrella stems, metal pens, brass piping, tire gauges, hydraulic fittings, radio antennas. Metal pieces would typically be combined with makeshift mouthpieces made from rubber, often pieced together from fishing or aquarium tubing, eyedrop devices, wine making kits, or rubber hoses. For filters, most would use brillo or steel wool. Small minorities in Nanaimo and Campbell River reported the use of makeshift glass devices for crack pipes. The majority of the Nanaimo and Campbell River samples stated that they would prefer to use glass devices, yet appropriate materials were hard to find and therefore they had to rely mainly on metal or alternative materials. Glass material pieces consisted mainly of pyrex glass tubes (obtainable from some corner stores), insulin vials, flame torch glass pieces, incense tubes, small flower vases from dollar stores, or light bulbs. The vast majority of respondents from Prince George stated that they predominantly used pyrex glass stems obtained from crack pipe material distribution programs, yet some complained that only some of the kits included proper metal screens.

Crack pipe use and sharing: About a third of the total sample stated that they typically used crack by themselves, whereas most others stated that they often used with others, either in groups or with one other person (e.g., friend or partner). Respondents who had reported sharing crack pipes elaborated that such sharing behaviour occurred in situations where they had lost or forgotten their pipe or it had been stolen. Others suggested that they ran out of a key pipe component (e.g., brillo) or could not access pipe materials (e.g., since crack pipe distribution was not active). Some also described that they were in a situation where they bought crack and needed to use right away but did not have their own pipe and so they ended up using someone else's. Conversely, some reported that they sold crack to someone who did not have a pipe so they lent them their own to facilitate immediate use. Several respondents indicated that they intentionally did not carry a pipe on them for fear of arrest or seizure by police, or possible denial of access to a shelter. Others explained that collective pipe use was a deliberate action taken mainly for economic benefit, since this way crack could be 'pooled' and cost-effectively shared by several people. Others elaborated that lending their own pipe to others would facilitate the build-up of crack residue in the pipe, which they could use for their own benefit for free. Finally, several respondents underscored how crack pipe sharing was also a social gesture or indication of 'solidarity' among crack using individuals, since sharing would commonly be limited to close or trusted friends or partners.

Possible measures to make crack use safer or make them quit: About half the total sample stated that they really could not think of anything that could make crack

use safer or less harmful for them, with many stating that the only way to reduce harms or increase safety related to crack use would be by finding a way to quit. A substantial minority of the sample – about 1 in 5 – stated that currently they do not think anything could be done to make them quit crack use. Among those who believed that major risks or harms related to crack use could be reduced without necessarily terminating use, a substantial proportion of respondents in both Nanaimo and Prince George suggested that the availability of ‘safer crack use kits’ would likely make crack use safer and less harmful for people who use crack, at least in the short-term, in as far as crack using individuals would not have to share pipes or use unsafe materials (e.g., metal instead of glass pipes) more likely to result in injuries, cuts and burns and therefore would reduce key health problems related to crack use. In addition, several people suggested that a designated crack use facility – e.g., a safe consumption room open to people who use crack – would reduce key risks and harms by providing a safe, protected and calm place to use.

A number of people raised that a key factor in risks and harms related to crack use was the uncontrolled quality (purity, potency) of crack obtained on the street, and the safety risks that came with the forced exposure to illegal (and often violent or dangerous) street markets. Several individuals suggested that a regulated crack quality control mechanism or a medically supervised and/or state-sanctioned crack distribution program would reduce related risks and improve crack use safety. Others suggested that ideally there would be a substitute/maintenance drug for crack/cocaine (akin to methadone for heroin) that would reduce their cravings for and dependence on crack. About half the total study sample saw effective treatment as the key method to effectively reduce harms and promote desistance. A substantial number of these respondents saw fundamental improvements in access to and the availability of more effective treatment services as a critical requirement. Key concerns about the current state of treatment for crack use were that respondents saw waiting lists for detoxification or treatment as far too lengthy. Several people stated that treatment services seemed uncoordinated, and it was hard for people to know what was available. A few respondents felt that available treatment should be much longer in duration (i.e., several weeks to months) in order to achieve lasting effects. It was added by some that the period immediately following release from treatment was most challenging, and that good ‘aftercare’ would be required to prevent relapse. A considerable number of respondents stated that a key aspect of treatment was ‘counseling’, yet current counseling practices required improvement, specifically to provide non-judgmental, open and honest counseling services. A couple of people suggested that special treatment programs should be available for woman or couples in order to provide specific support for these groups and that comprehensive treatment services should be linked to housing or job services to provide stability and/or distract them from opportunities to use crack. A substantial number of respondents mentioned that to quit crack, it was important to be away from the immediate environments where people mainly used and sold crack. However, most treatment programs were located in high crack use areas, which made it difficult for people who used crack to resist. Several respondents mentioned that the potential success of treatment was crucially dependent

upon addressing poly drug use. For example, several respondents suggested that their crack use was linked with their alcohol dependence, as the alcohol makes them use crack due to desirable combined effects. Other suggested that a steady supply of marijuana would help them overcome their cravings for crack, yet marijuana was often hard to come by.

Experiences with crack kit distribution: About one third of participants from the Nanaimo sample had used the crack kit distribution program when it was in operation. Previous users of the initiative stated that its main benefits were that they did not have to share pipes anymore, that they had access to clean, unblemished and safe pipes that prevented them from injury or disease, that they did not have to rely on dealers or other people to get pipes, and that the kits were distributed in conjunction with educational information about disease as well as information about treatment and other services. While most previous service users stated that the initiative had no shortcomings, some suggested that the program was not available at all times when needed, that many persons who use drugs did not know about it, or that the way the program was offered would expose 'closet' crack using individuals. Of the Nanaimo participants that had not accessed the initiative, most said that they had not known about or they did not reside in Nanaimo at the time.

4. Discussion

Crack use is an increasingly prevalent drug use phenomenon across Canadian cities, and in some jurisdictions, it has been reported to be the primary form of street drug use (Health Canada, 2006; Haydon & Fischer, 2005; Fischer et al., 2005a). Such indicators and developments have also been reported for British Columbia, and suggested for the three mid-sized communities (Nanaimo, Campbell River and Prince George) in which this study was conducted (Boyd et al., 2008; Werb et al., 2008; Chase Project Team, 2005; CCENDU, 2003). The main objective of this research study was to assess socio-economic characteristics, drug use, health status and intervention needs of a sample of individuals who use crack in these sites, as well as to explore in depth specific aspects of crack use risks and harms.

The people who used crack that were sampled included both sexes and a wide age range. In terms of key socio-economic indicators, more than half of the study sample were underhoused/homeless, pointing to this predominant form of marginalization which has been documented for crack using populations elsewhere (Shannon et al., 2006; Corneil et al., 2006; Fischer et al., 2005b). Given that housing status is well recognized as a powerful social determinant associated with a wide range of negative health outcomes (Hwang, 2001; Palepu et al., 1999), this situation is of great concern for the specific target population. For income generation, the majority of people who used crack in our study did not rely on paid work. Instead, they mainly relied upon a variety of social benefit programs for financial support. In addition, illegal or semi-legal activities like drug dealing and sex work, panhandling, binning, etc were common. These findings confirm the high degree of involvement of crack using individuals in forms of income generation other than regular employment (DeBeck et al., 2007; Cross et al., 2001; Baumer et al., 1998; Inciardi, 1995), many of which are associated with considerable social costs (e.g., social support programs, property crime) and/or health risks (e.g., sex trade). The involvement of many street-based drug using persons in small-scale/street level drug dealing is also well-documented, whereas the prevalence of other 'criminal activity' for income generation was somewhat lower than in other studies with comparable populations (Inciardi, 1995; Inciardi & Pottieger, 1994). Given the high degree of involvement in illegal activities for income generation and, of course, illegal drug use, it is not surprising that a high level of involvement with the criminal justice system was also prevalent in the sample. Close to half of the sample reported having been arrested at least once in the past year, and three out of four respondents were found to be under some form of criminal justice restraint. This suggests that considerable criminal justice resources are being spent on this population in the three study sites --- at this point seemingly with limited success certainly when it comes to reducing the prevalence of crack use. It is well documented that criminal justice expenditures by far, make up the major proportion of societal costs attributed to street drug use (Rehm J. et al., 2007; Fischer & Rehm, 2006; Fischer et al., 2006c) The vast majority of people who used crack assessed, also engaged in 'poly drug use' beyond their regular crack use patterns (as defined by eligibility criteria for the study), although some local variations emerged. Poly-drug use profiles have become the predominant norm for street drug use populations in Canada, as demonstrated by recent key studies

(Shannon et al., 2008; Malchy et al., 2008; Daniulaityte et al., 2007; Health Canada, 2006). Our study found high co-prevalence for alcohol and cannabis use. These substances are typically rarely mentioned in street drug use profile, yet should not be overlooked since they bring considerable health risks (e.g., alcohol) especially when used frequently and/or contribute to illegal activities by use alone (cannabis). Cocaine use co-occurred in about half the study sample although these rates varied across sites (e.g., significantly higher prevalence in Campbell River than in Nanaimo). These differences may be attributable to differences in drug markets/availability or local drug use habits/cultures (Firestone & Fischer, 2008; Patra et al., 2008; Anderson, 2006). At the same time, given that several respondents referred to a history of cocaine use in our qualitative data, it is evident that cocaine and crack use cultures in the study site environments are closely linked, and need to be so addressed by interventions. The study sample furthermore indicated a high co-prevalence rate of opioid use; such co-use however occurred more commonly in the form of prescription (pharmaceutical analgesic) opioids rather than heroin. Other recent Canadian studies have demonstrated that the prevalence of prescription opioid use has substantially increased in street drug use populations in numerous Canadian cities – as appears to be case also in the study sites – although heroin still appears to be available and consumed in the local sites where this study took place (Health Canada, 2006; Fischer et al., 2006b).

There are a number of key implications emerging from the poly-drug use profiles observed in the crack using study population. The first concerns morbidity and mortality risks. Specific poly-drug use combinations – e.g., stimulant, e.g. cocaine/crack, and opioid combinations, as found in our study population - have been found to be strongly associated with fatal or non-fatal drug overdose (Kerr et al., 2007; Poletini et al., 2005; Kaye & Drake, 2004). As such, interventions should address the fact that poly-drug use is common and places an individual at an elevated risk of overdose. Second, both cocaine and opioids/heroin reported as co-used substances by large proportions of participants in this study were used by way of injecting in the majority. Overall, close to half the total study sample were current injectors, most of which injected regularly (i.e., near-daily). Injection drug use is well documented as the primary risk factor for HIV and HCV transmission among street drug using populations, as well as a strong determinant of fatal and non-fatal drug overdose (Hagan et al., 2005; Darke & Hall, 2003; O'Driscoll et al., 2001). Hence, injecting plays a key role for extended morbidity/mortality risks beyond crack use itself in this study population. Finally, these findings on poly-drug use prevalence have important implications for interventions. While – as documented - there clearly is a need for crack use specific interventions in the study population, the range and focus of interventions needed is not limited to crack yet clearly ought to involve and be integrated with measures for other forms of high-risk drug use, whether through appropriate prevention, public health measures or treatment. Concretely, given that a substantial proportion of the study population besides crack use also engaged in injection drug use, secondary prevention measures need to address both these substantially overlapping risk behaviours. Similarly, treatment programs offered need to be prepared to address poly-dependence profiles.

As one of the key morbidities among street drug populations, infectious diseases are a key concern. Laboratory testing methods revealed an HIV antibody prevalence of 10% and an HCV antibody prevalence of 59% in our study sample. These prevalence rates are to be considered as relatively high in a population of primary non-injection drug using individuals and cause for considerable concern, as rates at these levels are usually found in more homogeneous IDU populations (Aceijas & Rhodes, 2007; Health Canada, 2006; Aceijas et al., 2004). Most or all participants in the study sample may have had a lifetime history of injecting (data not collected), and may thus have been exposed to HIV and/or HCV through injection drug use in the past as the primary risk factor (Alter, 2006; Hagan et al., 2005). These infectious disease prevalence data support previous studies that show that regular crack using persons as the ones included in our study are at a highly elevated risk for HIV and HCV positive status (Leonard et al., 2006; Millson et al., 2003; Roy et al., 2001; Metsch & McCoy, 1999; Edlin et al., 1994). For HCV specifically, recent evidence has suggested that it may be transmitted by way of crack pipe paraphernalia sharing (Fischer et al., 2008; Tortu et al., 2004; Roy et al., 2004; Faruque et al., 1996). Given the high HCV prevalence in this sample of primary crack using individuals, intensified investigation of possible transmission dynamics among people who use crack is urgently needed. Of further concern in our findings is that infectious disease prevalence was underestimated by study participants. A total of 14 participants (just under 10% of the total sample) tested positive for HCV, yet did not indicate awareness of their HCV positivity status. Given that awareness of infection status is an important determinant for both prevention (e.g., avoidance of unsafe sex or paraphernalia sharing) as well as for the conscious initiation of therapeutic measures (Kwiatkowski et al., 2002; Vidal-Trecan et al., 2000), this finding is alarming and may point to major barriers for infectious disease testing for the study population in the study sites. Furthermore, only a small minority of those that tested positive for HCV had received treatment for this costly and potentially fatal disease, even though effective treatments are available and can feasibly, safely and effectively be delivered even to active drug using individuals (Wilkinson et al., 2009; Bruggmann et al., 2008; Dalgard, 2005). Clearly, the health care needs of HCV positive persons who use crack are not being met on key fronts in the study sites and these deficiencies should be addressed by local health authorities.

In terms of other health indicators, over half of the study sample rated their physical health status as 'fair' or 'poor'. These findings are consistent with health or health related quality of life indicators being comparably low or compromised in street drug use populations (as for example, compared to the general population (Werb et al., 2008; Leonard et al., 2008; Falck et al., 2003). In our sample, this assessment is likely strongly influenced by the high prevalence of serious 'physical problems', which were reported by two thirds of the sample. The physical health problem most commonly cited by respondents was 'pain' (approximately three in ten respondents), a problem frequently present in street drug using populations and commonly associated with initiation or persistence of substance use problems (Novak et al., 2009; Sheu et al., 2008). The vast majority of the study sample also reported co-occurring mental health problems, primarily in the form of 'mood problems' (cited by 3 in 4 participants).

Approximately 1 in 5 respondents indicated anxiety problems. While the study's definition/inclusion of mood problems was somewhat broader than formal diagnostic criteria, these data clearly confirm that mental health or emotional problems are highly prevalent among people who use crack (Falck et al., 2004; Kleinman et al., 1990). While often ignored or neglected in favour of infectious or other physical health problems, the presence of substance and mental health co-morbidities are critical for outcomes and interventions in many ways (Meier & Barrowclough, 2009; Weaver et al., 2003; Cacciola et al., 2001; Ross et al., 1997a; Araujo et al., 1996). A large proportion of substance use incidence is known to be caused by inadequately diagnosed or treated mental health problems, i.e. can begin as a form of 'self-medication' by substance use (Harris & Edlund, 2005; Khantzian, 1997). Such has specifically been documented for stimulant (e.g., cocaine or crack) use which is disproportionately associated with mood, personality or anxiety disorder problems. Furthermore, concurrent disorders in substance using individuals have been associated with compromised health outcomes (Lowinson, 2005). At the same time, concurrent disorders are a major challenge for treatment programming and delivery due to their interactional dynamics, yet few interventions exist addressing such problems comprehensively and effectively (Lowinson, 2005; Rachbeisel et al., 1999). While our data in general evidence a strong need for an expansion and improvement of treatment options for crack use, these in particular also ought to address the distinct needs for treatment capacity and skills for co-morbid problems associated with crack use, i.e. mental health and other drug use problems.

This study found important details regarding crack use specific characteristics, risks and harms in the study population. Most participants have been involved in crack use for long periods of time (10+ years). The vast majority of respondents furthermore indicated high frequencies of crack use episodes per use day, i.e. a dozen or more episodes per day amounting to so-called 'bingeing' patterns. These crack use patterns are of great concern since they have been associated with multiple risk and harm outcomes, including sexual risk behaviours, psychotic episodes, etc., (Dackis & O'Brien, 2001; Inciardi, 1995; Waldorf, 1991).

Of particular concern is that 4 out of 5 participants reported that they actively engage in crack paraphernalia sharing, and had done so on numerous occasions – in many instances dozens of times - in the past 30 days. Crack paraphernalia sharing has been identified as a possible pathway for infectious disease, i.e. HCV, transmission among people who use crack, and is considered a marker for pre-eminent risk behaviour in the study population (Tortu et al., 2004; Edlin et al., 1992). Our qualitative data documented that dynamics behind crack pipe sharing is a product of a variety of factors such as the unavailability of pipes, the urgency to use crack immediately after purchase, economic reasons (e.g., the possibility to build up crack resin in one's own pipe if it is used by others or the need to pool crack with others), and 'social reasons' (e.g., crack use in a group setting). In addition, fear of police involvement (e.g., seizure or arrest) and fear of being banned from shelters for carrying crack paraphernalia were mentioned as reasons for sharing crack pipes. Clearly, these paraphernalia sharing dynamics need to be better understood and incorporated into intervention measures

aimed at this behaviour, yet also to possibly revise existing policies or law enforcement practices which appear to contribute to acute health risk behaviours akin to what has been observed for 'needle sharing' dynamics among drug injectors as a result of pressures from law enforcement (Kerr et al., 2005).

Our study furthermore revealed important dynamics regarding the sourcing of and materials used for crack pipe paraphernalia. Nearly all participants from Prince George had used the local crack pipe distribution program, whereas people who used crack in the other sites mainly used found or purchased makeshift items or obtained (potentially pre-used) paraphernalia from other drug using individuals. One important implication is that by virtue of access to the crack pipe distribution programs people who used crack in Prince George had access to glass stems/pipes, whereas crack using individuals in the other locales primarily relied on a variety of metal pieces or items to assemble their crack pipes. The latter kind of materials used for crack paraphernalia are much more likely to lead to oral cuts, sores, or burns, because of the metal's properties regarding heat transmission or due to their sharp edges (Boyd et al., 2008; Porter et al., 1997). Oral sores, cuts, or burns are an important risk factor for facilitating the potential transmission of infectious disease (e.g., HCV) among people who used crack, e.g. by way of sexual risk behaviour (oral sex) or crack pipe sharing (Tortu et al., 2004; Roy et al., 2004; Wallace et al., 1997; Faruque et al., 1996; Inciardi, 1995; Porter & Bonilla, 1993). About one in five respondents reported the presence of oral sores/wounds/cuts. The prevalence of oral sores/cuts/wounds and crack pipe sharing was slightly lower in Prince George where the crack pipe distribution program was available at the time of study - than in the other two study sites. Given the current dearth of interventions for crack use related risks and harms, it is of urgent importance to investigate the extent to which the distribution of safer crack use materials can reduce such risks and harms and to implement interventions based on these findings (Shannon et al., 2008; Boyd et al., 2008; Fischer & Coghlan, 2007). Evidence from a study evaluating such a program in Ottawa suggest that such measures are well received and utilized by the target population, and the prevalence of certain risk behaviours can be reduced [Leonard et al., 2008]. Despite evidence indicating the health benefits of crack kit programs, they continue to be politically contentious and have been discontinued in Nanaimo and Ottawa (James, 2007; Symington, 2007). Recently, health authorities in BC announced that select safer crack use materials (e.g., mouthpieces and pushsticks) would be made available for distribution by local health authorities as part of provincial public health programming aimed at high risk drug using groups (Small & Drucker, 2008; Times Colonist (Victoria) December 13, 2007), yet the implementation of this plan appears to have been sporadic and slow.

Our study's findings regarding social, health and treatment service utilization confirmed that this population is highly dependent upon basic social support/benefit programs. Virtually all participants reported the current use of drop-in centres, shelters or food banks, i.e. indicated that they were not able to independently provide for these basic needs on their own and thus underscored the existential deprivation which commonly characterizes crack using populations (Leonard et al., 2008; Corneil et al., 2006; Chase Project Team, 2005; Fischer et al., 2005b). Furthermore, both institutional

and street level health care services were heavily utilized. This finding may mean a number of different things. For one, various data indicators suggest that the study population is in highly compromised states of physical and mental health and could benefit from comprehensive social supports and health care. It could possibly be taken as a partially positive sign that health care services are commonly utilized and perhaps some of the major health problems are addressed. However, much of the health care utilization reported likely reflects responses to acute care needs or public health services like needle exchange. Overall, our study confirms that these primary crack using individuals have complex and severe health risks and problems which do not seem to be sufficiently addressed in the study locations

One third of the study population reported recent involvement with the addiction treatment system. Our data do not allow us to provide more detail on what kinds of treatment were specifically utilized, i.e. whether these were to treat crack use or other substance problems, or how sustained or sporadic these involvements were. It appears clear however that even though a majority of the study sample present an urgent need for treatment related to crack use, only a relatively small minority appear to be accessing such services. These circumstances are underscored by the qualitative data collected. A substantial number of participants stated that they currently do not see treatment as an effective or promising intervention for their crack use related problems, or noted serious problems/obstacles with the treatment options available. Beyond fundamental barriers to program access or gaps in program availability, the overall prospects and state of treatment programs for crack use in general are rather discouraging (Shannon et al., 2008; Small & Drucker, 2008; Fischer & Coghlan, 2007). The demonstrated efficacy of behavioural interventions for crack use is highly limited (Knapp et al., 2007). Despite a few select encouraging results in biological or early clinical experiments, with maintenance agents for crack and/or other stimulant use, a feasible, safe, and effective maintenance therapy for crack dependence (analogous to methadone maintenance therapy for opiate dependence) is not currently available or easy to address (Gorelick et al., 2004; Kleber, 2003). Thus – as concretely illustrated by our study sample – for those people who used crack who were actively in need of or seeking treatment for their crack use, multiple gaps and barriers exist.

As one option to reduce health risks associated with crack use, several Western European jurisdictions have established so-called ‘safer crack use facilities’, i.e. facilities (typically in conjunction with safer injection facilities) in which individuals are allowed to smoke crack and can obtain basic social and health care services as well as referrals to treatment (Fischer & Allard, 2007; EMCDDA European Monitoring Centre for Drugs and Drug Addiction, 2007; Hedrich, 2004; De Jong & Weber, 1999). A ‘safer inhalation’ facility component had been proposed as an additional intervention element to Vancouver’s ‘Insite’ (supervised injection) facility, but this proposal was rejected by the authorities; it was also recommended as a component for a safer drug consumption program in Victoria (Fischer & Allard, 2007; Shannon et al., 2006; Haydon & Fischer, 2005). When queried about the possibility of a safer crack use facility in their respective locales, the vast majority of the study sample (4 in 5) affirmed that they would utilize such a facility if available. Evidently, most people who used crack represented in our

sample would see potential benefits or value in the existence of a safer crack use facility. More detailed queries highlighted the distinct role of different factors in influencing crack using individuals' possible utilization of such a facility, illustrating for example that convenient, flexible and anonymous use, the availability of basic health and treatment services, and the absence of police were found to be important to potential users and should be taken into consideration if/when such a safer inhalation facility is considered for implementation.

In summary, our study suggests that people who use crack in mid-sized BC communities – specifically the study sites of Nanaimo, Campbell River and Prince George -- are a socio-economically marginalized population of poly-substance users with a high prevalence of physical and mental health problems (including high levels of infectious disease, e.g., HCV and HIV) and who frequently engage in risk behaviours. Clearly, prevention and treatment needs for this population are extensive, but far from sufficient. Given that crack use appears to be a particularly prevalent form of street drug use especially in the study sites, there is an urgent need to expand and improve the uptake and effectiveness of prevention, health care and treatment services offered for this high risk population. Furthermore, it needs to be considered to which extent current law enforcement practices are contributing to the socio-economic marginalization and health risk behaviours/problems displayed by this population, and how these could pragmatically be improved by appropriate political and legal action.

Table 1. Socio-demographics and Criminal Justice Involvement, n(%)

	Nanaimo (n=70)	Campbell River (n=37)	Prince George (n=41)	Total (n=148)	χ^2 Exact p-value
Sex					
Male	53 (75.7) ^ψ	21 (56.8)	20 (48.8) ^ψ	94 (63.5)	0.011
Age (in years)					
18 - 20	1 (1.4)	1 (2.7)	0 (0.0)	2 (1.4)	0.978
21 - 30	13 (18.6)	9 (24.3)	7 (17.1)	29 (19.6)	
31 - 40	21 (30.0)	10 (27.0)	12 (29.3)	43 (29.1)	
41 - 50	22 (31.4)	11 (29.7)	13 (31.7)	46 (31.1)	
51+	13 (18.6)	6 (16.2)	9 (22.0)	28 (18.9)	
Housing status*					
Stable	24 (34.3)	18 (48.6)	18 (43.9)	60 (40.5)	0.259
Unstable / temporary	22 (31.4)	5 (13.5)	12 (29.3)	39 (26.4)	
Homeless	24 (34.3)	14 (37.8)	11 (26.8)	49 (33.1)	
Income Sources*					
Paid work	23 (32.9)	11 (29.7)	13 (31.7)	47 (31.8)	0.947
Social benefits	61 (87.1)	29 (78.4)	37 (90.2)	127(85.8)	0.295
Family / partner / friends	16 (22.9)	15 (40.5) ^ψ	9 (22.0)	40 (27.0)	0.100
Drug dealing	29 (41.4)	15 (40.5)	15 (36.6)	59 (39.9)	0.877
Sex work, soliciting, panhandling, binning	30 (42.9)	15 (40.5)	23 (56.1)	68 (45.9)	0.300
Criminal activity	13 (18.6)	9 (24.3)	15 (36.6)	37 (25.0)	0.106
Other	20 (28.6) ^ψ	11 (29.7)	0 (0.0) ^ψ	31 (20.9)	0.001
Respondents arrested**	17 (24.3)^ψ	18 (48.6)	21 (51.2)^ψ	56 (37.8)	0.005
Reason for arrest (among arrestees)**, &					
Drug possession/use	4 (23.5)	3 (16.7)	3 (15.0)	10 (18.2)	0.782
Drug dealing / production / trafficking	3 (17.6)	2 (11.1)	1 (5.0)	6 (10.9)	0.469
Property offence	5 (29.4)	6 (33.3)	9 (45.0)	20 (36.4)	0.585
Violent offence	3 (17.6)	3 (16.7)	2 (10.0)	8 (14.5)	0.768
Sex work / prostitution	0 (0.0)	0 (0.0)	4 (20.0) ^ψ	4 (7.3)	0.023
Parole / probation / treatment order / bail violation	3 (17.6)	2 (11.1)	2 (10.0)	7 (12.7)	0.761
Other	5 (29.4)	8 (44.4)	4 (20.0)	17 (30.9)	0.262
Under current judicial restraint^{&}	49 (71.0)	26 (70.3)	33 (80.5)	108(73.5)	0.486

^ψMinimum adjusted standardized residual greater than absolute 2.0, where p-value for overall $\chi^2 \leq 0.10$

*In the past 30 days; **In the past year (in the past 30 days in Nanaimo only)

[&]Estimates are based on lower sample sizes

Table 2. Drug Use (in the past 30 days)

Drug/Drug Category	Prevalence of use – n (%)					Used by Injection* – n (%)				
	Nanaimo (n=70)	Campbell River (n=37)	Prince George (n=41)	Total (n=148)	χ^2 Exact p-value	Nanaimo (n=70)	Campbell River (n=37)	Prince George (n=41)	Total (n=148)	χ^2 Exact p-value
Alcohol	44 (62.9)	29 (78.4)	31 (75.6)	104 (70.3)	0.168	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	††
Marijuana / hashish	46 (65.7)	23 (62.2)	19 (46.3)	88 (59.5)	0.124	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	††
Mushrooms / ecstasy	7 (10.0)	3 (8.1)	0 (0.0)	10 (6.8)	0.120	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	††
Speed/methamphetamines /crystal meth/acid	21 (30.0) ^ψ	0 (0.0) ^ψ	7 (17.1)	28 (18.9)	0.001	4 (19.0)	0 (0.0)	3 (42.9)	7 (25.0)	0.617
Cocaine ^{&}	20 (28.6) ^ψ	27 (73.0) ^ψ	23 (56.1)	70 (47.3)	0.000	7 (35.0)	11 (45.8)	15(68.2) ^ψ	33 (50.0)	0.022
Crack ^{&}	70 (100.0)	37 (100.0)	41 (100.0)	148(100.0)	††	0 (0.0)	1 (2.8)	0 (0.0)	1 (0.7)	0.212
Benzodiazepines / barbiturates	17 (24.3)	9 (24.3)	12 (29.3)	38 (25.7)	0.825	2 (11.8)	1 (11.1)	0 (0.0)	3 (7.9)	0.471
Heroin	26 (37.1)	16 (43.2)	6 (14.6) ^ψ	48 (32.4)	0.014	18 (69.2)	13 (81.2)	4 (66.7)	35 (72.9)	0.821
Methadone (from street)	9 (12.9) ^ψ	1 (2.7)	1 (2.4)	11 (7.4)	0.058	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	††
Other opioids ^{&&}	32 (45.7)	19 (51.4)	23 (56.1)	74 (50.0)	0.562	15 (46.9)	12 (63.2)	13 (56.5)	40 (54.1)	0.508

*As main route of administration among users of specific substance

††Not computed

^ψ Minimum adjusted standardized residual greater than absolute 2.0, where p-value for overall $\chi^2 \leq 0.10$

[&]Estimates are based on lower sample sizes (for injection only)

^{&&}Includes Talwin and Ritalin, T3s and T4s (any codeine), Fentanyl, Demerol, Dilaudid, Percocet or Percodan, Morphine, OxyContin

Table 3. Infectious Disease and Overdose, n(%)

	Nanaimo (n=70)	Campbell River (n=37)	Prince George (n=41)	Total (n=148)	χ^2 /ANOVA Exact p-value
Injection drug use*	23 (32.9) ^ψ	17 (45.9)	25 (61.0) ^ψ	65 (43.9)	0.015
Number of injection days (among injectors)*					
Mean	12.3	20.2	12.0	14.2	0.051 [†]
Standard deviation	11.3	11.0	12.0	11.9	
Median	7.0	25.0	7.0	10.0	
Range	1.0-30.0	1.0-30.0	1.0-30.0	1.0-30.0	
Number of injections per injection day(among injectors)*, &					
1 to 2	16 (69.6) ^ψ	3 (17.6) ^ψ	14 (58.3)	33 (51.6)	0.016
3 to 4	3 (13.0)	5 (29.4)	2 (8.3)	10 (15.6)	
5+	4 (17.4)	9 (52.9) ^ψ	8 (33.3)	21 (32.8)	
Shared needle/syringe (among injectors)*, &	3 (13.6)	3 (18.8)	2 (8.0)	8 (12.7)	0.593
Had unprotected sex*	22 (31.4)	21 (56.8) ^ψ	13 (31.7)	56 (37.8)	0.023
Ever tested HIV positive^{&}	6 (8.7)	0 (0.0)	5 (12.2)	11 (7.5)	0.108
Think they are HIV positive^{&}	1 (1.4)	0 (0.0)	1 (2.4)	2 (1.4)	0.647
Ever received HIV treatment (among HIV+ cases)	3 (50.0)	0 (0.0)	4 (80.0)	7 (63.6)	0.303
HIV antibody positive (laboratory)	6 (8.6)	3 (8.1)	5 (12.2)	14 (9.5)	0.778
Ever tested HCV positive^{&}	35 (50.7)	11 (30.6) ^ψ	26 (65.0) ^ψ	72 (49.7)	0.011
Think they are HCV positive^{&}	1 (1.4)	0 (0.0)	0 (0.0)	1 (0.7)	0.574
Ever received HCV treatment (among HCV+ cases)^{&}	3 (8.6)	1 (9.1)	6 (23.1)	10 (13.9)	0.252
HCV antibody positive (laboratory)	41 (58.6)	17 (45.9)	29 (70.7)	87(58.8)	0.085
Experienced an overdose*	0 (0.0) ^ψ	4 (10.8) ^ψ	2 (4.9)	6 (4.1)	0.025

*In the past 30 days

^ψMinimum adjusted standardized residual greater than absolute 2.0, where p-value for overall $\chi^2 \leq 0.10$

[†]p-values for ANOVA

[&]Estimates are based on lower sample sizes

Table 4. Physical and Mental Health, n(%)

	Nanaimo (n=70)	Campbell River (n=37)	Prince George (n=41)	Total (n=148)	χ^2 Exact p-value
Physical health status* &					
Excellent, very good, good	28 (41.2)	19 (52.8)	22 (53.7)	69 (47.6)	0.347
Fair, poor	40 (58.8)	17 (47.2)	19 (46.3)	76 (52.4)	
Participants reporting physical health problems*	53 (75.7) ^ψ	20 (54.1)	23 (56.1)	96 (64.9)	0.032
Main physical health problem (among those reporting a physical health problem)*					
Pain	21 (39.6) ^ψ	3 (15.0)	3 (13.0)	27 (28.1)	0.027
HIV	2 (3.8)	0 (0.0)	0 (0.0)	2 (2.1)	
Seizures	2 (3.8)	0 (0.0)	0 (0.0)	2 (2.1)	
Fractures/trauma	5 (9.4) ^ψ	8 (40.0) ^ψ	6 (26.1)	19 (19.8)	
Other	23 (43.4)	9 (45.0)	14 (60.9)	46 (47.9)	
Participants reporting mental/emotional health problems*	40 (57.1)	25 (67.6)	22 (53.7)	87 (58.8)	0.427
Main mental health problem (among those reporting a mental health problem)* &					
Mood problem	31 (79.5)	20 (83.3)	12(54.5) ^ψ	63 (74.1)	0.085
Anxiety problem	7 (17.9)	3 (12.5)	6 (27.3)	16 (18.8)	
Psychotic episodes	1 (2.6)	1 (4.2)	4 (18.2) ^ψ	6 (7.1)	

*In the past 30 days

&Estimates are based on lower sample sizes

^ψMinimum adjusted standardized residual greater than absolute 2.0, where p-value for overall $\chi^2 \leq 0.10$

Table 5. Crack Use, n(%)

	Nanaimo (n=70)	Campbell River (n=37)	Prince George (n=41)	Total (n=148)	χ^2 /ANOVA Exact p-value
Length of crack use (years)^{&}					
Mean	10.7	12.8	9.8	10.9	0.205 [†]
Standard deviation	7.8	6.9	7.5	7.5	
Median	10.0	13.5	7.0	10.0	
Range	0.5-33.0	0.2-26.0	1.0-30.0	0.2-33.0	
Number of episodes of crack use per use day^{&, ††}					
Mean	20.8	48.1	28.9	29.6	0.016 ^{†, ‡}
Standard deviation	16.8	51.5	34.7	34.7	
Median	17.5	20.0	20.0	20.0	
Range	3.0-80.0	4.0-150.0	2.0-150.0	2.0-150.0	
Respondents who shared crack paraphernalia*	57 (81.4)	31 (83.8)	29 (70.7)	117 (79.1)	0.293
Number of paraphernalia sharing episodes (among respondents who reported sharing)^{&, †}					
1 to 5 times	11 (19.3) ^ψ	14 (48.3) ^ψ	8 (27.6)	33 (28.7)	0.042
6 to 20 times	19 (33.3)	3 (10.3) ^ψ	9 (31.0)	31 (27.0)	
>21 times	27 (47.4)	12 (41.4)	12 (41.4)	51 (44.3)	
Sources of crack paraphernalia*					
Crack kit program	0 (0.0) ^ψ	0 (0.0) ^ψ	40 (97.6) ^ψ	40 (27.0)	0.000
Drug dealer	16 (22.9) ^ψ	3 (8.1)	0 (0.0) ^ψ	19 (12.8)	0.001
Other drug user	34 (48.6) ^ψ	5 (13.5) ^ψ	5 (12.2) ^ψ	44 (29.7)	0.000
Friend/partner	17 (24.3)	8 (21.6)	6 (14.6)	31 (20.9)	0.480
Makeshift/found items	50 (71.4) ^ψ	19 (51.4)	4 (9.8) ^ψ	73 (49.3)	0.000
Purchased parts in a store	27 (38.6)	20 (54.1) ^ψ	4 (9.8) ^ψ	51 (34.5)	0.000
Presented with oral sores/wounds*	18 (25.7)	9 (24.3)	5 (12.2)	32 (21.6)	0.223
Number of days with oral sores/wounds (among respondents who reported an oral sore)^{&, †}					
Mean	10.2	8.7	6.8	9.2	0.783 [†]
Standard deviation	11.1	8.9	7.5	9.7	
Median	5.0	7.0	4.0	5.0	
Range	1.0-30.0	1.0-30.0	2.0-20.0	1.0-30.0	

[&]Estimates are based on lower sample sizes

[†]p-values for ANOVA

^{††}n=4 outliers (scores ≥ 200) coded to next highest value (score = 150)

[‡]Homogeneity of variance assumption violated (Welch p-value reported)

*In the past 30 days

^ψMinimum adjusted standardized residual greater than absolute 2.0, where p-value for overall $\chi^2 \leq 0.10$

Table 6. Social/Health/Treatment Service Utilization, n(%)

	Nanaimo (n=70)	Campbell River (n=37)	Prince George (n=41)	Total (n=148)	χ^2 Exact p-value
Used any social/health/ treatment services*					
Social service (drop-in, shelter, food bank)	66 (94.3)	35 (94.6)	40 (97.6)	141(95.3)	0.717
Health service (community health centre, GP, walk-in, hospital, ER)	43 (61.4)	24 (64.9)	30 (73.2)	97 (65.5)	0.452
Street health service (needle exchange/outreach)	32 (45.7) ^ψ	16(43.2) ^ψ	39(95.1) ^ψ	87 (58.8)	0.000
Treatment service (detox, addiction, MMT)	26 (37.1)	15 (40.5)	8 (19.5) ^ψ	49 (33.1)	0.088
Users who would use SCS services if available^{&}	55 (78.6)	24(64.9) ^ψ	35 (87.5)	114(77.6)	0.057
Factors that would influence SCS use (important or very important)^{&}					
SCS located close to usual drug use area	55 (83.3)	18 (69.2)	32 (86.5)	105(81.4)	0.188
SCS open at convenient hours	63 (95.5)	23 (88.5)	31 (83.8)	117(90.7)	0.134
SCS use is anonymous	55 (84.6)	23 (88.5)	27 (75.0)	105 82.7)	0.323
SCS allows crack smoking	43 (66.2) ^ψ	20 (80.0)	33(89.2) ^ψ	96 (75.6)	0.029
Users can get help from staff using drugs	45 (68.2)	15 (57.7)	20 (55.6)	80 (62.5)	0.386
Users can get help from/help other users using drugs	25 (37.9)	15 (57.7)	16 (45.7)	56 (44.1)	0.221
Users can use SCS as long/often as they want	55 (83.3)	18 (72.0)	31 (83.8)	104(81.2)	0.417
Users can share drugs	19 (28.8)	10 (41.7)	7 (19.4)	36 (28.6)	0.175
Basic social services (e.g., housing referral, welfare help) available	48 (73.8) ^ψ	25 (96.2)	36(97.3) ^ψ	109(85.2)	0.001
Basic health services (e.g., vein care) available	60 (90.9) ^ψ	26(100.0)	37(100.0)	123(95.3)	0.050
Needle exchange available	57 (86.4)	21 (84.0)	36 (97.3)	114(89.1)	0.155
Addiction treatment referrals available	62 (93.9)	24 (92.3)	36 (97.3)	122(94.6)	0.655
Detox/addiction treatment available on site	43 (65.2) ^ψ	22 (84.6)	34(94.4) ^ψ	99 (77.3)	0.002
Police have no access to SCS	56 (84.8)	24 (92.3)	31 (83.8)	111(86.0)	0.581

*In the past 30 days

^ψMinimum adjusted standardized residual greater than absolute 2.0, where p-value for overall $\chi^2 \leq 0.10$ [&]
Estimates are based on lower sample sizes

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