# Crack Use in Canada: Epidemiology, Harms & Interventions

## Benedikt Fischer, PhD

Professor & CIHR/PHAC Chair in Applied Public Health & MSFHR Senior Scholar

I/Director, Centre for Applied Research in Mental Health and Addictions (CARMHA)

Faculty of Health Sciences & School of Criminology, Simon Fraser University, Vancouver, Canada

Adjunct Scientist, BC Centre for Disease Control (BCCDC), Vancouver

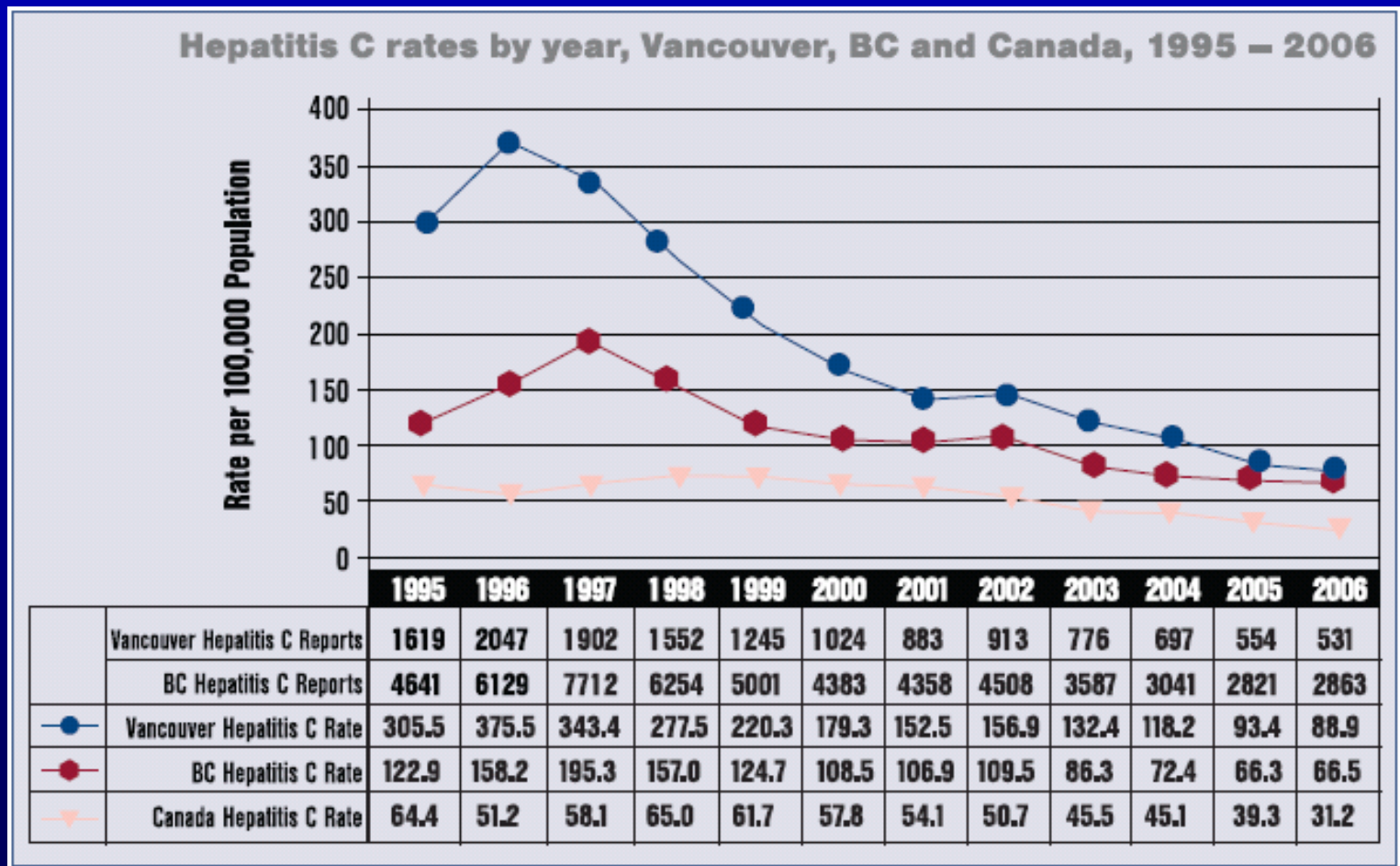Senior Scientist, Centre for Addiction and Mental Health, Toronto

North America

# Canada - General

- 2$^{nd}$ largest country in the world, but only 32 million population

- 5,000km wide, 4.5 time zones

- 1/4 of population lives in large urban centres (Toronto, Montreal, Vancouver); 90% live within 100km of US border

- Strong 'public health' tradition, but also strong moral forces

- Cold! (much of the time)

# Street Drug Use Epidemiology - Canada

- Estimated 100,000 – 150,000 street drug users => both in urban & rural areas

- Predominant heroin/cocaine injection, but increasing shift to a) prescription drug misuse and b) non-injection (crack) use within poly-drug use patterns

- Estimated 1,000 – 2,000 drug-related overdose deaths per year

- ~ 5,000 – 6,000 new HCV infections (90% drug use related) and ~ 2,500 – 4,500 new HIV infections (17% - 25%  drug use)
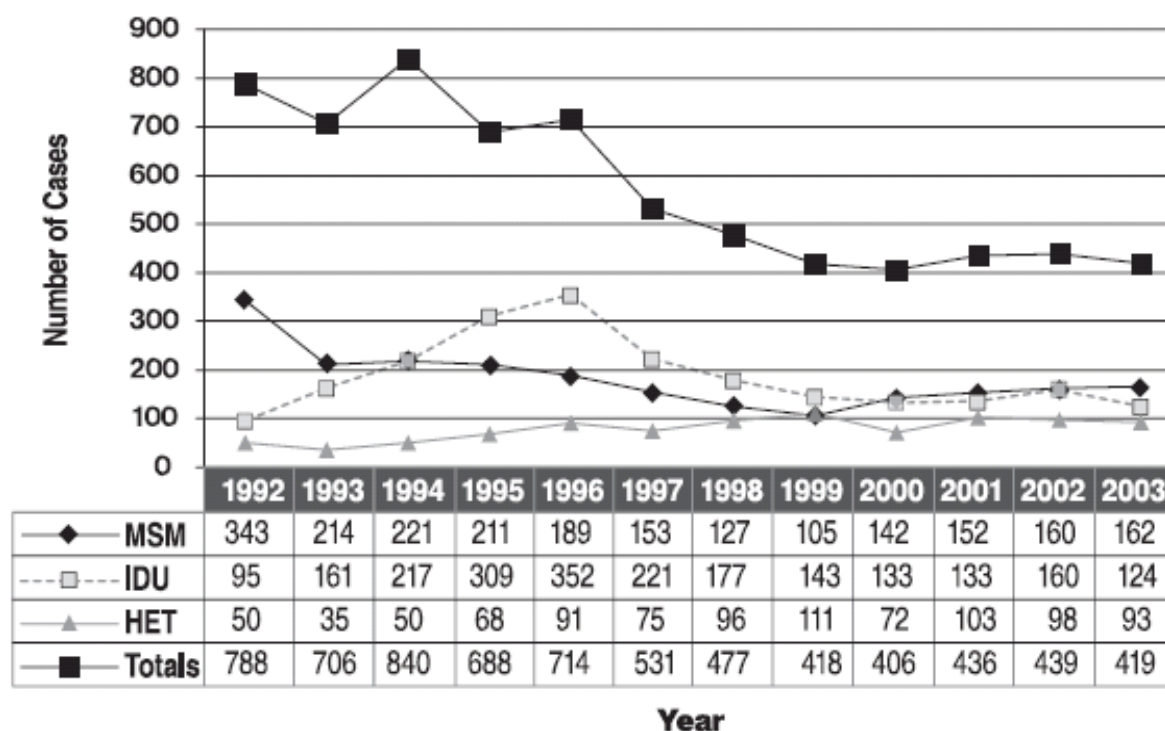
# New HepC Infections, Canada, 1995 - 2006

**Hepatitis C rates by year, Vancouver, BC and Canada, 1995 – 2006**

| | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Vancouver Hepatitis C Reports | 1619 | 2047 | 1902 | 1552 | 1245 | 1024 | 883 | 913 | 776 | 697 | 554 | 531 |
| BC Hepatitis C Reports | 4641 | 6129 | 7712 | 6254 | 5001 | 4383 | 4358 | 4508 | 3587 | 3041 | 2821 | 2863 |
| Vancouver Hepatitis C Rate | 305.5 | 375.5 | 343.4 | 277.5 | 220.3 | 179.3 | 152.5 | 156.9 | 132.4 | 118.2 | 93.4 | 88.9 |
| BC Hepatitis C Rate | 122.9 | 158.2 | 195.3 | 157.0 | 124.7 | 108.5 | 106.9 | 109.5 | 86.3 | 72.4 | 66.3 | 66.5 |
| Canada Hepatitis C Rate | 64.4 | 51.2 | 58.1 | 65.0 | 61.7 | 57.8 | 54.1 | 50.7 | 45.5 | 45.1 | 39.3 | 31.2 |

CCENDU. (2007).

# New HIV infections, B.C., 1992 - 2003

Figure E2. Number of individuals with newly positive HIV tests in BC with identifiable risk factors, 1992-2003



| | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MSM | 343 | 214 | 221 | 211 | 189 | 153 | 127 | 105 | 142 | 152 | 160 | 162 |
| IDU | 95 | 161 | 217 | 309 | 352 | 221 | 177 | 143 | 133 | 133 | 160 | 124 |
| HET | 50 | 35 | 50 | 68 | 91 | 75 | 96 | 111 | 72 | 103 | 98 | 93 |
| Totals | 788 | 706 | 840 | 688 | 714 | 531 | 477 | 418 | 406 | 436 | 439 | 419 |

Year

MSM: Men having sex with men
IDU: Injection Drug Use
HET: Heterosexual Contact
Source: BCCDC Sexually Transmitted Disease Control

CCENDU. (2005).

# Crack use in Canada

- Since mid-1990s, prevalence of crack use among street drug users in Canada has rapidly increased

- In many cities, crack use is the most prevalent form of street drug use (Haydon & Fischer 2005)

- Crack is extremely cheap & available in black markets

- Major concern, since due to association with major public health & order concerns

# 'I-Track' Multi-site Surveillance Study of IDUs, 2006 (n=13,527)

**Table 17.   Drugs taken by a non-injecting route in the previous 6 months**

| Drug | | Edmonton | Quebec | Regina | Sudbury | Toronto | Victoria | Winnipeg | Total average % |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | CENTRE | | | | |
| Acid (LSD) | n | 13 | 134 | 7 | 3 | 24 | 17 | 22 | 220 |
| | % | 4.7 | 8.4 | 2.8 | 2.0 | 9.2 | 6.7 | 8.8 | 6.1 |
| Alcohol | n | 216 | 1269 | 171 | 106 | 214 | 180 | 214 | 2370 |
| | % | 78.3 | 79.8 | 68.4 | 70.7 | 82.3 | 70.9 | 85.6 | 76.6 |
| Amphetamines | n | 109 | 362 | 20 | 19 | 66 | 47 | 17 | 640 |
| | % | 39.5 | 22.8 | 8.0 | 12.7 | 25.4 | 18.5 | 6.8 | 19.1 |
| Barbiturates | n | 41 | 79 | 28 | 22 | 49 | 9 | 94 | 322 |
| | % | 14.9 | 5.0 | 11.2 | 14.7 | 18.8 | 3.5 | 37.6 | 15.1 |
| Benzodiazepines | n | 178 | 599 | 100 | 66 | 157 | 87 | 157 | 1344 |
| | % | 64.5 | 37.6 | 40.0 | 44.0 | 60.4 | 34.3 | 62.8 | 49.1 |
| Cocaine | n | 187 | 829 | 77 | 96 | 177 | 161 | 119 | 1646 |
| | % | 67.8 | 52.1 | 30.8 | 64.0 | 68.1 | 63.4 | 47.6 | 56.2 |
| Crack | n | 231 | 980 | 80 | 82 | 231 | 155 | 187 | 1946 |
| | % | 83.7 | 61.6 | 32.0 | 54.7 | 88.8 | 61.0 | 74.8 | 65.2 |
| Demerol | n | 43 | 122 | 34 | 13 | 44 | 24 | 21 | 301 |
| | % | 15.6 | 7.7 | 13.6 | 8.7 | 16.9 | 9.4 | 8.4 | 11.5 |
| Dilaudid | n | 67 | 389 | 31 | 49 | 104 | 61 | 18 | 719 |
| | % | 24.3 | 24.5 | 12.4 | 32.7 | 40.0 | 24.0 | 7.2 | 23.6 |
| Ecstasy | n | 29 | 347 | 18 | 18 | 95 | 31 | 20 | 558 |
| | % | 10.5 | 21.8 | 7.2 | 12.0 | 36.5 | 12.2 | 8.0 | 15.5 |
| Fentanyl | n | 4 | 0 | 9 | 19 | 2 | 0 | 5 | 39 |
| | % | 1.4 | 0.0 | 3.6 | 12.7 | 0.8 | 0.0 | 2.0 | 2.9 |
| Heroin | n | 29 | 215 | 3 | 17 | 99 | 71 | 16 | 450 |
| | % | 10.5 | 13.5 | 1.2 | 11.3 | 38.1 | 28.0 | 6.4 | 15.6 |
| Ketamine | n | 0 | 91 | 0 | 0 | 3 | 0 | 0 | 94 |
| | % | 0.0 | 5.7 | 0.0 | 0.0 | 1.2 | 0.0 | 0.0 | 1.0 |
| Marijuana | n | 203 | 1222 | 164 | 108 | 209 | 192 | 198 | 2296 |
| | % | 73.6 | 76.8 | 65.6 | 72.0 | 80.4 | 75.6 | 79.2 | 74.7 |
| Methadone | n | 72 | 4 | 45 | 59 | 96 | 68 | 62 | 406 |
| | % | 26.1 | 0.3 | 18.0 | 39.3 | 36.9 | 26.8 | 24.8 | 24.6 |
| Methadone (non-prescribed) | n | 0 | 173 | 0 | 0 | 0 | 0 | 0 | 173 |
| | % | 0.0 | 10.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.6 |

Year: 2006   Sample Size (n) = 13527                 PHAC. (2006).

# Main Drug Use, VIDUS, 1997 - 2005 (n= 1,600)

Injection drug use in the Vancouver Injection Drug Use Study cohort has declined in DTES and crack cocaine smoking has increased.

**Reported drug use by VIDUS cohort**
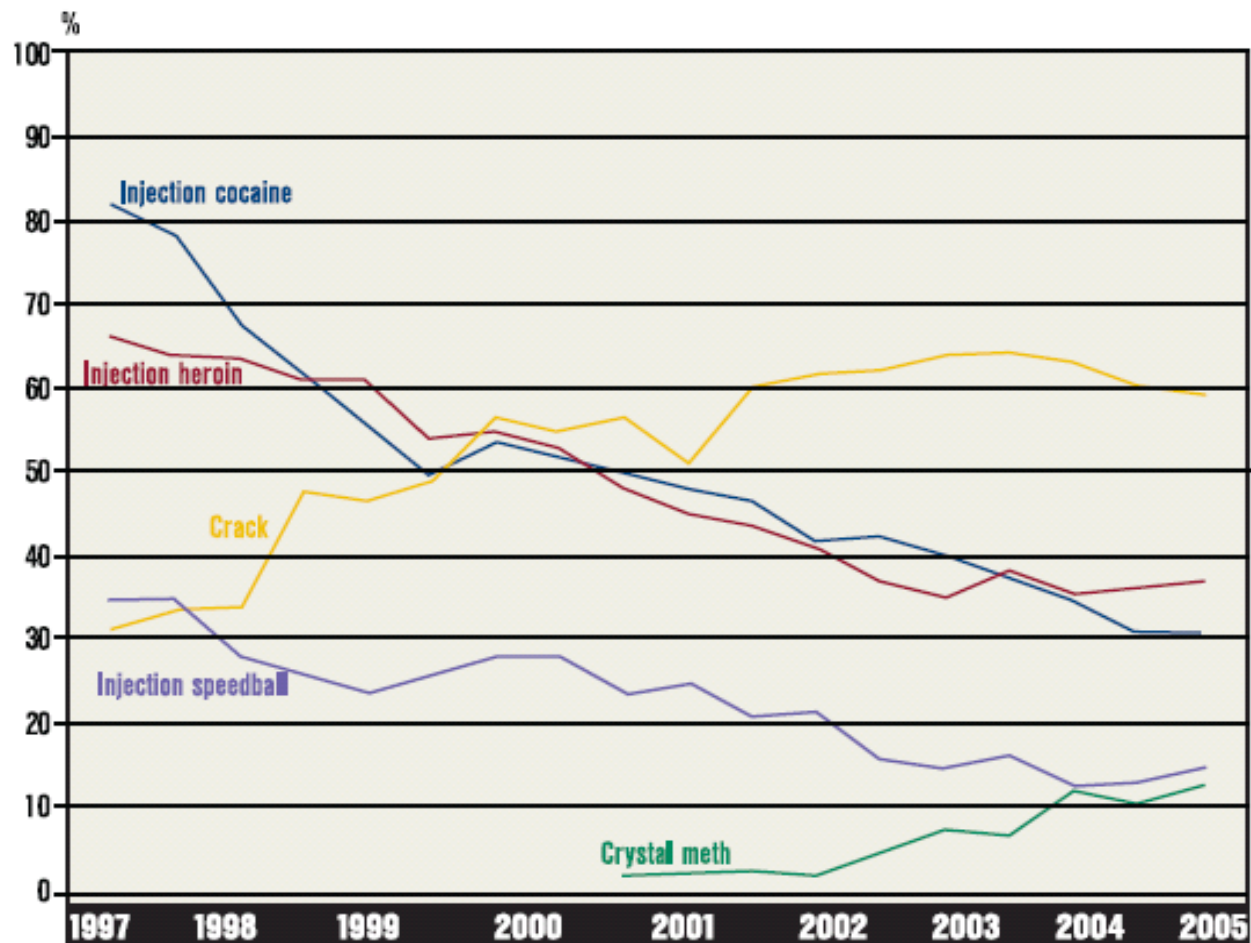
# Major harms associated with crack use

- Morbidity: Independent predictor of HIV, HepC and other STI seropositivity

- US multi-site drug user study: HIV+ 2.4 times higher among crack (15.7%) than non-crack users (5.2%) (Edlin et al. 1994, also Kral et al. 1998; Metsch et al. 1999)

- Several studies indicate substantially higher STI (e.g., chlamydia, gonorrhea, syphilis, herpes) among crack users than non-users (Maranda et al. 2004; Metsch et al. 1999; Ross et al. 2002)

- Several epidemiological studies have demonstrated crack use as an independent predictor of HepC positive status (Thorpe, 2000;Roy, 2001;Nyamathi, 2002)

**Table 2.** Unadjusted Odds Ratios (ORs) for Effects of Selected Characteristics and Behaviors on Testing Positive for HCV Infection Among Homeless and Impoverished Injection and Non–injection Drug Users*

| Predictors | Injection Drug Users (n = 141) OR (95% CI) | P Value | Non–injection Drug Users (n = 743) OR (95% CI) | P Value | Total Sample (N = 884) OR (95% CI) | P Value |
|---|---|---|---|---|---|---|
| Age, y | | | | | | |
| 18–32 | 1.00 — | | 1.00 — | | 1.00 — | |
| 33–40 | 2.37 (0.81 to 6.98) | .12 | 2.61 (1.35 to 5.03)[†] | .004 | 2.85 (1.72 to 4.73)[‡] | .001 |
| ≥41 | 9.76 (3.17 to 30.10)[‡] | .001 | 4.39 (2.33 to 8.25)[‡] | .001 | 6.77 (4.20 to 10.42)[‡] | .001 |
| Race | | | | | | |
| White | 1.00 — | | 1.00 — | | 1.00 — | |
| African American | 1.66 (0.64 to 4.28) | .29 | 1.49 (0.69 to 3.23) | .31 | 0.84 (0.53 to 1.34) | .46 |
| Latino | 1.43 (0.43 to 4.73) | .56 | 0.32 (0.10 to 1.01) | .053 | 0.48 (0.26 to 0.87)[§] | .02 |
| Other[ǁ] | — | | | | | |
| Living on own before 18 | | | | | | |
| No | 1.00 — | | 1.00 — | | 1.00 — | |
| Yes | 1.17 (0.53 to 2.59) | .70 | 1.61 (1.02 to 2.54)[§] | .04 | 1.85 (1.34 to 2.56)[‡] | .001 |
| Any time in jail | | | | | | |
| No | 1.00 — | | 1.00 — | | 1.00 — | |
| Yes | 2.60 (0.91 to 7.41) | .07 | 1.30 (0.82 to 2.05) | .26 | 2.66 (1.84 to 3.83)[‡] | .001 |
| Homeless for >1 y | | | | | | |
| No | 1.00 — | | 1.00 — | | 1.00 — | |
| Yes | 0.81 (0.35 to 1.89) | .63 | 1.69 (1.07 to 2.69)[§] | .02 | 1.79 (1.29 to 2.48)[‡] | .001 |
| Substance use | | | | | | |
| Lifetime injection drug use | | | | | | |
| No | — | | — | | 1.00 — | |
| Yes | — | | — | | 25.35 (16.13 to 39.86)[‡] | .001 |
| Injection drug use past 6 mo | | | | | | |
| No | — | | — | | 1.00 — | |
| Yes | — | | — | | 24.64 (11.37 to 53.42)[‡] | .001 |
| Lifetime cocaine use | | | | | | |
| No | 1.00 — | | 1.00 — | | 1.00 — | |
| Yes | 0.56 (0.20 to 1.6) | .28 | 1.18 (0.75 to 1.87) | .48 | 2.43 (1.76 to 3.36)[‡] | .001 |
| Lifetime crack use | | | | | | |
| No | 1.00 — | | 1.00 — | | 1.00 — | |
| Yes | 0.64 (0.20 to 2.02) | .44 | 2.14 (1.28 to 3.58)[†] | .004 | 2.42 (1.66 to 3.52)[‡] | .001 |
| Daily crack use past 6 mo | | | | | | |
| No | 1.00 — | | 1.00 — | | 1.00 — | |
| Yes | 2.23 (0.84 to 5.89) | .11 | 1.59 (0.99 to 2.57) | .057 | 1.65 (1.17 to 2.33)[†] | .01 |
| Lifetime methamphetamine use | | | | | | |
| No | 1.00 — | | 1.00 — | | 1.00 — | |
| Yes | 0.37 (0.16 to 0.82)[§] | .015 | 0.93 (0.45 to 1.94) | .85 | 1.78 (1.18 to 2.69)[†] | .01 |
| Lifetime alcohol use | | | | | | |
| No | 1.00 — | | 1.00 — | | 1.00 — | |
| Yes | 1.44 (0.60 to 3.44) | .42 | 1.74 (1.10 to 2.75)[§] | .02 | 2.45 (1.74 to 3.45)[‡] | .001 |
| Daily alcohol use past 6 mo | | | | | | |
| No | 1.00 — | | 1.00 — | | 1.00 — | |
| Yes | 1.11 (0.46 to 2.66) | .82 | 2.40 (1.51 to 3.82)[‡] | .001 | 1.88 (1.33 to 2.66)[‡] | .001 |
| Health history | | | | | | |
| Hospitalized for drug problem | | | | | | |
| No | 1.00 — | | 1.00 — | | 1.00 — | |
| Yes | 1.31 (0.59 to 2.91) | .51 | 1.12 (0.60 to 2.10) | .71 | 2.62 (1.81 to 3.80)[‡] | .001 |
| Hospitalized for mental illness | | | | | | |
| No | 1.00 — | | 1.00 — | | 1.00 — | |
| Yes | 1.09 (0.44 to 2.70) | .86 | 1.34 (0.70 to 2.59) | .38 | 2.08 (1.37 to 3.16)[‡] | .001 |
| Sexual activity: multiple sexual partners past 6 mo[¶] | | | | | | |
| Yes | 1.00 — | | 1.00 — | | 1.00 — | |
| No | 0.17 (0.05 to 0.59)[§] | .005 | 0.20 (0.03 to 1.46) | .112 | 0.47 (0.20 to 1.12) | .090 |

\* Injection drug use based on lifetime history; comparison group includes all individuals not reporting any lifetime injection drug use.
[†] P < .01, $\chi^2$ test for differences between predictor categories and the HCV antibody positivity.
[‡] P < .001, $\chi^2$ test for differences between predictor categories and the HCV antibody positivity.
[§] P < .05, $\chi^2$ test for differences between predictor categories and the HCV antibody positivity.
[ǁ] There were too few people of "other" racial backgrounds to compute odds ratios.
[¶] More than 3 sexual partners in the past 6 months.
CI, confidence interval.

ORs for effects of select characteristics on HepC+ positive status among homeless sample (n=884; Nyamathi et al. 2002)

**Factors associated with HepC+ status among young IDUs (n=698; Thorpe et al. 2000)**

**Table 2.** Multiple logistic regression analysis for factors associated with hepatitis C seropositivity among young injection drug users in Chicago, 1997–1999.

| Characteristic | Total sample (N = 698) | Adjusted odds ratio[a] (95% CI) |
|---|---|---|
| Duration of injection drug use, years | | |
| <1 | 201 | 1.00 |
| 1–4 | 307 | 2.17 (1.20–3.90) |
| >4 | 190 | 4.88 (2.64–9.03) |
| Frequency of injection | | |
| Less than daily | 368 | 1.00 |
| Once or more daily | 330 | 2.07 (1.37–3.13) |
| Backloading, past 6 mo | | |
| No | 502 | 1.00 |
| Yes | 196 | 1.59 (1.03–2.45) |
| Ever injected drugs in shooting gallery | | |
| No | 513 | 1.00 |
| Yes | 184 | 2.08 (1.34–3.22) |
| Crack use, past 6 mo | | |
| None/low (<4 days/week) | 623 | 1.00 |
| High (≥4 days/week) | 75 | 2.68 (1.49–4.84) |
| Residence | | |
| Suburban | 266 | 1.00 |
| Urban | 423 | 1.77 (1.06–2.93) |
| Education | | |
| Didn't complete high school | 301 | 1.00 |
| High school diploma, GED, or higher | 397 | 0.58 (0.38–0.88) |
| Race/ethnicity | | |
| White | 423 | 1.00 |
| Hispanic | 155 | 1.09 (0.64–1.86) |
| Black | 118 | 0.35 (0.18–0.65) |

NOTE. CI, confidence interval; GED, general equivalency diploma; mo, months.

[a] Adjusted for age and all other listed variables.

Thorpe et al. (2000).

**Table 2:** Factors associated with HIV seroconversion among people who reported using injection drugs

| Factor | Hazard ratio (95% CI) | |
| --- | --- | --- |
| | Unadjusted | Adjusted* |
| Daily smoking of crack cocaine†‡ | | |
| Period 1 | 1.28 (0.75–2.19) | 1.03 (0.57–1.85) |
| Period 2 | 2.27 (1.44–3.61) | 1.68 (1.01–2.80) |
| Period 3 | 4.01 (1.79–8.96) | 2.74 (1.06–7.11) |
| Age (per year increase) | 0.99 (0.97–1.01) | 0.99 (0.96–1.02) |
| Duration of injection drug use (per year) | 0.99 (0.97–1.01) | 0.99 (0.97–1.02) |
| Sex (female v. male) | 1.37 (0.95–1.96) | 1.02 (0.66–1.60) |
| Aboriginal ethnicity (yes v. no) | 1.87 (1.29–2.71) | 1.79 (1.21–2.66) |
| Daily cocaine injection‡ (yes v. no) | 3.71 (2.62–5.26) | 2.94 (2.00–4.33) |
| Daily heroin injection‡ (yes v. no) | 1.55 (1.10–2.20) | 1.05 (0.71–1.54) |
| Sex work‡ (yes v. no) | 1.59 (1.06–2.37) | 0.87 (0.52–1.48) |
| Unprotected sex‡ (yes v. no) | 0.89 (0.62–1.30) | 0.82 (0.55–1.22) |
| Syringe borrowing‡ (yes v. no) | 2.20 (1.51–3.21) | 1.72 (1.14–2.59) |

Note: CI = confidence interval.
*Adjusted for the variables listed in this table.
†All estimations for daily smoking of crack cocaine include the interaction effect of the 3 study periods (period 1 = May 1, 1996, to Nov., 30 1999; period 2 = Dec. 1, 1999, to Nov. 30, 2002; period 3 = Dec. 1, 2002, to Dec. 31, 2005.
‡Activity or situation in the 6 months before follow-up.

# Crack use as an independent risk factor for HIV seroconversion in VIDUS (1996 – 2005; n=1,043; deBeck et al. CMAJ 2009)

Figure 2: Association between daily smoking of crack cocaine and HIV seroconversion among participants enroled in the Vancouver Injection Drug Users Study.
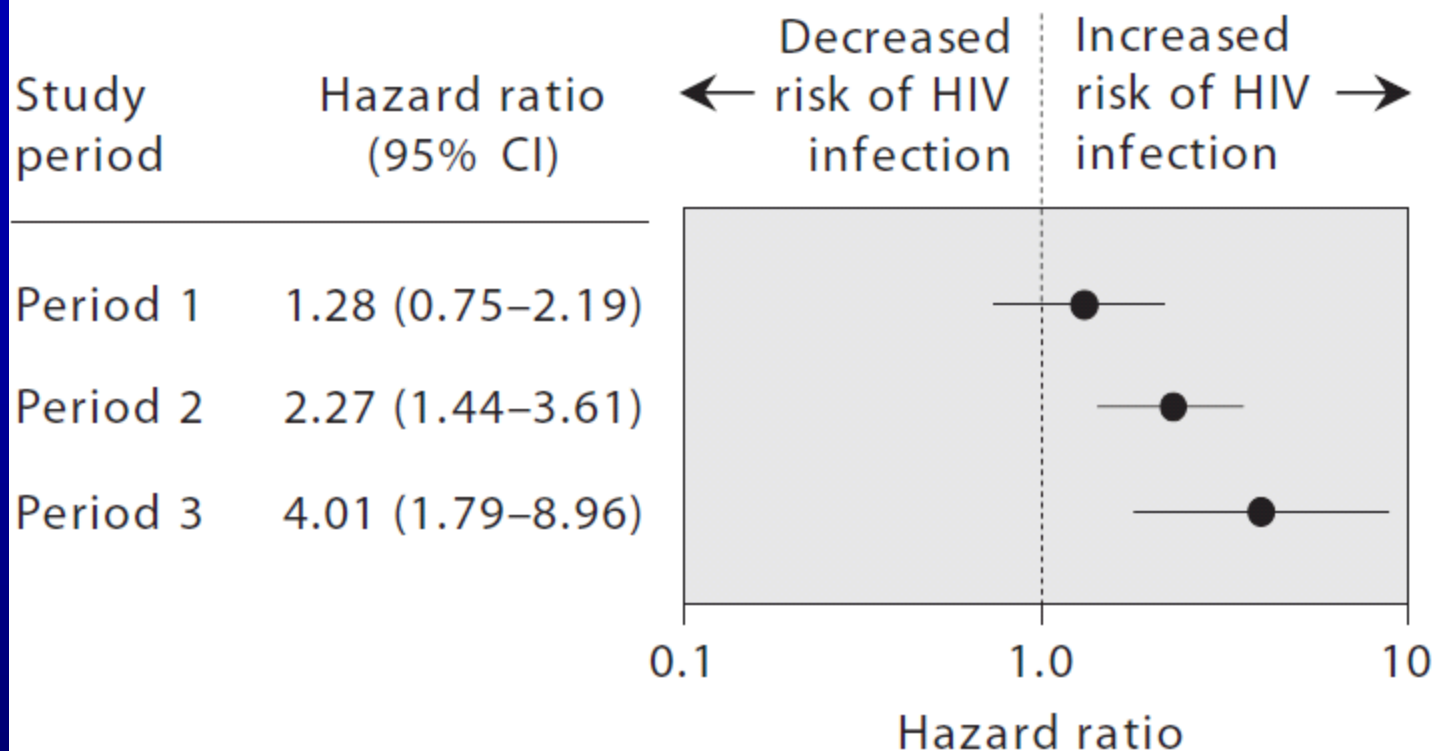
Period 1 = May 1, 1996 to Nov. 30, 1999; period 2 = Dec. 1, 1999 to Nov. 30, 2002; period 3 = Dec. 1, 2002 to Dec. 31, 2005. CI = confidence interval.

Source: DeBeck K, Kerr T, Li K, Fischer B, Buxton JA, Montaner JSG, Wood E. Smoking of crack cocaine use as a risk factor for HIV infection among people who use injection drugs. *CMAJ* (in press).

# Major harms associated with crack use

- **Morbidity:** High rates of mental health problems, esp. personality, anxiety, depression disorder symptoms (Falck et al. 2004)

- Pulmonary problems or infections (Perlmann et al. 1999); severe nutritional & sleep deficiencies (Falck et al. 2003)

- **Mortality:** Independent predictor of premature mortality compared to other drug users (Cook et al. 2008)

# Major harms associated with crack use

- **Crime:** Higher prevalence & frequency of aquisition crime (e.g., property, theft, B&E, drug dealing); more violent crime (Inciardi 1995; Gossop et al. 2006; Manzoni et al. 2006)

- Meta-analysis: "Crack users are about 6 times more likely to offend than non-crack users" (Bennett et al. 2008)

- Crime level analysis for 142 US cities: Cities with higher crack use levels had decrease in burglaries and increase in robberies (Baumer et al. 1998)

# Log Regression of illegal income generation activities in VIDUS (n=1,600; deBeck et al. 2007)

Table 3

Logistic regression analysis of factors associated with partaking in prohibited income generating activities

| Variable | Analysis of all prohibited activities[a] | | Analysis of restricted prohibited activities[b] | |
|---|---|---|---|---|
| | AOR | 95% CI | AOR | 95% CI |
| Age (per year older) | 1.0 | (1.0–1.0) | 1.0 | (1.0–1.0) |
| Frequent cocaine inject[c] (yes vs. no) | 0.6 | (0.3–1.2) | 0.7 | (0.4–1.4) |
| Frequent crack use[c] (yes vs. no) | 3.5 | (1.9–6.2) | 3.6 | (2.0–6.4) |
| Frequent heroin inject[c] (yes vs. no) | 2.3 | (1.3–4.1) | 2.6 | (1.5–4.6) |
| Syringe borrowing[c] (yes vs. no) | 0.9 | (0.3–3.0) | 0.8 | (0.3–2.6) |
| Syringe lending[c] (yes vs. no) | 2.7 | (0.8–9.8) | 2.3 | (0.7–7.1) |
| Public injecting[c] (yes vs. no) | 1.4 | (0.6–3.4) | 1.1 | (0.5–2.5) |
| Homelessness[c] (yes vs. no) | 1.6 | (0.7–3.8) | 1.1 | (0.5–2.5) |
| Addiction treatment[c] (yes vs. no) | 0.7 | (0.4–1.2) | 0.8 | (0.4.–1.4) |
| Non-aboriginal female (reference) | 1.0 | Ref | 1.0 | Ref |
| Aboriginal female (yes vs. reference) | 0.3 | (0.1–0.7) | 0.5 | (0.2–1.0) |
| Non-aboriginal male (yes vs. reference) | 0.4 | (0.2–0.7) | 0.4 | (0.2–0.7) |
| Aboriginal male (yes vs. reference) | 0.2 | (0.1–0.7) | 0.3 | (0.1–0.9) |

AOR: adjusted odds ratio; CI: confidence interval.

[a] All prohibited activities include the following categories: sex trade, drug dealing, other criminal activities, panhandling and binning.

[b] Restricted prohibited activities include the following categories: sex trade work, drug dealing, other criminal activities.

[c] Activities or situations referring to previous 6 months.

Debeck et al. (2007).

# Comparison of crack users and non-crack users in multi-site OPICAN cohort (Fischer et al. 2006)

**Table 1** Prevalence of crack use (last 30 days) in sample (n = 627) by city.[a]

| Variable | Edmonton | Montreal | Quebec City | Toronto | Vancouver |
|---|---|---|---|---|---|
| Crack users (last 30 days) % (n)[†] | 66.7 (62) | 26.1 (37) | 3.6 (3) | 66.7 (80) | 86.2 (162) |
| Mean number of days of crack use (SD)[‡††] | 9.7 (9.2) | 8.1 (9.2) | 2.0 (1.0) | 14.2 (11.0) | 24.3 (9.4) |

[a]Based on self-report.
[†]Prevalence of crack use differs significantly among all cities.
[‡]For those reporting crack use (n = 344).
[††]Vancouver is significantly higher in number of days of crack use from all other cities; Toronto is different from Montreal (Bonferonni test for multiple comparisons).

Fischer et al. (2006).

# Comparison of crack users and non-crack users in multi-site OPICAN cohort (Fischer et al. 2006)

Title

Table 2 Comparison of crack users and crack non-users on select variables† in total sample (n = 627).

| Variable | Crack users (n = 344) % (n) | Crack non-users (n = 283) % (n) | F Statistic/t-square | Chi-square Statistic | Exact P value |
|---|---|---|---|---|---|
| **Demographics** | | | | | |
| Mean age (SD)* | 35.6 (9.0) | 34.0 (9.5) | 4.8 | – | 0.030 |
| Permanent housing*** | 34.0 (117) | 58.0 (164) | – | 36.0 | 0.000 |
| Sex (% male) | 64.5 (222) | 68.2 (193) | – | 0.9 | 0.335 |
| **Income (last 30 days)** | | | | | |
| Paid work*** | 15.4 (53) | 26.1 (74) | – | 11.1 | 0.001 |
| Social assistance/welfare or disability | 61.0 (210) | 59.0 (167) | – | 0.3 | 0.604 |
| Sex work*** | 27.3 (94) | 13.8 (39) | – | 17.0 | 0.000 |
| Drug dealing income*** | 39.0 (134) | 12.0 (34) | – | 57.4 | 0.000 |
| Other criminal income | 18.9 (65) | 13.4 (38) | – | 3.4 | 0.066 |
| **Health** | | | | | |
| Physical health problem*** | 78.2 (269) | 64.7 (183) | – | 14.1 | 0.000 |
| Depression‡*** | 43.7 (149) | 51.2 (144) | – | 17.8 | 0.000 |
| HIV Positive†† (n = 538) | 17.7 (47) | 13.0 (32) | – | 2.2 | 0.335 |
| HCV positive†† (n = 495)* | 56.4 (150) | 46.6 (115) | – | 6.7 | 0.036 |
| **Service utilization (last 6 months)** | | | | | |
| Emergency room | 48.0 (165) | 49.8 (141) | – | 0.2 | 0.643 |
| Walk-in clinic*** | 53.5 (184) | 41.7 (118) | – | 8.6 | 0.003 |
| Regular doctor | 51.9 (161) | 58.0 (164) | – | 2.3 | 0.130 |

*P < 0.05, ***P < 0.001.
†Self-report unless otherwise stated.
‡Based on CIDI-SF
††Based on saliva antibody test.

Fischer et al. (2007).

# Comparison of crack users and non-crack users in multi-site OPICAN cohort (Fischer et al. 2006)

Title

Table 3 Comparison of crack users and crack non-users on select variables in total sample (n = 627).

| Variable | Crack users (n = 344) % (n) | Crack non-users (n = 283) % (n) | F Statistic | Chi-square Statistic | Exact P value |
|---|---|---|---|---|---|
| *Infectious disease risks* | | | | | |
| Ever injected | 100.0 (344) | 100.0 (283) | – | n/a | n/a |
| Inject (last 30 days) | 85.5 (294) | 86.2 (244) | – | 0.1 | 0.788 |
| Unprotected sex (last 30 days)* | 51.6 (177) | 59.9 (169) | – | 4.3 | 0.037 |
| *Drug use (last 30 days)†* | | | | | |
| Alcohol | 64.0 (220) | 66.1 (187) | – | 0.3 | 0.579 |
| Mean # of days used (SD)*** | 9.2 (10.0) | 12.2 (10.8) | 8.4 | – | 0.004 |
| Cocaine | 53.5 (184) | 58.0 (164) | – | 1.3 | 0.263 |
| Mean # of days used (SD) | 12.3 (11.1) | 12.4 (11.4) | 0.0 | – | 0.947 |
| Dilaudid*** | 28.8 (99) | 41.0 (116) | – | 10.3 | 0.001 |
| Mean # of days used (SD)*** | 8.2 (9.8) | 16.8 (11.4) | 34.3 | – | 0.000 |
| Heroin* | 72.1 (248) | 63.6 (180) | – | 5.2 | 0.023 |
| Mean # of days used (SD) | 22.8 (10.3) | 20.9 (10.0) | 3.7 | – | 0.056 |
| Tylenol 3/4*** | 38.7 (133) | 24.7 (70) | – | 13.8 | 0.000 |
| Mean # of days used (SD) | 12.3 (11.4) | 14.7 (12.5) | 2.0 | – | 0.160 |
| Valium | 40.4 (139) | 32.9 (93) | – | 3.8 | 0.052 |
| Mean # of days used (SD) | 10.1 (10.8) | 10.0 (10.7) | 0.0 | – | 0.936 |
| *Overdose (last 6 months)* | 18.0 (62) | 18.1 (51) | – | 0.0 | 0.984 |
| *Drug treatment (last 12 months)* | 25.4 (87) | 30.0 (85) | – | 1.7 | 0.193 |
| *Criminal justice* | | | | | |
| Arrested (last 12 months)*** | 59.6 (205) | 39.6 (112) | – | 24.9 | 0.000 |
| Arrested for (of those arrested): | | | | | |
| Drug offense*** | 15.4 (53) | 5.7 (16) | – | 15.1 | 0.000 |
| Property offense | 47.5 (97) | 36.6 (41) | – | 3.5 | 0.061 |
| Detention (last 12 months)*** | 51.3 (174) | 31.9 (89) | – | 23.6 | 0.000 |

n/a: no statistics are computed since this variable is a constant.
*P < 0.05, ***P < 0.001.
†Mean number of days used excludes those who did not report use of the drug (i.e., coded as 0 days used).

Fischer et al. (2007)

# Risk factors for infectious disease transmission among crack users

- Homelessness/Drug use in public spaces ➔ rushed & risky use practices

- Incarceration ➔ unsafe use

- Compromised physical & mental health status ➔ general susceptibility for ID/'bingeing'/'self-medication'

- Sex trade involvement, high-risk sexual behavior, sex-for drug exchanges (Ross et al. 2002; Booth et al. 1993; Lejuez et al. 2005) ➔ 'sex/drugs spiral'

# Risk factors for infectious disease transmission among crack users

- Injection drug use/needle sharing => most crack users are current/past IDUs

- Use of risky makeshift paraphernalia for crack use, e.g., broken glass, metal hardware, popcans, inhalers

- Oral cuts, burns, wounds and leisons, increasing susceptibility for ID transmission through oral cavity in context of drug use or sexual activity (Porter et al. 1997; Faruque et al. 1996; Haydon&Fischer 2005)

- Crack paraphernalia sharing as a possible ID transmission mode?

CP012

CP013
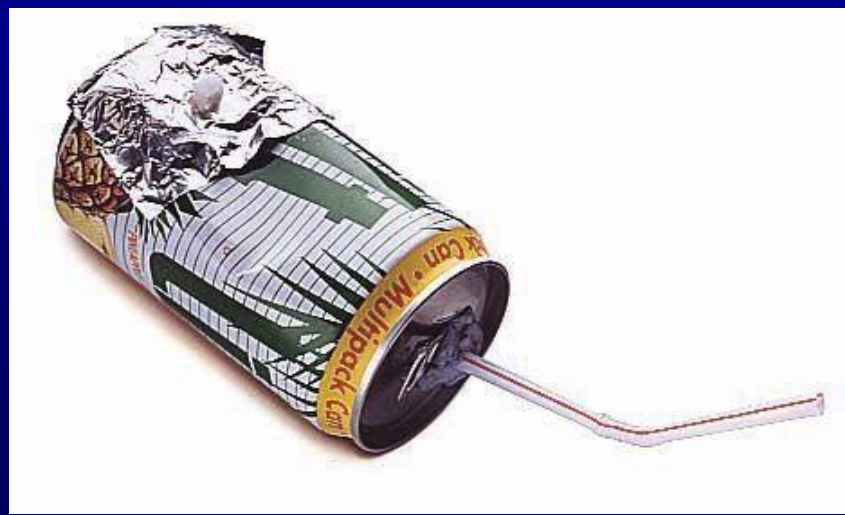
# Possible infectious disease transmission pathways for crack users

1) **Indirect causal pathways:** Crack users engage in/are exposed to risk factors in context of crack use (e.g., incarceration, sex risks, injection drug use)

2) **Direct causal pathways:** Crack use itself is a causal pathway for infectious disease transmission (e.g., HCV transmission through crack pipe sharing)

➔ Important for targeted prevention!

# Possible HCV transmission through crack pipe sharing

- Review of 28 studies 1989 – 2006: 2.3% - 17% of non-injection (crack) drug user populations are HCV+ (Scheinman et al. 2007)

- Possible transmission by crack paraphernalia sharing?

- 75% - 90% of crack users in Canadian samples shared crack pipes in last 30 days  (Fischer et al. in press; Leonard et al. 2006)

- Multi-site BC study: 79% of crack users shared pipes in last 30 days, 44% > 21 times (Fischer et al. in press)

- Multiple reasons for sharing: Unavailability of pipes; urge for immediate use after purchase; enforcement effects; 'social reasons'

# Prevalence intervals of HepC rates in non-injection drug use samples by study quality scores (Scheinmann et al. 2007)
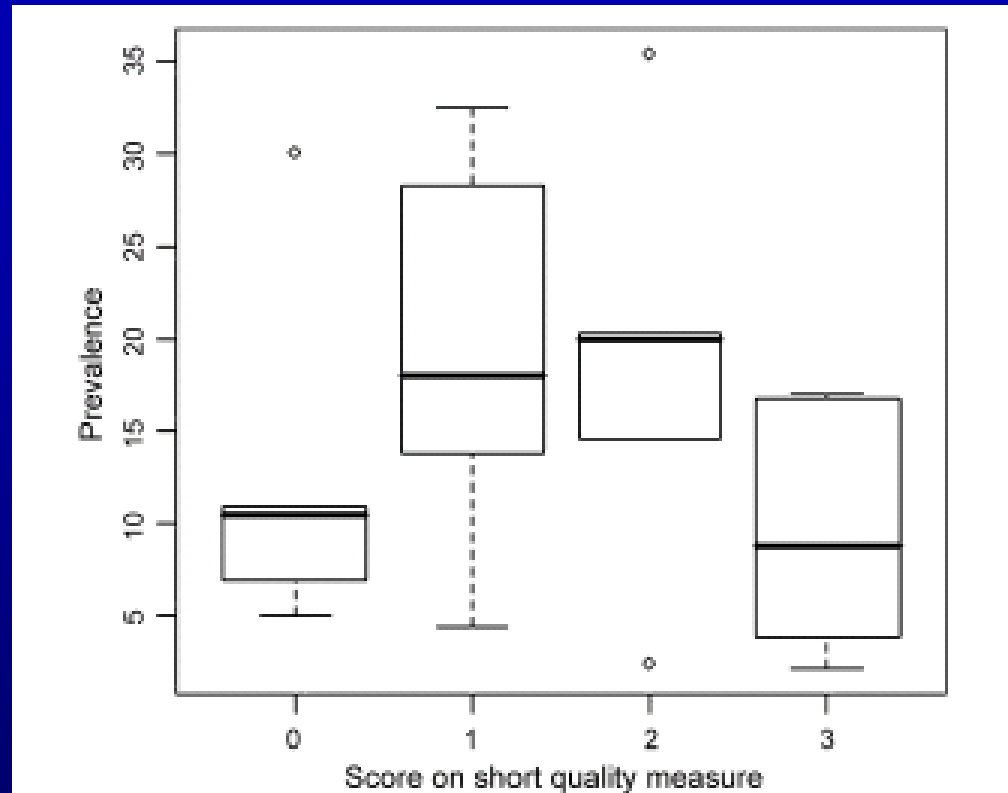


Fig. 2. Plots of prevalence by quality scores; medians and ranges by quality. The range is indicated by the horizontal bottom line or dot and the horizontal line or dot. The dot indicates that this lower or upper value is an outlier, while the line indicates that this lower or upper value is within the expected range. The median value for each quality score is indicated by the thick black line in the rectangle. Each rectangle encompasses the 25th–75th percentile for the corresponding quality score.

Scheinmann et al. (2006).

# Study to explore plausibility of HCV transmission through crack pipe sharing (Fischer et al., EurJofGastro&Hep 2008)

- Collection of recently used crack pipes from N=51 crack users in Toronto
- Screening of crack pipes for HCVirus by previously validated PCR methods to manually extract HCV-RNA
- 43.1% (n=22) of sample was HCV anti-body positive
- 2.0% (n=1) of the 51 pipes tested positive for the presence of HCV RNA (4.5% of HCV+ sub-sample)
- HCV infected pipe was of makeshift quality; owner was HCV+ and presented with multiple oral sores/cuts
- HCV transmission by way of crack pipe sharing may be biologically plausible

# Interventions for street drug use in Canada

Available main interventions for high-risk drug users in Canada:

- Needle exchange services (NES)

- Opioid maintenance treatment (e.g., methadone/buprenorphine + experimental heroin maintenance)

- Supervised injection site ('Insite') in Vancouver

➔ Virtually no targeted prevention or treatment interventions for (increasing) population of crack users!
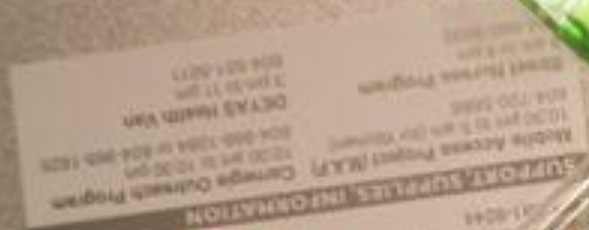
# 'Insite' – Supervised Injection Site (Vancouver)

Safer Crack Smoking Kit

# 'Safer crack use kits' (SCUK)

- Idea emerged initially in late 1990s, driven as 'grass-roots' initiative from local service providers

- Provision of 'safer crack use' materials (glass stem, metal screen, push-stick, mouth-piece) plus safer sex items (condoms, lubricant) and prevention info

- Objectives: To reduce use of high-risk crack materials, crack pipe sharing, infectious disease risks; use SCUK as outreach tool for marginalized crack users

LifeStyles

NON-LUBRICATED

RIP SCREENS 5.

SCORE

LORIS
MEDIUM · Moyen
TAMPON ALCOOL
ISOPROPYLIQUE ANTISEPTIQUE
ALCOHOL PAD

# SCUK in Canada

- SCUK initiatives launched by local health service agencies in several cities (e.g., Toronto, Ottawa, Nanaimo, Guelph, Winnipeg)

- Substantial initial community/political resistance: Only a few public health departments supported initiatives; in several cities SCUK were shut down due to opposition from politicians/police/media

- Relatively thin evidence base for impacts of SCUK

# SCUK – Evaluation data

- Surveys of crack users in Vancouver (91%), Victoria (75%), other BC communities (78%) indicate that majority of crack users would use SCUK programs if available

- Evaluation of Ottawa SCUK program, involving n=500 crack users (Leonard et al. 2008)
  - Prevalence of crack pipe sharing remained high (80%) at 6- and 12-month follow-up, but reduced frequency
  - Decrease of prevalence of crack injection from 96% to 78%, explained by crack pipe availability
  - No evidence of actual reductions in infectious disease transmissions

# 'Safer Consumption Sites' (SCS) for crack smokers

- Concept of SCS based on SIS model for IDUs

- Objective: Provide users with a safer & clean environment where crack can be used calmly, also offer health services; safer use materials; treatment referrals

- SCS exist in several European countries; appear to work well and effectively (e.g. Hedrich et al. 2005; Fischer & Allard 2007; Kimber et al. 2003)

- Proposals to establish SCS in several Canadian cities (e.g., Vancouver, Victoria)

- Main barriers: Environmental/workplace regulations regarding 'smoking'; extreme drug use & behavior patterns (e.g., 'bingeing', mental health) of crack users

# Treatment Interventions for Crack Use

- For long-term effectiveness, public health measures need to be complemented by effective treatment

- Currently, only available treatment for crack use is psycho/C-B therapy ➔ but: lengthy, costly, high drop-outs, limited effectiveness (Crits-Christoph et al. 1999; Wechsberg et al. 2007)

- Numerous medications have been assessed for pharmacotherapeutic interventions, but none have shown convincing effectiveness (vanden Brink & Ree 2003; Castells et al. 2007; Grabowski et al. 2004)

- Most treatment efforts will likely be futile unless co-morbidity/mental health issues are simultaneously addressed

# Conclusions

- Crack use clearly as a major & growing public health problem in Canadian cities

- Consists of extremely harmful interplay of physical & mental health factors, sexual risk contexts and negative social impacts ➜ need better epidemiological understanding of trajectories

- Badly neglected phenomenon on prevention and treatment ends: Urgent need to develop & evaluate feasibility & effectiveness of possible interventions

- Key focus needs to be on public health/prevention measures as well as possible pharmacotherapeutic treatments (requires active collaboration with neurosciences)