AN OVERVIEW OF NON-MEDICAL USE OF PRESCRIPTION DRUGS AND CRIMINAL JUSTICE ISSUES IN CANADA

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Executive Summary

In Canada, the non-medical use of prescription drugs, specifically prescription opioids (POs) and benzodiazepines (BDs), have gathered attention in recent years. Although nation-wide epidemiological data are currently sparse, provincial data and data from the US indicate an area of growing concern. The following report explores the trends of non-medical use of prescription opioids (NMUPOs) and benzodiazepines (NMUBDs), the health and societal implications of non-medical use and some of the criminal justice policy issues in Canada.

NMUPO & NMUBD Use & User Characteristics

The reported medical use of POs in Canada has approximately doubled in less than a decade, and currently ranks third after the US and Germany among the world's largest PO consumer countries on a per capita basis. Concurrent with this increase in the general availability are additional opportunities for non-medical use. Unfortunately, information on the NMUPOs and NMUBDs in Canada is relatively constrained due to a lack of longitudinal data available and to methodological concerns (i.e. operational definitions, framing of questions and response rates).

Data that is available highlight NMUPO use among younger age groups within the general population, with no gender difference among adults, but an over-representation of young adults (19-24), with reported use higher among high-school females. Additionally, US studies have indicated lower socio-economic status, with associated variables such as poverty, unemployment or low income as risk factors for NMUPO in the general population. Among street drug user populations, there is evidence that NMUPO may be becoming more prevalent than heroin use. Unlike general populations of NMUPO users, street drug user populations using POs non-medically have been reported as older compared to other street drug users. Provincial data in Ontario indicate that PO citation as problem substances among treatment admissions has increased substantially, with over 80% reporting past year NMUPO. Specific analyses of socio-demographic characteristics of PO clients in treatment facilities are currently not available.

Unlike POs, Canada's spending per capita on benzodiazepines (BDs) has remained quite stable over the past decade. Unfortunately, there are few studies on NMUBDs among Canada's general population, and thus the extent of non-medical use is unclear at this time. Surveys among university and high-school students report past year use of tranquilizers around 2%; however, non-medical use was not specified in all studies. Prevalence changes over time for NMUBDs among street-drug user populations are unclear due to few over-time comparisons, with prevalence rates ranging from 6% in Vancouver's' Downtown Eastside to 31.3% in Victoria. NMUBD among treatment populations has shown stability over time, with citations of BD use as problem substance increasing with age, and being higher among women.

Diversion Routes

Tracking how prescription drugs such as POs and BDs are attained for non-medical purposes is challenging as they are legitimately generated products, available and distributed legally through the medical system. US data on diversion indicate heterogeneity of sources or routes, from the manufacturing site to the consumer, further complicating where to target points of intervention.

There is currently little data available on Canada's general population regarding how POs for non-medical use are obtained; however, doctors, friends, family, the street, "double doctoring" and healthcare workers are reported as potential sources. Within street drug user populations, regular dealers, friends/partner, trade, or directly from the medical system have been identified as sources, with irregular dealers, doctors, and theft reported less frequently. A doctor's prescription, the street, or a combination of the two, have been identified among NMUPO users in treatment facilities.

BDs are consumed at lower prevalence levels that POs and consumption rates have remained relatively stable over time. Unfortunately, there is little data available on sources for the NMUBDs in Canada. A multi-site study revealed that among NMUBD street drug users the most common sources were friends, followed by doctors, with irregular/regular dealers, a partner, and theft reported less frequently. Studies in the US among the general population report that youth and students primarily cite peers, friends and family members as BD sources. Additionally, there is some evidence suggesting healthcare worker involvement in diverting BDs.

Health Implications

It has been estimated that between 10%-33% of NMUPO users may develop dependence or other drug use disorders in Canada. While there are reports on specific PO related deaths in Canada (e.g., fentanyl or oxycodone), a lack of national data on overdose deaths related to NMUPOs makes an exact quantification difficult; however, in the US, such deaths have increased since the 1990s, replacing heroin and cocaine as the leading drugs involved in fatal drug overdoses. Based on Canada's epidemiological profile and US rates, a large number of NMUPO-related mortality can be expected. Additionally, NMUPO is associated with a variety of diseases including elevated use disorders of other substances, higher levels of mental disorders, and somatic diseases (specifically pain). Although there are few Canadian studies on the associations between injuries and NMUPO, based on international literature both intentional and unintentional injuries can be linked to NMUPOs. And finally, a steady increase among clients reporting past year PO use and PO as presenting problem substances has been seen in Ontario among treatment facilities.

Data on the health consequences on NMUBD is scarce in Canada; however, like POs, BDs have reinforcing properties with the potential for abuse and dependence. US survey data indicate that among respondents who reported past-year non-medical use of sedatives/tranquilizers, that 9.8%

met criteria for abuse/dependence, with higher prevalence among adolescents (17.4%). Despite a lack of research exploring possible associations between NMUBDs and overdose deaths in Canada, international studies have identified drug poisoning by BDs in approximately 3.8% of all deaths caused by poisoning from a single drug. Although associations have been made between BD use and injuries (traffic injuries, suicide, and falls), the relationship is unclear. Unlike POs, treatment admissions related to BDs has remained stable.

Societal Implications

The health/burden of disease and use related crime constitutes the primary factors determining direct 'social cost' impacts of substance use. Given the absence of Canadian data no s ocial costing is currently available; however, in 2001 it was estimated that the societal costs related to PO abuse in the US were approximately $8.6 billion, costs which are likely higher today considering the increase in PO abuse.

PO-related admissions to substance treatment programs and emergency room admissions are key categories that indicate the health/burden of disease related to NMUPOs over-time. As emergency room admission data are not routinely or systematically collected in Canada, rates are currently unclear. In the US, it has been reported that emergency room visits involving POs rose by 120% in the period 1997-2002. Among treatment admissions in Ontario, PO related admissions approximately doubled in less than a decade (9.4% to 15.7%), which are likely an underestimation as the reporting system does not cover admissions to or initiations of opioid maintenance treatment.

Little is known about PO related mortality in Canada as information on ps ychoactive drug-related accidental deaths is not centrally collected. A recent analysis in Ontario suggests that PO-related mortality rates have doubled in the period 1991-2004. Additionally, several US studies indicate that PO-related accidental poisoning deaths have increased substantially in recent years, outnumbering those related to heroin or cocaine.

There are currently no empirical specific assessments of the crime and criminal impacts of non-medical use of prescription drugs in Canada, thus only the potential nature and extent of crime and criminal impact is offered. As supply and sourcing routes of prescription drugs are distinct from illegal drugs, including friends, family and double-doctoring, defining and the enforcement of drug-related acquisition crimes is highly complex. An analysis on a street drug user population cohort in Canada paralleled findings in the US where PO-only users may be more socially integrated and less crime-involved than predominantly heroin or cocaine/crack involved street drug users.

Policy Issues

As Canada finds itself in the early stages of policy development, it is crucial that the best possible policy is developed for the complex issue of non-medical use of POs and BDs. As such, any policy should recognize that POs and BDs are important medications in areas of medical care, such as pain, sleep and mental health, and that any policy or intervention must take care not to interfere with effective health care in these areas. An exploration of several policy issues is presented, highlighting the use of active and expanded law enforcement, and tighter controls of medical care and drug providers. Additionally, some of the challenges and negative consequences of such initiatives are presented including the possible deleterious effects of criminalization on a youth population, enforcement impact on black market dynamics, monitoring challenges, and the phenomenon of opiophobia and its impact on access to effective medical care.

Conclusion

With a current inability to accurately assess the extent of NMUPOs and NMUBDs in Canada, there is a pressing need for more research before policies addressing this complex issue can be proposed. There has been a tendency for assessments, interventions, or calls for measures aimed at non-medical use of prescription drugs to predominantly see and analyze the root of the problem at the individual level. We strongly recommend that when developing policies that address the NMUPOs and NMUBDs in Canada that a broad perspective is kept, recognizing the possible systemic determinants or dynamics. Additionally, we recommend that the NMUPOs and NMUBDs are recognized first and foremost as health problems and are addressed by health based interventions or improvements to health care.

1. Methodology

AMSTAR, a measurement tool to assess the methodological quality of systematic reviews (Shea et al., 2007), and the overview by Egger and colleagues (2001) were used as a guide to conduct this systematic literature review.

A systematic literature search on epidemiological studies reporting:

- *prevalence* of *non-medical use* of either *PO*s or *BDs* in *North America* (search terms in italic; North America was operationalized as either Canada or US or North America)
- *non-medical use* of *POs* or *BDs* combined with either *general population* or *street drug user*
- *consequences* of *POs* or *BDs* in *North America* (we specified overdose, pain, injury and mental health separately)

was performed in multiple electronic bibliographic databases including: Ovid MEDLINE, PubMed, EMBASE, Web of Science (including Science Citation Index, Social Sciences Citation Index, Arts and Humanities Citation Index), PsycINFO, CABS (BIDS), WHOLIST, SIGLE, ETOH, Google Scholar, and the Cochrane Database of Systematic Reviews. The available published and unpublished literature was searched up to July 2008 inclusive. In addition, a manual search of the bibliographic pages of selected articles and reviews as well as the content pages of major epidemiological and addiction speciality journals were conducted. The search was not limited to English language publications.

In addition, we looked for data on NMUPOs or NMUBDs in major Canadian surveys, and analyzed the respective questions in the Ontario surveys, where the second author is currently the acting PI (for technical information see Adlaf & Paglia-Boak, 2007; Ialomiteanu et al., 2009; Ialomiteanu & Adlaf, 2009).

2. Epidemiology Of The Non-Medical Use Of Prescription Drugs In Canada

2.1. Prevalence of Non-Medical Use of Prescription Opioids (NMUPO)

2.1.1. Introduction

In Canada, there have been substantive suggestions and concerns that non-medical use of prescription opioids (NMUPO; [Note: Prescription opioids (POs) in the context of this analysis mainly include and refer to the following medical opioid compositions or products: codeine, morphine, oxycodone, hydromorphone, hydrocodone, fentanyl; where other substances are included or referred to, this is specified]) seem to have risen, following trends similar to those in the United States in recent years (Fischer et al., 2008c; Popova et al., 2009; Compton & Volkow, 2006; Hurwitz, 2005; Fischer et al., 2008b). These views, in part, are informed by the fact that the extent of medical PO use – a preeminent determinant influencing non-medical use - in Canada occurs at highest level in global comparison and has approximately doubled in the past decade (Fischer & Rehm, 2008). Correspondingly, inflation-adjusted retail spending on opioid drugs per Canadian also more than doubled between 1998 and 2007 (from $7 to $14.80 in 2007 dollars), mainly due to therapeutic choice and volume effects (Morgan et al., 2008). Canada – after the US and Germany – is the world's third largest PO consumer country on a per capita basis, with the average consumption in defined daily dose (DDD) units per million inhabitants per day totaling 18,914 (19,965 in Germany and 40,604 in the US) (International Narcotics Control Board, 2009a).

2.1.2. General Populations

The most recently completed Canadian general population survey on substance use, the Canadian Addiction Survey (CAS; (Adlaf et al., 2005a)) contained no data on the non-medical use of prescription drugs, and hence no epidemiological data on NMUPO in the Canadian adult population at large are currently available. The new Canadian Alcohol and Drug Use Monitoring Survey (CADUMS) – conducted in 2008 by telephone with a representative national Canadian population sample of 16,672 respondents
reported that in the total sample, 28.4% had used psychoactive pharmaceutical drugs in the past year. Of these, 2.0% reported that they used such substances to 'get high' [Note: This operational definition is much more narrow than definitions of 'non-medical drug use' as for example used in the US, and hence are not comparable to the latter data as they likely lead to substantial under-estimations. There are further methodological concerns with CADUMS, as the survey's response rate was ~35% only]. The lion's share of recent psychoactive pharmaceutical drug users in CADUMS – 21.6% - had used POs in the past year. Of these, 1.5% - or 0.3% of the total population – had used these 'to get high' (Health Canada, 2009). As will be discussed below, these figures are substantially lower than NMUPO rates reported for the US general

population (i.e., 5.0% in 2007; (Substance Abuse and Mental Health Administration (SAMHSA), 2008b)).

Using available Canadian data and projections based on ratios from epidemiological indicators from the US, a different approach had estimated that in Canada in 2003 there were between 321,000 and 914,000 NMUPO users in the general population aged between 15 and 49 (Popova et al., 2009). Several local indicators from across the country describe the prevalence of NMUPO. For example, in Edmonton in 2002, 7.8% of adults over 18 reported past year non-medical use of prescription drugs, with POs being the most common (4.9%) (Wild et al., 2008).

The Canadian Campus Survey (CCS) collected data on substance use and other health issues from a random sample of 6,282 full-time university undergraduate students from 40 universities in 2004. 13.7% reported lifetime use of 'other opiate-type prescription drugs', 5% reported past year use and 1% reported use in the past 30 days. However, although these questions were framed and placed together with questions on illicit drug use, the CCS did not specify whether use was medical or non-medical (Adlaf et al., 2005a). The previous iteration of the CCS (1998; (Gliksman et al., 2000) did not include any items on NMUPO, and so no overtime comparisons can be made.

The Ontario Student Drug Use and Health Survey (OSDUHS) is a representative survey of middle and secondary school students in the province of Ontario. In the most recent (2007) iteration of the survey, 21% of respondents reported NMUPO in the past year (Adlaf & Paglia-Boak, 2007). Over-time trend data could only be provided on the use of OxyContin, which had been first surveyed in 2005; past year non-medical use of OxyContin increased from 1% (2005) to 1.8% (2007) (Adlaf & Pagila-Boak, 2005; Adlaf & Paglia-Boak, 2007). Analogous to the OSDUHS, other provincial studies have shown patterns of NMUPO prevalence among high school students. The Student Drug Use Survey in the Atlantic Provinces (SDUSAP) included a new item on NMUPO in 2007 (yet again without previous data for over-time trends). Between 17% and 20% of students respondents in the provinces of NS, NB, NL and PE reported such use (Poulin & Elliot, 2007). In Alberta, the 2005 Alberta Youth Experience Survey reported that 0.8% of young people in grades 7-12 reported past year use of OxyContin (Lane & AADAC Research Services, 2006). In the fall of 2007 in Manitoba, a total of 3.5% of males and 3.9% of females in grades 7 to senior 4 reported past year use of opioids. However, although students were asked generally whether they used prescription drugs to get high, it appears that they were only asked specifically about the drug Ritalin (Friesen et al., 2008). Finally, the OxyContin taskforce in Newfoundland and Labrador and the Cape Breton Victoria Regional School Board both reported problematic use of OxyContin among young people that required further investigation (OxyContin Task Force, 2004; Covell, 2004).

2.1.3. Street Drug User Populations

A recent study estimated that there were 72,000 NMUPO users, heroin users, or both among the Canadian street drug using population based on overdose death data and a key informants survey, with more individuals using POs non-medically than heroin in 2003 (Popova et al., 2009). Several studies in Canada examine drug use patterns among so-called street drug users, e.g. injection drug users (IDUs) or other high-risk drug users who obtain drugs mainly from street drug markets. The multi-site OPICAN study, a cohort study of opioid and other drug users conducted in 7 Canadian cities (N=484), found in 2005 that POs were used by 80.6% of the total sample, either with or without heroin (ranging from 29.5% to 100% by site; (Fischer et al., 2008a)). Comparisons with baseline assessments suggested that PO use had substantially increased in the cohort since 2001, and largely substituted for decreasing heroin use (Fischer et al., 2006a). In 2005, NMUPO was more prevalent than use of heroin (for the last 30 days) in five of the seven city samples. Prevalence of heroin use significantly decreased among untreated participants since baseline (2001 onward) in all study sites, suggesting a recent shift from heroin to PO use in the study sample (Fischer et al., 2006b).

The 'I-Track' study examines drug use and related risk behavior among IDUs in multiple cities across Canada, recording both participants' injected and non-injected drugs in the last 6 months in 2004 ('Pilot Phase' (Health Canada, 2004)) and 2006 (Phase 1 (Health Canada, 2006)). Among injected drugs, morphine (54.3% in 2004; 53.7% in 2006) and Dilaudid (50.2%; 32.9%) were recorded at high but relatively stable or decreasing levels; in comparison, injected heroin use decreased from 42.8% (2004) to 27.6% (2006). Among non-injected drugs, Tylenol with codeine (52.3%) in 2004; 51.5% in 2006, Dilaudid (27.0%; 23.6%), and Demerol (15.8%; 11.5%) were recorded at overall stable levels; in comparison, non-injection heroin use decreased from 25.6% (2004) to 15.6% (2006). Overall in the 7 sites in 2006, greater proportions of study participants injected Dilaudid than heroin in the previous 6 months (27.6% vs 32.9%) and the former drug's use prevalence was higher in 4 of the 7 cities. Overall in the 7 sites, more injected non-prescribed morphine than heroin in the previous 6 months (27.6% vs. 32.9%) (Health Canada, 2006).

Additional local sites across Canada have highlighted the prevalence of NMUPO in street drug users. A comparison of available Phase 1 (2003) and Phase 2 (2005) I-Track study data for the site of Victoria suggests a similar picture to the overall data, with prevalence rates for injection drug use for morphine (49.8%; 52.8%) and Dilaudid (40.3%; 39.6%); and prevalence rates for non-injection use for Tylenol/codeine (47.6%; 31.3%) and Dilaudid (24.4%; 24.1%) (Epidemiology and Disease Control and Population Health Surveillance Unit, 2006). Among clients of the Vancouver Supervised Injection Site ('Insite'; N=4764), as a percentage of all visits between March 2004 and April 2005, morphine (13.2%), Dilaudid (6%) and OxyContin (0.5%) use were reported by minorities; these use rates however were substantially lower than those recorded for heroin (40%) and cocaine (28.2%) (Tyndall et al., 2006). The CHASE project

team in the Downtown Eastside in Vancouver reporting non-injection drug patterns found that 6% reported use of Dilaudid (compared to 55% crack-cocaine, 6% benzodiazepines) (CHASE Project Team, 2005). Finally, several studies have reported that Edmonton has a very small heroin using community and POs have filled the void. Overall, in a survey of IDUs in inner-city Edmonton, 33.3% reported that their current drug of choice is morphine (compared to 3.3% cocaine, and 10% cocaine and opiates) (Wild et al., 2003; Strang & Rashiq, 2005). More recent data from ARC (2007) showed that past month use of specific POs by Edmonton inner-city drug misusers ranged from 60% for OxyContin and 50% for Dilaudid, to 8.9% for morphine and 3.3% for Demerol (Wild et al., 2008)

2.1.4. Treatment Populations

Some trend data are available on problematic PO use from individuals entering addiction treatment services. Specifically for the province of Ontario, the Drug and Alcohol Treatment Information System (DATIS) records use prevalence (in last 12 months) as well as problem substance citations for POs for nearly all individuals entering publicly funded addiction treatment services (N=80, 881 in 2003/4; N=103,345 in 2007/8, excluding family members). Both indicators, i.e. PO use prevalence (from 13.6% in 2003/04 to 20.1% in 2007/08) and PO citations as problem substance (7.6% to 13.6% in same period) among admissions have increased substantially, e.g., almost doubled, in recent years (Drug and Alcohol Treatment Information System (DATIS), 2008). Among patients admitted to the Methadone Maintenance Treatment program at the Centre for Addiction and Mental Health – Canada's largest addiction treatment hospital – in Toronto, 82% reported past year NMUPO (either in conjunction with or without heroin (Brands et al., 2004)). Among admissions for CAMH's opioid detoxification program between 2000 and 2004, the percentage of cases citing OxyContin use increased from 3.8% in 2000 to 55.4% in 2004 (Sproule et al., 2009).

Local cross sectional data also indicates problematic use among treatment populations. For example, in Regina in 2004/5, 1,192 clients being treated within drug treatment agencies reported using prescription narcotics, and 70% identified their use as problematic (Addictions Services Regina Qu'Appelle Health Region, 2006). In 2003, the OxyContin Task Force reported a 9.5% increase in admissions for OxyContin abuse in Newfoundland compared to the previous year (OxyContin Task Force, 2004). Finally, between May and December 2000, 209 new clients at the Native Addiction Services (NAS) in Calgary completed a self administered questionnaire. Overall, 48% reported inappropriate use of prescription drugs, 62% of whom reported using opioids or other analgesics (Wardman et al., 2002).

2.2. Prevalence of Non-Medical Use of Benzodiazepines (NMUBD)

2.2.1. Introduction

In Canada in 2007, approximately $7.50 per capita was spent on retail purchases of benzodiazepines (BDs) and the related drugs zopiclone and zaleplon. Unlike POs, however, there was very little increased spending per Canadian between 1998 and 2007 after accounting for inflation (Morgan et al., 2008). Correspondingly, in the most recent INCB report on psychotropic substances, compared to other countries, Canada's consumption of BDs varies according to drug category, yet has overall been quite stable over the past decade. For example, Canada's average consumption in defined daily dose (DDD) per thousand inhabitants per day of BD-type sedative hypnotics totals 8.74 in the latest reporting period (compared to 12.77 in Australia, 16.47 in the United States and 32.44 in the UK). However, consumption of BD-type anxiolytics is higher than a decade ago at 24.66 (compared to 43.03 in the United States, 12.76 in the UK and 19.02 in Australia). Finally, consumption of BD-type anti-epileptics (specifically Clonazepam) is considerably lower at 2.95, yet is higher than the US (1.45), the UK (1.3) and Australia (0.76) (International Narcotics Control Board, 2009b).

2.2.2. General Populations

The most recently completed Canadian general population survey on substance use, the Canadian Addiction Survey (CAS; (Adlaf et al., 2005a)) contained no data on prescription drug use, and hence cannot give any indication of NMUBD in the Canadian adult population at large. The recent national CADUMS population survey reported that 10.7% of the Canadian adult population had used pharmaceutical sedatives, mostly BDs, in the past year. Of these, 1.4% - or 0.2% of the total sample population – had used these "to get high" ((Health Canada, 2009); see methodological caveats for CADUMS discussed above).

Further available data shows an unclear picture of the extent of NMUBD. For example, the 7 Addictive Behaviours Study by the Addiction and Mental Health Research Laboratory in Alberta in 2002 found that 0.9% of Alberta's general population reported non-medical use of tranquilizers (e.g. Ativan, Valium and Xanax) in the past 12 months, compared to 4.9% for analgesics and 3% for sedatives (Wild et al., 2008).

The Canadian Campus Survey (CCS) collected data on substance use and other health issues from a random sample of 6,282 full-time university undergraduate students from 40 universities in 2004. 5.2% reported lifetime use of tranquilizers (prescription type drugs like Valium, Librium, Xanax, Ativan, Klonopin), 2% reported past year use and 1% reported use in the past 30 days. However, these questions were framed and placed together with questions on illicit drugs, and did not specify whether use was for medical or non-medical purposes (Adlaf et al., 2005b). The previous iteration of the CCS (1998; (Gliksman et al., 2000)) did not include any

items on non-medical use of prescription tranquilizers, and so no overtime comparisons can be made. Higher rates have been found in smaller-scale studies of university students, for example at McGill University in a study of 149 students in 2003-4, 8.1% reported lifetime NMUBD (Barrett et al., 2006)

Several recent studies with high school student populations have shown similar rates of past year non-medical use of tranquillizers. The Ontario Student Drug Use and Health Survey (OSDUHS) is a representative survey of middle and secondary school students in the province of Ontario. In the most recent (2007) iteration of the survey, 1.8% of respondents reported use of tranquilizers (e.g. Valium, Ativan and Xanax) in the past year and 2.2% reported lifetime use. There have been no significant changes in past year use over the past decade, with percentages hovering around 2% (Adlaf & Paglia-Boak, 2007). Other provincial studies have shown comparable results, with between 2.3% and 3% of student respondents in the provinces of NS, NB, NL and PE reporting such non-medical use of tranquilizers in the Student Drug Use Survey in the Atlantic Provinces (SDUSAP). This shows a decrease since 1998, when past year non-medical use in the four provinces ranged from 3.4%-5.9% (Poulin & Elliot, 2007). Past year use of tranquilizers decreased from 2002 to 1% in the 2005 Alberta Youth Experience Survey (Lane & AADAC Research Services, 2006). Finally, reports on adolescent drug use showed past 30 day use of anti-anxiety drugs (e.g., Valium, Xanax, Ativan) at 0.8% - 2.3% in areas of Cape Breton (Covell, 2004).

2.2.3. Street Drug User Populations

The 'I-Track' study examines drug use and related risk behaviors among IDUs in multiple cities across Canada, recording both participants' injected and non-injected drugs in the last 6 months in 2004 ('Pilot Phase' of four sites (Health Canada, 2004)) and 2006 (Phase 1 – total of seven sites across Canada (Health Canada, 2006)). Among injected drugs, NMUBD remained stable in the total study population across sites between the two phases (12.1% in 2004; 8.4% in 2006). Among non-injected drugs, NMUBD increased substantially from 13.2% in 2004 to 49.1% in 2006. However, it must be noted that examples of BDs (e.g. Xanax, Valium, nerve pills) were added as a specific choice of response at phase 1, therefore direct over-time comparisons need to be made with this caveat in mind. The multi-site OPICAN study, a cohort study of opioid and other drug users across Canada, found that BDs were the most commonly used non-opioid prescription drug used across sites, with 36.2% of the sample reporting past 30 day use (legitimate and/or non-medical use) (Haydon et al., 2005).

Several local studies have shown high prevalence for NMUBD among street drug users. Key informants in an assessment in Edmonton confirmed BDs among the prescription drugs most commonly used non-medically among street drug users. Furthermore, past 30 day use among inner city drug users was reported by 43.7% of respondents in the local OPICAN cohort and by 45.6 % in the Assessment of Risk Contexts (ARC) study (Wild et al., 2008). Looking

specifically at non-injection drug use patterns, a comparison of available Phase 1 (2003) and Phase 2 (2005) I-Track study data for the site of Victoria show prevalence rates for NMUBDs at 33.9% in Phase 1 and 31.3% in Phase 2 (Epidemiology and Disease Control and Population Health Surveillance Unit, 2006). However, the CHASE project team in the Downtown Eastside in Vancouver reporting non-injection drug patterns found that only 6% of study participants reported NMUBD (CHASE Project Team, 2005).

2.2.4. Treatment Populations

Some over-time data are available on NMUBD from individuals entering addiction treatment services, generally showing stability over time. Specifically in the province of Ontario, the DATIS records use prevalence (in last 12 months) as well as problem substance citations for BDs for nearly all individuals entering publicly funded addiction treatment services (N=80,881 in 2003/4; N=103,345 in 2007/8, excluding family members). Both indicators, i.e. BD use prevalence (11.2% in 2003/04 compared to 10% in 2007/08) and BD citations as problem substance (3.9% in 2003/4 and 3.4% in both 2006/7 and 2007/8) among treatment admissions remained relatively stable in this time period (Drug and Alcohol Treatment Information System (DATIS), 2008). Treatment requests specifically in Toronto recorded by the Drug and Alcohol Registry of Treatment (DART), showed that in 2002-3, 1% regarded BDs as a problem substance, while the corresponding total for the succeeding year was <2% (Research Group on Drug Use, 2004). Of admissions to methadone maintenance treatment at CAMH between 1994-1999, overall 26% reported problem BD use, with no significant changes observed over time (Brands et al., 2002). Amongst all treatment enrollees in 2003/4 at the Addictions Foundation of Manitoba (AFM), 28% of clients reported lifetime use of sedatives/hypnotics and tranquilizers at least once, with the most common being BDs. Use of sedative hypnotics and tranquilizers increased from 22.4% in 2000/1 to 31.3% in 2005/6, yet it is not clear how much of this increase can be attributed to NMUBD (CCENDU, 2004; Stevens & The Winnipeg Site Network Team, 2006).

3. Who is using prescription drugs non-medically (e.g., gender, age, and socioeconomic differences)?

3.1. Who is using prescription opioids non-medically?

3.1.1. General Populations

As indicated above, the first nationally representative survey to look into the question of NMUPO was the CADUMS survey with field work conducted in 2008 (Health Canada, 2009). So far, only results on the question of 'use to get high' were released, which are methodologically restricted and do not provide a full picture on the NMUPO phenomenon. In this category, there was no difference between men and women, but young adults (ages 19-24) were much overrepresented (4.9% of all young adult users of PO use them to get high, compared to 1.0% of all others).

In the Ontario CAMH Monitor of 2008, similar results were reported, albeit we can compare the results for NMUPO in general in addition to those who responded that they use PO to 'get high'. Any NMUPO was reported by 2.3% (1.3%-3.1%) of Ontario adults. No significant differences were found between men (2.3%, 95%CI: 0.9%-5.8%) and women (2.3%, 95%CI: 1.1%-4.5%). The only significant difference was found for psychological distress. Use of any pain relievers was significantly higher among those reporting elevated psychological distress (8.2%, 95%CI: 27.5%-48.2%, versus 1.4%, 95%CI: 0.7%-2.9%) No other significant differences were found for age, binge drinking, income, tobacco use and region (CAMH Monitor 2008, unpublished data).

NMUPO to 'get high' was reported by 0.5% (0.1%-2.9%) of Ontario adults, the same proportion as for Canada. NMUPO to 'get high' was significantly higher among men (0.9%, 95%CI: 0.1%, 6.2%) than among women (0.1%, 95%CI: 0.0%-0.7%). Bivariate analyses revealed significant differences for psychological distress and tobacco use. Use of any pain relievers to 'get high' was significantly higher among those reporting elevated psychological distress (3.5%, 95%CI: 0.5%-20.9%), and among current smokers (2.7%, 95%CI: 0.5%-14.4%). No significant differences were found for age, binge drinking, income, and region (CAMH Monitor 2008, unpublished data).

Much higher rates for NMUPO were reported in the OSDUHS high school students' survey for 2007. Past year NMUPO (i.e., at least once in the past 12 months) was reported by 20.6% (95%CI: 18.9%-22.3%) of students. Bivariate analysis by sex revealed a significant difference between males (18.0%, 95%CI: 15.8%-20.3%) and females (23.5%, 95%CI: 20.8%-26.3%). Based on the regression analysis, significant predictors were sex, with females more likely than males to report use (OR=1.4, 95%CI: 1.1-1.8); grade, showing a significant increase between 7th grade and 8th grade (OR= 1.9, 95%CI: 1.1-3.4); past year tobacco use (OR=1.8, 95%CI: 1.4-2.3),

alcohol use (OR=1.8, 95%CI: 1.2-2.5), and any illicit drug use (OR=1.9, 95%CI: 1.4-2.4) (Adlaf & Paglia-Boak, 2007).

Specifically, past year non-medical OxyContin use was reported by 1.8% (95% CI: 1.3%-2.4%) of students. Bivariate analysis by sex revealed no significant difference between males (1.7%, 95%CI: 1.2%-2.3%) and females (1.9%, 95%CI: 1.3%-2.8%). Results from the regression analysis showed the significant predictors were tobacco use (OR=2.2, 95%CI: 1.4-4.3), any illicit drug use (OR=9.8, 95%CI: 5.4-18.1), and poor self-rated mental health (OR=2.5, 95%CI: 1.1-5.8).

Overall, the age gradient with more NMUPO was also confirmed by Sproule et al. (1999) and by research outside of Canada (US: (Dowling et al., 2006; Zacny et al., 2003)). So overall, youth or young adulthood seem to be the age periods, where NMUPO is most prevalent. However, there may be a second age group in the forties with higher NMUPO (Simoni-Wastila & Strickler, 2004), as well as some higher prevalence in the elderly (Martin, 2008).

With respect to sex, the picture is less clear. NMUPO in Canada was not found more prevalent in women overall, but in high school students. On the other hand, more men than women reported NMUPO to 'get high'. In the US, studies often report higher prevalence in women (Mitka, 2000; Simoni-Wastila, 2000; Simoni-Wastila et al., 2004b).

Another important risk factor for NMUPO is socio-economic status (SES), although the evidence here stems entirely from the US (Spiller et al., 2009; Huang et al., 2006). Several studies have showed, that lower socio-economic status, with associated variables such as poverty, employment or low income, are risk factors for NMUPO.

So overall, lower age, low SES and use/abuse of other substances seem to be the best predictors of NMUPO in the general population.

3.1.2. Street Drug User Populations

Among street drug users, there are also some indications that predominant PO users, e.g., as compared to heroin or other street drug users, present distinct socio-economic characteristics. An analysis based on follow-up data from the multi-site OPICAN study suggested that NMUPO users, among other characteristics, were more likely to be older and received legal employment income, than heroin-only users (Fischer et al., 2008a). Relevant information comes from several US studies, which also suggest that NMUPO users may feature somewhat distinct socio-economic characteristics. For example, lower levels of illegal income generation and higher levels of income from paid work have been found in primary NMUPO users compared to other drug users (Sigmon, 2006). The age relationship from the general population does not hold true for NMUPO users among street drug users, possibly linked to the fact, that there is a group of

NMUPO street drug users which migrated from using heroin intravenously for various reasons (e.g., (Fischer et al., 2008a; Strang & Rashiq, 2005)).

3.1.3. Treatment Populations

Data from the DATIS population indicate, that clients in Ontario treated primarily for PO as the problem substance showed the following characteristics (from (Fischer et al., 2009c), submitted CMAJ): more male (58.7%; lower proportion of men compared to other problem substances); younger compared to other problem substances with almost 60% younger than 35 years of age; about ¼ of the sample fully or part time employed (comparable to people with cocaine as problem substance but less employment than people with alcohol problems); 29.8% with some kind of legal problems (lower compared to other problem substances). Unfortunately, additional socio-demographic details of PO clients within the DATIS population are not available without further specific analysis.

3.2. Who is using benzodiazepines non-medically?

3.2.1. General Populations

There are very few studies on NMUBD for Canada in general population samples. The CADUMS included a category of sedatives which in all likelihood consisted mainly of BDs. In total, sedative use was about 11% in the general population more in women (13.2%) than in men (8.0%), and more in older (11.7%) compared to young adults (defined as 15-24 year olds;5.5%). However, when using sedatives to get high, the young adults have clearly higher rates: 14.4% in this age group agreed to this question. In using sedatives to get high, no differences were found between gender (Health Canada, 2009).

In high school students, past year non-medical sedative use was reported by 1.8% (95%CI: 1.4%-2.3%). Bivariate analysis by sex revealed no significant difference between males (1.7%, 95%CI 1.2%-2.4%) and females (1.9%, 95%CI: 1.5%-2.5%). The only significant predictor from the regression analysis was poor self-rated mental health (OR=2.4, 95%CI: 1.2-4.8) (Adlaf & Paglia-Boak, 2007).

In treatment samples, BD use as problem substance increased with age ((Rush, 2002); based on DATIS), and was higher among women (5.9%) compared to men (2.5%). Clients with BD problems are included in the DATIS population of individuals seeking treatment in Ontario; however, no specific analysis has been conducted to describe this sub-population in any socio-demographic detail.

In the US, there are more and representative large-scale surveys including NMUBD in the general population, but there are no clear and consistent conclusions, not even with respect to

sex, ethnicity or age (Goodwin & Hasin, 2002; Huang et al., 2006; Simoni-Wastila, 2000; Simoni-Wastila et al., 2004b; Simoni-Wastila & Strickler, 2004). It may be that there are clearer trends for subclasses of BD.

4. How and under what circumstances are individuals obtaining prescription drugs for non-medical use? Are there links to organized crime or other criminal networks?

4.1. Introduction

Unlike illicit drugs such as heroin and cocaine, prescription drugs such as opioids (POs) and benzodiazepines (BDs) are legitimately generated products, and as such are available and distributed legally, specifically through the medical system. Data from the US and specifically for POs highlights that there are at least five main points in the system where diversion from the medical system can occur, namely at the manufacturing site, in transit, by the distributor or dispenser, at the point of prescribing, or by the consumer (Smith & Woody, 2005). Therefore, there is a diverse heterogeneity of sources or routes that POs can be diverted from the medical system to the non-medical user.

Essential context for the phenomenon of non-medical use of prescription drugs concerns the recent increase in the general availability and legitimate use of prescription substances, since along with increases in medical availability obviously comes an increase in the opportunity for diversion. According to the International Narcotics Control Board (INCB), the total consumption in defined daily doses per million inhabitants per day of all POs in Canada more than doubled in six years from 8,713 in 2000-2002 to 18,914 in 2005-2007. Canada is currently ranked as the third highest consumer in the world after the US and Germany (International Narcotics Control Board, 2004; International Narcotics Control Board, 2005a; International Narcotics Control Board, 2009a). Similar to POs, the total consumption of BD-type anxiolytics in defined daily doses per thousand inhabitants per day in Canada increased from 21.65 in 2000-2002 to 38.66 in 2005-2007 (International Narcotics Control Board, 2005b; International Narcotics Control Board, 2008b; International Narcotics Control Board, 2009c). Although data from the late 1990s reported that diversion represented only a very small percentage of the number of drugs that are dispensed in Canada, with increases in consumption so too increases the quantities available for non-medical use (Darke & Stewart, 1999; Goldman, 2008).

4.2. How are prescription opioids obtained?

4.2.1. Canadian Data

4.2.1.1 General Populations

There is very little available data from Canada, especially within general populations and specifically for POs. One study which mailed questionnaires to regular users of codeine found that 37% met the criteria for codeine dependence. Amongst the dependent group, in addition to the codeine that they received legitimately from their doctor, 32% also obtained codeine from

friends, 11% from family members, 19% from the street and 11% through prescriptions from more than one doctor (double doctoring) (Sproule et al., 1999).

4.2.1.2 Street Drug Users Populations

Relatively more data is available on sourcing by marginalized populations in Canada. Street drug users appear to use a variety of sources, which commonly includes dealers, providing evidence that street drug markets for POs are functioning. For example, in-depth interviews with IDUs in Toronto discovered that the vast majority of POs used for non-medical purposes were bought from dealers. Furthermore, there appeared to be a general distinction between PO markets and markets for other drugs (Firestone-Cruz & Fischer, 2008). Interviews with regular street users of POs in two cities in Canada found that regular sources (described as involving multiple transactions in past month, having a personal or business rapport and having mutual knowledge of offerings/preferences) were used more frequently in Toronto (79.1%) than Victoria (35.9%). In addition, 46.5% of users in Toronto and 69.2% in Victoria had sold POs, and the majority had exchanged POs for other drugs (76.7% in Toronto and 79.5% in Victoria). Finally, in both sites, again there was a possible demarcation line between sources of POs and sources for other illicit drugs (Fischer et al., 2009a). Among illicit opioid users in the multisite OPICAN cohort, baseline data showed that for several individual POs, about half of respondents reported friends as sources and around 40% used regular dealers. Other less frequent sources included irregular dealers (between 10% and 20%), a doctor (between 8% and 40%, depending on the specific drug), and a small proportion from theft (Haydon et al., 2005). Follow up data from the OPICAN cohort confirmed that a substantial proportion of POs used non-medically were obtained directly or indirectly (e.g. through friends or partners) from sources in the medical system (Fischer et al., 2006b). Finally, a narrative description of the street drug trade specifically in Edmonton, Alberta in 2005 suggested that most POs were procured by robbery, diversion, sale of legally obtained prescription and the use of stolen prescription blanks (Strang & Rashiq, 2005).

4.2.1.3 Treatment Populations

Another relatively rich data source comes from patients entering treatment for opioid dependence. Among patients admitted to the Methadone Maintenance Treatment (MMT) program at the Centre for Addiction and Mental Health (CAMH) – Canada's largest addiction treatment hospital – in Toronto between Jan 2000 to Dec 2004, the majority of NMUPO users sourced the drugs using a doctor's prescription (37%) with other key sources being from the street (21%), a combination of prescription and street (26%), non-prescription purchases (i.e., over-the-counter codeine formulations) (5%) and from family or friends (1%) (Sproule et al., 2009). Interestingly, there was a clear linear trend between age and source, with the likelihood of obtaining from the street decreasing with age, and obtaining from a physician increasing with age (Sproule et al., 2009). An earlier study of patients admitted between January 1997 and December 1999 to MMT at CAMH found similar results with POs obtained from physicians,

purchased on streets, obtained from family or friends. However, 61% reported at least some came from physician's prescription (Brands et al., 2004).

4.2.2. US DATA

4.2.2.1 General Populations

Similar to Canada, there is very little evidence available from the US regarding the sourcing of POs amongst general populations. Youth and student NMUPO users mainly report peers, friends and family members as their primary sources, as well as their roommates or partners (McCabe & Boyd, 2005). However, a web survey of students at a Midwestern university in 2005 found that almost 40% report that they have more than one source (McCabe et al., 2007). For example, of past year NMUPO users between the ages of 18 and 25 years in the 2005 NSDUH, the majority (53%) obtained their drugs from a friend or relative for free. Other methods of obtaining POs for non-medical use included from one doctor (12.7%) and bought from a friend or relative (10.6%) (SAMHSA, 2006). Furthermore, those who hold a prescription have been shown as sources of POs. In a 2003 random sample of undergraduates, of those with a prescription for POs, 26% had been approached to divert their medication (McCabe et al., 2006). College samples have also shown several sex differences in sourcing. In the NSDUH sample, males were three time more likely than females to have bought from a dealer and were more likely to have bought POs from a friend. Conversely, women are more likely to have obtained their POs from a friend or relative for free (McCabe et al., 2007; SAMHSA, 2006). Additionally, those in the NSDUH sample who met criteria for dependence were less likely to obtain POs for free from a friend or relative (37.5%), but more likely to have bought them from a friend or relative (19.9%). (8.1% F vs 15.9% M) (SAMHSA, 2006).

Amongst high school students in Detroit, the most common sources of POs were family and friends, yet users also commonly obtained POs from a dealer or by way of theft (Boyd et al., 2006). As with college students, high school students that have a legitimate prescription for POs are common sources. Of students in grades 7-12 in a Michigan school district who held prescriptions, 10% reported having traded their drugs, 25% had given them away or had loaned them to other students (boys more frequently to boys, and girls to girls), and 12% had had their medications taken without consent, or stolen (Boyd et al., 2007).

Regarding other specific sources, it has been suggested that the Internet has become an increasingly relevant source for illegitimately obtaining prescription drugs (Compton & Volkow, 2006). However, there is some debate regarding the quantity of prescription drugs that are procured on the Internet, and the fact that the role may have been overstated (Zacny et al., 2003; Dekker, 2007; Mitka, 2000; Forman, 2006). On websites that did sell prescription drugs without a prescription, the most frequently offered prescription drugs in 2006 were BDs (84%), followed by POs (68%). Although the total number of sites increased between 2004 and 2006, the

percentage of sites offering these drugs reportedly decreased overall (Beau Dietl & Associates, 2006). In addition, possibly related to increased awareness, regulation and law enforcement there are indications that there have been some decreases in Internet availability in recent years (Boyer & Wines, 2008).

Finally there is some evidence to suggest that healthcare workers themselves may act as a means of diverting prescription medications. For example, data from drug diversion cases involving healthcare workers investigated in Cincinnati between 1992 and 2002 showed that opioids were the most commonly diverted drugs (67.4%). Nurses, nursing assistants and medical assistants were responsible in ¾ cases, with hospitals being the most common sources, followed by pharmacies (Inciardi et al., 2006).

4.2.2.2 Street Drug User Populations

Similar to general populations, evidence suggests that street drug users often obtain POs for non-medical use from friends, acquaintances or family members, as well as personal prescriptions. However, it appears that they use a variety of other sources, which include script doctors, doctor shopping, residential burglaries and thefts from pharmacies, as well as active street markets (Inciardi et al., 2007; Joranson & Gilson, 2007). A study of sourcing in a sample of heroin involved IDUs in New York City found that nearly 2/5 had sold at least one PO at least once in their lifetime and those who had sold heroin or cocaine in their lifetime were twice as likely to sell POs (Davis & Johnson, 2008). Interestingly in this sample, the main source for OxyContin in particular differed according to the primary motivation for use. For example, those who use OxyContin for euphoria or withdrawal were twice as likely to use a dealer than those whose primary motivation was for pain relief (83% of whom reported a doctor or pharmacy as a source) (Davis & Johnson, 2008).

4.2.2.3 Treatment Populations

A relatively rich source of data on sourcing comes from people who are entering treatment for drug dependence. A number of these studies have found that, as with general populations, a primary source of POs is from friends or family, with ~50% - 70% reporting this source (Anonymous, 2005; Cicero et al., 2008b; Levy, 2007; Rosenblum et al., 2007). In addition, there is evidence to suggest that those who present with substance use disorders use a greater variety of sources, with one study reporting that more than 60% regularly use more than one source (Cicero et al., 2008a). In some studies, use of dealer is the most common, reported by up to 82% of enrollees, and more frequently by males and those who report motivations other than pain as their primary motivation for use (Anonymous, 2005; Rosenblum et al., 2007; Cicero et al., 2008a; Cicero et al., 2008b). Between 17% and 37% report direct or indirect sourcing from a physician, with one study reporting that 84% had a legitimate prescription at some point (Anonymous, 2005; Levy, 2007; Passik et al., 2006). Less frequent sources include thefts and prescription forgeries, with the least frequently acknowledged source, perhaps not surprisingly

being the Internet (Cicero et al., 2008a; Cicero et al., 2008b; Anonymous, 2005; Rosenblum et al., 2007; Passik et al., 2006).

4.3. How are benzodiazepines obtained?

4.3.1. Canadian data

4.3.1.1 Street Drug User Populations

Yet again, there is very little data on the sources of BDs for non-medical use amongst marginalized populations. Among street drug users in the OPICAN cohort, baseline data showed that the most common sources for BDs for non medical use were friends (46%) and doctors (27.6%). Less frequently reported sources were irregular dealers (16.5%), regular dealers (8.8%), a partner (3.5%) and, as with POs, only a very small number from thefts (0.4%) (Haydon et al., 2005). A more local study found that specifically in Edmonton, Alberta , according to inner city key informants, 55% sourced BDs on the street, 33.3% from physicians and 11.1% from both (Wild et al., 2008).

4.3.2. US data

4.3.2.1 General populations

From the very limited available evidence on how BDs are obtained for non-medical use in the general population, it appears that as with POs, youth or student NMUBD users mainly report peers, friends and family members as their primary sources, as well as their roommates or partners. In the 2003 Student Life Survey, a web-based survey of a random sample of college students at a Midwestern university, of those who reported non-medical use of sedatives or anxiety meds (e.g., Ativan, Xanax, Valium, Klonopin), 58.2% reported obtaining their drugs from friends and 9.6% family (McCabe & Boyd, 2005). Again as with POs, youth with a legitimate prescription also report diversion of their own medication. For example, in a 2005 study of 7-12 graders, of those with a prescription for sedative or anxiety medication (e.g., Ativan, Xanax, Valium, Klonopin, etc), 10% reported trading their medication, with many fewer reporting having sold them. In addition, 15% had given them away or loaned them, and 14% had them taken against their will (Boyd et al., 2007). As with POs, there is some evidence to suggest that healthcare workers may act as a means of diverting BDs. Data from drug diversion cases involving healthcare workers investigated in Cincinnati between 1992 and 2002 showed that POs were the most commonly diverted drugs (67.4%), followed by BDs (14.5%) (Inciardi et al., 2006).

4.3.2.2 Street Drug User Populations

Evidence regarding obtaining BDs among street drug users comes mainly from anecdotal or local reports. For example, local clinicians and outreach workers in Denver, Colorado describe the easy availability of BDs (e.g., Valium, Xanax, Ativan), on the street. Similarly, BDs and other prescription depressants are seen to be a growing threat in Georgia with the drugs widely available on the street or via the Internet. Dealers and abusers themselves use a variety of methods for obtaining the drugs, including stolen prescription pads, robbing pharmacies, and attempts to convince doctors to prescribe the desired pills (Community Epidemiology Work Group, 2008). One available study which involved interviews with IDUs in US cities between 2004 and 2006, reported three main sources for all prescription drugs, including tranquilizers (such as Xanax, Valium and Klonopin). The main sources reported were self, friends or relatives with legitimate prescriptions, public or streets settings and finding the prescription drugs on the street or elsewhere (Lankenau et al., 2007).

5. What are the health implications for those who use prescription drugs non-medically (e.g., dependence, other illicit drug use, co-morbidity, treatment utilization)?

5.1. NMUPO Health Risks

5.1.1. Introduction

The health risks of POs can roughly be divided into two categories:

- Risks associated with the drug itself and the biochemical processes after ingestion. In this respect, all forms of opioid use are quite similar.
- Risks associated with circumstances, in which the drug use takes place; the latter becomes especially for the subgroups of user, which use other illegal drugs as well and can be characterized as part of the street drug user population. In some environments, many of the POs are consumed simultaneously with other drugs and in modes which pose specific health risks (e.g., intravenously).

Four major forms of health risks exist:

1. dependence and other forms of drug use disorders;
2. overdose;
3. disease risks such as association with mental and behavioural disorders, infectious diseases such hepatitis C (HCV), and B (HBV), human immunodeficiency virus infection (HIV), and other somatic conditions;
4. injuries, both unintentional injury (other forms of poisoning than overdosing) and intentional injury (suicide, violence).

The forms of relationship between NMUPO and health outcomes can be associations or causal relations. For the most part, the underlying literature reports associations only, even though many authors have the tendency to misinterpret these as causal. In the following, we will only use causal language if such a relationship was firmly established.

5.1.2. Dependence

POs are highly addictive, but by no means would all of the NMUPO users develop dependence or other drug use disorders. Sproule et al. (1999) found that roughly 1/3 of codeine users in a convenience sample in Ontario met the criteria for dependence (Sproule et al., 1999). This proportion seems high in relation to the addictive potential found in recent US surveys, or historically for other drugs given extramedical use. For instance, in the US, among respondents

18 years and older (n=91,823) of the nationally representative 2002-2004 National Surveys on Drug Use and Health, the prevalence of past-year NMUPO amounted to 4.5%. Of those with non-medical use, 12.9% met criteria for abuse/dependence (Becker et al., 2008). In an earlier study representative for the US, Anthony et al. found that roughly ¼ of extramedical heroin users were at risk of developing dependence over the life course (Anthony et al., 1994). While more representative data from Canada are missing, it is safe to estimate that between 10% and 33% of NMUPO users may develop dependence or other drug use disorders. We have no indication that this rate is different from illegal opioid users.

5.1.3. Overdose

NMUPO has been linked to overdosing and to overdose deaths. While data for Canada are scarce, there are reports on fentanyl-related deaths in Ontario (Martin et al., 2006), and a report that the oxycodone in 2002 was involved in 27 drug related deaths in Toronto alone (Research Group on Drug Use, 2004). However, the exact quantification of overdose deaths related to NMUPO for Canada has not been established.

In the US, NMUPO-related deaths have increased since the mid 1990s and prescription drugs have replaced heroin and cocaine as the leading drugs involved in fatal drug overdoses in all urban-rural categories (Paulozzi & Yongli, 2008). More details on overdose death can be found in section 7 below.

Given the overall epidemiological profile (see other chapters), we expect quite a large number of NMUPO-related mortality for Canada as well (Popova et al., 2009). However, while NMUPO is related to overdose and mortality in Canada, the question should be raised, if NMUPO is not relatively safer than illegal street opioids, i.e. heroin for Canada. Overall, NMUPO appears to be less associated with injection, as well as is less likely to be contaminated with other substances, therefore likely resulting in lessened risk for infectious disease (e.g., HCV or HIV) transmission and/or overdose. Thus, overall, there may be a public health benefit associated with the recent shifts to NMUPO in the street drug use scene (Fischer et al., 2009b).

5.1.4. Disease Risks

In general, for street drug users, low standards of general hygiene due to personal neglect of general health, unsafe injection practices and multiple daily injections, poverty as well as nutritional deficiency and direct suppression effect of immune system by opioids (Govitrapong et al., 1998) may adversely affect the immune system and lead to a variety of bacterial infections, such as bacterial endocarditis, septicaemia, pneumonia, bacterial infections of bones and joints, and oral diseases.

Moreover, in most studies to date and irrespective of the sample, NMUPO has been associated with higher levels of psychiatric symptoms and disorders, and pain, compared to the general population (see descriptions of CAMH Monitor 2008 and OSDUHS above; (Brands et al., 2004; Monga et al., 2007; Sproule et al., 1999; Sproule et al., 2009). Also, other substance use and substance use disorders are over-proportionally present among NMUPO users (Adlaf et al., 2006; Brands et al., 2004; Firestone-Cruz & Fischer, 2008; Fischer et al., 2008a; Leri et al., 2005; Monga et al., 2007; Patra et al., 2009; Sproule et al., 1999; Strang & Rashiq, 2005). Overall, there is ample evidence for Canada, that NMUPO is associated with elevated use of other substances and with higher levels of mental problems.

With respect to somatic disease, we expect higher levels of all categories associated with a weakened immune system, pain, irrespective of the sample examines (i.e, in the general population, treatment samples and marginalized samples, in comparison with similar people without NMUPO) and for those who inject POs non-medically, higher levels of the related infections.

The most clear links within somatic disease seem to be between NMUPO and pain. Clearly, high levels of pain were found as a problem indicated by many NMUPO users from the general population (Banta-Green et al., 2009) as well as from marginalized populations (Monga et al., 2007) or in treatment samples (Brands et al., 2004; Sproule et al., 2009)

5.1.5. Injuries

There are few studies on the associations between NMUPO and injury for Canada. In an early study in Saskatchewan, Shorr et al. (1992) found that compared to non-users, the relative risk (95% CI) of hip fracture among people 65 years or older in current users of codeine or propoxyphene was 1.6 (1.4-1.9) (Shorr et al., 1992). Overall, based on the general literature outside of Canada, we expect that both intentional and unintentional injuries are linked to NMUPO ((Maurer, 2009), but see (Kelly et al., 2004), but we need specific studies to test this hypothesis.

5.1.6. Treatment and health services utilization

There are no Canada wide data on treatment enrolment for PO. The most systematic data we found refer to Ontario, where a clear upward trend for admission related to NMUPO can be seen (see more detailed data below in section 7).

TABLE 1: POS USED IN PAST 12 MONTH/ REPORTING POS AS PRESENTING PROBLEM SUBSTANCE OF SUBSTANCE ABUSE CLIENTS WITH OPEN ADMISSIONS (WITHOUT FAMILY MEMBERS) RECORDED IN THE DATIS SYSTEM (DRUG AND ALCOHOL TREATMENT INFORMATION SYSTEM (DATIS), 2008)

Fiscal Year	2003/2004		2004/2005		2005/2006		2006/2007		2007/2008	
	N	%	N	%	N	%	N	%	N	%
Past 12 months	10,977	13.6	14,288	15.3	16,507	16.7	18,404	18.0	20,756	20.1
Problem substance	6,192	7.6	8,860	9.5	10,568	10.7	12,046	11.8	14,049	13.6

Source: DATIS Statistical tables http://www.datis.ca

As treatment admission for NMUPO -disorders tend to correlate quite highly with overall usage, we can expect further increases here, as long as the overall per capita use of POs increase.

In a survey of paramedics in Brockville and the District Leeds Grenville (Ontario), 15% reported OxyContin amongst the most common problem substances, with the estimated percentage of emergency medical calls caused by or related to OxyContin at 2% (more than cocaine/crack, heroin and hallucinogens) (Garvin, 2004).

5.2. NMUBD Health Risks

5.2.1. Dependence

For Canada, data on NMUBD are scarce (see above), and data on health consequences of NMUBD are even scarcer. BDs are a drug class which clearly has reinforcing properties and thus a potential for dependence and abuse (Busto & Sellers, 1991; Busto et al., 1989). However, there are no prevalence or incidence data for BD dependence or BD-use disorders for Canada.

For the US, such data exist: Among the general population, based on the 2002–2004 National Survey on Drug Use and Health (NSDUH), for respondents for 18 years and older (n = 92,020), the prevalence of past-year non-medical use of sedatives or tranquilizers, mostly from the class of BDs, was 2.3%. Of those with non-medical use, 9.8% met criteria for abuse/dependence (Becker et al., 2007). Among adolescent respondents in the 2005 NSDUH, prevalence rates were notably higher with 8.2% reporting past year non-medical use of tranquilizers (including BDs and other minor tranquilizers. Of all non-medical prescription drug users, 17.4% met criteria for dependence, 6.5% of whom were solely for non-medical use of tranquilizers (Schepis & Krishnan-Sarin, 2008).

5.2.2. Overdose

BD use has been part of the mix in street drug users (see above). BDs were found in Canadian overdose deaths as well, but no study has systematically explored possible associations. Drug poisoning deaths in England showed BDs caused 3.8% of all deaths caused by poisoning from a single drug (Charlson et al., 2009). Overviews as well as a number of studies from Australia

corroborated these results and found relatively high involvement of BD in overdose deaths also involving heroin and opioids or methamphetamines (Darke et al., 2007; Darke & Zador, 1996; Kaye et al., 2008; Paulozzi et al., 2009). Not many studies were done in Canada on this theme, but Fischer et al. (2004) corroborated the international findings and found a significant bivariate association between BD use and risk of overdose (OR = 1.70; 95% CI: 1.13 – 2.57) (Fischer et al., 2004). So overall, BDs consistently had been associated with overdosing and overdose deaths in marginalized populations.

For the general population, the results on NMUBD and mortality were inconclusive. On the basis of existing research there is limited data examining independent effects of NMUBD upon mortality. Future research is needed to carefully examine risks of use in accordance with doctors' prescriptions and extra-medical use (Charlson et al., 2009).

5.2.3. BD and abuse/dependence of other substances

For Canada, we lack data on associations with NMUBD in the general populations. In the relatively small subgroup of street users, there are clear indications of NMUBD as part of the most common poly-substance use patterns, as several studies on IDUs or opioid users in Canada show (e.g., (Health Canada, 2006; Haydon et al., 2005; Fischer et al., 2005; Wild et al., 2008). In these populations, intravenous applications of BDs can also be found. In treatment sample for substance use disorders, there were also clear indications for parallel use of BD, especially in MMT treatment (Brands et al., 2004).

5.2.4. Injuries

BD use was found to be associated with traffic injury (Kelly et al., 2004) and suicide (Fanton et al., 2007). The latter relationship may just show the confounding based on the primary disorder where BD were prescribed. There are some indications that falls in the elderly are associated with BD use, but the data are not conclusive (Hegeman et al., 2009). The relationships between NMUBD and injury are not clear.

5.2.5. Treatment and health services utilization

There are no Canada-wide data on treatment enrolment for BD. The most systematic data we found refer to Ontario, where no trends related to BD use can be seen (Drug and Alcohol Treatment Information System (DATIS), 2008):

TABLE 2: REPORTING BDS AS PRESENTING PROBLEM SUBSTANCE OF SUBSTANCE ABUSE CLIENTS WITH OPEN ADMISSIONS (WITHOUT FAMILY MEMBERS) RECORDED IN THE DATIS SYSTEM (DRUG AND ALCOHOL TREATMENT INFORMATION SYSTEM (DATIS), 2008)

2003/4		2004/5		2005/6		2006/7		2007/8	
N	%	N	%	N	%	N	%	N	%
3186	3.9	3777	4.0	3647	3.7	3503	3.4	3548	3.4

In the survey of paramedics in Brockville and the District Leeds Grenville (Ontario), 38% of respondents identified sedatives/hypnotics (including BDs and barbiturates) as the most common problem substances related to emergency calls, compared to 15% for OxyContin (Garvin, 2004).

6. What are the societal implications of the increase in non-medical use of prescription drugs?

6.1. Introduction

There are two main areas through which the presence of, or increases in, psychoactive substance use impact most strongly on the societal level: health or burden of disease (e.g., premature mortality, morbidity and disability) as well as use-related crime. Drug-related crime, in turn, can either be behaviorally related to the use of the respective substance or be associated with its use, e.g., in the form of procurement crime (see below). These two areas, together with workplace or productivity costs, are most important also since they constitute the primary factors determining 'social cost' impacts of substance use. To concretely illustrate: Birnbaum and colleagues (2006) conducted a societal cost assessment of PO abuse in the US in 2001. Total costs were estimated to be $8.6 billion, comprised of $2.6 billion for healthcare costs, $1.4 billion for criminal justice costs and $4.6 billion for workplace costs (their particular methodology of cost analysis did not include the social costs of crime-related victimization) (Birnbaum et al., 2006). Given that these costs were estimated for 2001 based on conservative methodology, and that NMUPO levels are higher today, it can be assumed that these costs are substantially higher today. Given the scarcity or absence of relevant specific and/or systematic epidemiological, health services or crime data related to non-medical prescription drug use data in Canada, no empirical calculations or estimations could be provided for these potential impacts. This situation persists today from the gaps reflected in the most recent Economic Costs of Substance Abuse in Canada study (Rehm et al., 2006) which did not present any data on non-medical use of prescription drugs given that relevant data indicators did not exist, and the economic cost picture which it presented would likely look considerably different if prescription drugs had been included. The best that can be offered at this point is some 'informed speculation' about the issues of social consequences of non-medical use of prescription drugs under examination informed by of existing limited data from Canada or other jurisdictions (e.g., the US).

6.2. Health

6.2.1. Morbidity

There are several key categories of health impacts related to NMUPO for which over-time data have been documented, namely PO-related admissions to substance treatment programs and PO-related emergency room admissions. Both indicators – in the context of rising medical PO and NMUPO levels in the US - have substantively increased since the 1990s (Fischer et al., 2008b). For example, in the period 1997 – 2002, Emergency Room episodes involving POs in the US rose by 120%, and on that basis rose at a much higher rate than ER episodes related to alcohol or illegal drugs (Gilson et al., 2004). Further increases are documented for the period 2004 - 2006, when PO-related ER-admissions rose from 172,726 to 247,669, i .e. 43% within a two year

period (figures are based on different methodology than previous reporting period and hence not fully comparable (Substance Abuse and Mental Health Administration (SAMHSA), 2008a)). In Canada, no data are available on ER-admissions, as such data are not routinely or systematically collected. Some data have recently emerged regarding PO-related treatment admissions. In Ontario, Canada's most populous province, the DATIS collects data from virtually all publicly funded substance use treatment agencies, services and programs across the province. Most recent data indicate that PO-related admissions to publicly funded treatment agencies in Ontario approximately doubled in the period 2004/05 – 2008/09 (fiscal years), i.e. within a 5-year period, alone. Specifically, PO-related treatment admissions rose by a total volume of 60%; the proportion of PO-related admissions of all treatment admissions rose from 9.4% to 15.7% in the reporting period ((Fischer et al., 2009c) submitted, CMAJ). These data follow even more pronounced trends in the US, where PO-related admissions to substance use treatment – as documented by the national Treatment Episode Data Set database – have risen from 16,605 in 1997 to 74,750 in 2007, i.e. quadrupled in about a decade (Department of Health and Human Services, 2009). The increases in PO-related treatment admissions documented for Ontario are likely an underestimation, since DATIS does not cover admissions to or initiations of opioid (e.g., methadone or buprenorphine) maintenance treatment, which are a standard form of treatment for any form of opioid dependence ((Fischer et al., 2009c) submitted, CMAJ). In fact, both local methadone maintenance treatment as well as opioid detoxification programs in Ontario have reported substantial increases in admissions related to PO-problems in recent years. For example, in a sample of 178 admissions to the methadone treatment program at CAMH (Toronto) between 1997 – 1999, 83% either reported use of POs by themselves or in conjunction with heroin (Brands et al., 2004). Among 571 cases admitted to the opioid detoxification program between 2000 and 2004 at CAMH, the annual proportion of reported OxyContin use rose from 3.8% in 2000 to 55.4% in 2004 (Sproule et al., 2009). Evidently, any form of morbidity (e.g., dependence) related to the non-medical use of prescription drugs may lead to loss in social or economic productivity (e.g., by way of short- or long-term disability, inability to work) and hence – akin to other problematic substance use – may lead to negative social impact in this way (see (Birnbaum et al., 2006; Wall et al., 2000; Rehm et al., 2006). However, no data are available for Canada to even remotely estimate such potential impact on a comprehensive level are currently available.

6.2.2. Mortality

Several studies from the US have indicated that accidental poisoning deaths (i.e., overdose deaths) related to POs have substantially risen in recent years. A seminal study by Paulozzi et al. documented that PO-related accidental poisoning deaths in the US increased by a rate of 91.2% between 1999 and 2002, i.e. doubled in a 3-year period alone to a total of 5,528 of PO-related deaths in 2002 (Paulozzi et al., 2006). Moreover, in the year 2002 documented PO-related accidental deaths outnumbered accidental deaths related to heroin or cocaine, i.e. the two major illicit drugs associated with mortality consequences (Paulozzi et al., 2006). Several studies in the

US have furthermore documented strong increases in PO-related deaths on local or regional (e.g., state) levels (e.g., West Virginia, see (Paulozzi et al., 2009)). In Canada, much less is known about developments in regards to PO-related mortality. These data deficiencies in part relate to the fact that Canada has no centrally collected database on psychoactive drug related accidental deaths, and thus no relevant national data repository exists, since these data fall into the jurisdiction of provincial coroners' services. Further methodological and practical problems are that provincial coroners' services operate with highly divergent classification and analysis standards as well as data management procedures (e.g., electronic versus paper record keeping), and in many instances do not automatically separate PO-related deaths from other substance use related deaths cases. While no systematic data are available on PO-related mortality in Canada, some local and sporadic or preliminary information pieces are available which at least seem to suggest that PO-related deaths play a non-negligible and likely increasing role in psychoactive substance use related mortality. A recent analysis by Dhalla and colleagues suggested that PO-related mortality rates in the Ontario population have approximately doubled from 14 per million residents in 1991 to 27 per million residents in 2004 (Dhalla et al., 2009). Also in Ontario, OxyContin was reportedly involved in a total of 464 drug-related deaths in the period 2004 – 2008 – representing an approximate proportion of 20% - 25% of all drug-related deaths documented by the provincial coroner's office in that period – and constituting a total death toll approximately 10-times higher than the number of deaths related to heroin (Silversides, 2009). A preliminary assessment of limited recent drug-related overdose data from select provinces (e.g., BC and Quebec) suggests that POs may even be involved in 30% to 40% of all drug-related mortality in these jurisdictions. A study by Martin et al. examined 112 cases of fentanyl-related overdose mortality cases which occurred in the province of Ontario between 2002 and 2004; these cases alone represented a proportion of ~8% of all drug-related overdose mortality that occurred in Ontario in that study period (Martin et al., 2006).

6.3. Crime

A further key consideration regarding the societal impact of non-medical use of prescription drugs is its possible impact on crime and subsequent burden to the criminal justice system. Especially when concerned with social costs related to substance use, crime and criminal justice impacts are highly relevant, since they typically account for the lion's share – i.e., up to 80% - of social costs related to substance use, primarily because potential victimization and criminal justice system resources (e.g., law enforcement or correctional system resources) are extremely expensive compared to other potential cost sources (Wall et al., 2000; Fischer, 2003).

While there are at this point no empirical specific assessments of the crime and criminal impacts of non-medical use of prescription drugs in Canada, a number of key considerations for the potential nature and extent of such crime and criminal justice impact will be offered and illustrated with related empirical data where possible. First of all, following Paul Goldstein's tripartite model of fundamental categories of drug-related crime, there are three basic categories

of substance use related forms of crime: 1)pharmacological/behavioral crime (e.g., crime that is a result of behavioral effects of the pharmacology of the substances consumed, e.g., inter-personal violence); 2) acquisition crime (e.g., crime committed in the processes of obtaining drugs, i.e. either illegal purchasing or trafficking or crimes committed to obtain funds or resources needed to obtain the drugs; 3) systemic violence (e.g., crimes related to illegal distribution and markets of drugs; (Goldstein, 1985)). Given that both POs and BDs are narcotic/sedative kinds of drugs, and do not result in stimulant/aggressive effects, the potential pharmacological/behavioral crime effects, e.g., in the form of violence– in contrast to such well-documented effects for alcohol or cocaine/crack - are likely negligible and will not be further discussed here (Brands et al., 1998).

Primary relevance in the discussion of the crime impact related to non-medical use of prescription drugs likely applies to the second possible crime category, namely drug acquisition crime. Several careful and distinct considerations are necessary here. First of all, with view on possible increases in non-medical use of prescription drugs in the general population (i.e., non-marginalized populations), it is fundamentally possible that increases in non-medical use of prescription drugs may lead to considerable increases in related acquisition crime, since these drugs are used non-medically and hence need to be obtained illegally. To illustrate: The equivalent of the population rate of NMUPO users in the US general population (5.0%) would translate into approximately >1 million Canadian NMUPO users, which could entail a substantial amount of PO-related crime. While most users of other illegal drugs which cannot be domestically or self-produced (as is, for example, possible with cannabis) are commonly involved in regular acquisition crimes primarily related to the act of obtaining drug supplies, a key issue is that supply and sourcing routes for non-medical use of prescription drugs are distinct from those of other illegal drugs and heterogeneously diverse, even though these are not assessed in necessary detail for Canada (Fischer et al., 2008b; Inciardi et al., 2007; Fischer et al., 2009a). As shown in Part 3, a majority of non-medical prescription drug users in the US report that they mainly obtain their drugs informally through family or friends, and hence do not involve drug-related crime in the conventional sense (see e.g. (McCabe & Boyd, 2005; Inciardi et al., 2007; Gilson et al., 2004)). There are data from the US and elsewhere which document that a substantial proportion of non-medically used prescription drugs are obtained through so-called ‘double doctoring’ (i.e., the presentation of real or feigned health systems to multiple medical care providers or pharmacies) to obtain/fill multiple prescriptions; prescription forgeries or fraud; pharmacy robberies; thefts of pharmaceutical products; break-ins/robberies in homes where prescription drugs are kept by legitimate patients (Inciardi et al., 2007; Hurwitz, 2005; Martyres et al., 2004; Inciardi et al., 2009). In the Canadian OPICAN study of regular illicit opioid users, respondents indicated that they obtained their drugs both from dealers and physicians, with primary PO users indicating a higher proportion of ‘having a regular doctor’ and thus suggesting potentially higher access to PO drugs by way of the medical supply (Fischer et al., 2009a). In an older Canadian survey of prescription drug abusers attending treatment, 39% of respondents reported that they had obtained their drugs from more than one doctor, i.e. had engaged in double doctoring (Goldman, 2002). In addition, a substantial proportion of prescription drugs – whether

medically or non-medically used – can be obtained via Internet sales which also do not constitute acts of drug-related crime in the conventional sense (Forman, 2006; Inciardi et al., 2007). At the same time, there is evidence from both the US and locally limited research in Canada that prescription drugs are offered on bl ack markets in Canada, and illegal drug trade activity involving prescription drug products clearly exists. Over a decade ago, Sajan and colleagues demonstrated in a study of street drug markets that prescription drugs, including POs and BDs, were amply available on Vancouver street drug markets (Sajan et al., 1998). In a recent two-site exploratory study conducted in Toronto and Victoria, Fischer et al. found that POs were available on street drug markets, yet that they were commonly available from dealers other than those offering other illicit drugs and traded through different selling or trading mechanisms (Fischer et al., 2009a). While recent RCMP 'Drug Situation Reports' address the national availability and trading activity of the prescription drug covered here on black markets only in briefest passing (i.e., subsumed under 'other drugs'; (RCMP Criminal Intelligence, 2008)), the extent of prescription drug-related crime especially related to such use in general populations is not anywhere nearly sufficiently assessed to allow for any form of quantifiable statements, yet ought to be considered a high research priority.

Besides possible non-medical use of prescription drugs in general populations, some specific considerations need to be directed to street drug user populations, in which non-medical prescription drug use levels have been documented to be increasing and high. The Canadian multi-site OPICAN study assessed a sample of n=671 regular illicit opioid users of heroin and POs (and other drugs; (Fischer et al., 2005; Fischer et al., 2006b)). While the majority of the sample was involved in (mainly property) crime for income generation, an analysis of determinants of property crime involvement in the study sample assessed at baseline did not find an involvement in NMUPO to be a significant predictor of distinct levels of property crime involvement, although it is important to note that this analysis did not examine cleanly delineated sub-samples by specific drug use yet included mainly respondents with co-occurring/overlapping use patterns (Manzoni et al., 2006). A more recent and detailed analysis of the follow-up sample of the Canadian OPICAN study cohort, distinguishing between heroin-only, PO-only, and combined heroin and PO users, found that PO-only users indicated a substantially higher prevalence of income from legal paid work than the two other user categories (although it did not more specifically investigate drug-use related crime involvement; (Fischer et al., 2008a)). These findings may allude to what several US studies involving PO users have recently documented, namely that predominant prescription drug – e.g., PO – users in street drug use populations appear to be more socially integrated (e.g., e.g., less likely to be homeless or more likely to draw income from legal employment) and less crime-involved (e.g., as referring to property crime or sex work for income generation, or drug dealing) than – for example – predominantly heroin or cocaine/crack involved street drug users (Rosenblum et al., 2007; Davis & Johnson, 2008; Sigmon, 2006; Surratt et al., 2006; Miller et al., 2004). These observations may point to the fact that street involved predominantly prescription drug users constitute a somewhat distinct – i.e., more socially integrated and less criminogenic – population of illicit opioid drug users to begin

with, in which patterns of predominant prescription drug use may reduce the likelihood of or necessity for criminal involvement. Specifically, it is quite possible that the distinctly available routes for obtaining or sourcing prescription drugs (e.g., double-doctoring, prescription drug exchanges) may decrease the extent of the involvement in property crime related to the acquisition of drugs (Fischer et al., 2009a). Again, none of these details are systematically empirically assessed in Canada, yet must be considered an urgent research priority.

A further important aspect of 'social harms' related to non-medical use of prescription drugs are possible costs to the medical system as well as private (insurances) or public drug benefit plans. In 2007, total prescription drug expenditures in Canada for POs amounted to $485 million and $247 million for BDs (Morgan et al., 2008). While the expenditures for BDs had remained relatively stable since 1998, the expenditures for POs approximately doubled in this period (Morgan et al., 2008). It is completely unclear at this point which extent of these drugs was dispensed or ended being consumed for non-medical purposes. Even if only 1% - likely an underestimation - of the total drug volume reported was dispensed or obtained to facilitate non-medical purposes, the economic harm for public and/or private drug plans would already be in the multi-million dollar range.

Little, if any, evidence is currently available in Canada to assess whether prescription drugs play a role in organized crime ('gangs') activity related to drugs and related violence (e.g., shootings) and other harms in Canada, as documented for heroin, cocaine or cannabis.

7. What are the criminal justice policy issues for addressing the non-medical use of prescription drugs?

There are several key issues to be considered for criminal justice policy regarding non-medical use of prescription drugs, which are especially important and crucial in this current climate where the area of non-medical use of prescription drug use in Canada finds itself in the early stages of a policy development or formation stage, in which best possible policy should be developed and bad policy should be avoided. The points are discussed in a non-specific order below.

First, either on the basis of adjustments to the applicable drug control laws (e.g., CDSA/FDA) or a respective targeting or re-orientation of existing (drug) law enforcement resources and practice, attempts could be made to tackle the currently emerging and growing problem of non-medical use of prescription drugs by way of active and expanded law enforcement. From available statistics, it appears that relatively few incidents of non-medical use of prescription drugs are enforced under current drug law statutes. Among the total of 100,675 drug offenses reported in Canada by police in 2007, only about 15% concerned 'other drugs', with about half of these for possession offenses, although this omnibus category, besides possibly including POs, involved drugs like metamphetamine, LSD, ecstacy etc. (specific details on enforcement of POs are not provided in these data; (Dauvergne, 2009)). Notably, it ought to be considered that given current prevalence estimates of non-medical use of prescription drugs, a large number of members of the Canadian general population, and many more actual incidents of non-medical use could – in theory – be subject to criminal drug law enforcement under the Controlled Drugs and Substances Act CDSA for drug possession related to prescription drug abuse involving drugs that are either not theirs or not used for the purposes as medically prescribed. To be specific, if US general population rates are applied, some >1 million of Canadian adults, and some one in five high-school students based on survey data, would be estimated to be active NMUPO users and thus could be subject to criminal enforcement for illegal possession. At the same time, there are numerous incidents of prescription drug sourcing or obtaining - outside of formal criminal acts like robberies, thefts, prescription forgeries, etc. - committed for the purpose of non-medical use which could be perceived and construed under current drug control legislation as illegal drug trading or trafficking from the perspective of law enforcement, and hence followed by strict criminal law enforcement and punishment.

None of these appear to be advisable as sensible policy measures or priorities on the basis of consideration of several kinds of evidence and information. First of all, most non-medical use of prescription drugs, as well as the predominant forms of sourcing or supply that appears to be occurring among most non-medical users in the form of informal sourcing from friends, family, the use of leftover medical supplies etc. (see above), is likely – except for marginalized populations, e.g. street-based populations or use/sourcing incidents occurring in public places – not realistically, equitably or effectively enforceable. Second, at this point, there is little or no

comprehensive data available – especially for Canada – to assess how much of the so-called 'non-medical' use of prescription drugs actually occurs that is not in some form related to medical conditions or health problems (e.g., in the form of self-medication in the context of inadequate, terminated, unaffordable or inaccessible medical care for pain, etc. (Fischer et al., 2008b)) and thus in reality would reliably pass the fundamental test for 'criminal' drug misuse. For example, Novak et al. found in a nationally representative US population survey that both regular and incidental NMUPO was significantly associated with the presence of physical pain and psychiatric disorder symptoms (Novak et al., 2009). In a sample of dependent adolescent NMUPO users assessed at a treatment center in Baltimore, more than 75% had an Axis 1 disorder, with half having 2 or more disorders and 68% presenting a psychiatric treatment history (Subramaniam & Stitzer, 2009). This dynamic – i.e., the questionable nature of invoking criminal enforcement of illicit drug use as a crime against people who are severely ill, i.e. who are likely to use illicit drugs due to state of dependence and/or needs for self-medication (see also (Fischer et al., 2005; Fischer et al., 2008b; Khantzian, 1997)– is of course present in debates over current illicit drug control and thus not new when applied to the issue of appropriate measures and approaches to prescription drug control.

However, the field of prescription drug control – especially from a criminal justice end – is in a state of early formation and hence a realm where errors or counterproductive directions in this respect can still largely be avoided at this point. Second, given that many current non-medical users of prescription drugs in Canada are young people, the possible criminalization of non-medical users might do more harm than good, i.e. by way of criminal labeling and stigma effects, secondary deviance, foreclosing social, professional and educational opportunities, etc., which may be far more severe than the actual benefits accomplished through such user enforcement (Fischer et al., 1998; Lenton & Heale, 2000; Lenton et al., 2000). These effects have been quite well documented for other groups of psychoactive substance users (e.g., cannabis users) who are currently subject to law enforcement and for whom – in the interest in sensible, good and public health oriented public policy – the non-enforcement or elimination of active user criminalization has been repeatedly and authoritatively recommended (see e.g., (Room et al., 2008)).

Further related considerations are that of a possibly intensified focus of enforcement on sourcing or supply routes of prescription drugs consumed non-medically may possible intensify black market dynamics and related un-intended consequences. Specifically, if the current low levels of focus of drugs enforcement on prescription drugs (see recent 'RCMP Drug Situation Reports'; (RCMP Criminal Intelligence, 2008)) is intensified, relevant substances may more actively be sold/dealt with in the context of black markets (i.e., by professional dealers, possibly increasing the involvement of organized crime) at increasing black market prices, and – in the context of demand or non-medical use levels remaining constant – thus potentially leading the increasing levels or severities of acquisition crime by non-medical users or supply related crimes by traffickers, dealers etc. These speculative effects within the described scenarios are dynamics that are well-documented for other areas of psychoactive substance use, including more recently

in varying forms contexts for alcohol, tobacco, cannabis and khat (MacCoun & Reuter, 2001; Babor et al., 2003; Room et al., 2008; Joossens & Raw, 2000; Beare, 2002).

A final consideration refers to the current realities and profiles of sources of prescription drugs – whether for medical or non-medical use – in a globalized Canada in the 21st century. While specific estimates vary, unquestionably a substantial extent of current prescription drug supply – with the specific drug categories discussed in this paper being at the top of the list – are currently bought/obtained via the Internet (Inciardi et al., 2007; Joranson & Gilson, 2006; Fischer et al., 2008b; Nielsen & Barratt, 2009; Compton & Volkow, 2006). For example, Foreman et al. (2006) found that Vicodin was available without a prescription on about half of the top 100 Internet sites offer prescription drug sales (see also (Forman, 2006)). Littlejohn & colleagues found that prescription drugs were readily available for sale on the internet, yet pointed out that such access still privileges individuals in higher socio-economic strata, with higher access levels to the Internet (Littlejohn et al., 2005). In a CASA study conducted in 2007, a total of 210 hours was devoted to documenting the number of Internet sites dispensing selected prescription drugs. Using Internet search engines and e-mail advertisements, researchers discovered that of the 187 Internet sites found to be selling controlled prescription drugs during this period, 157 (84%) did not require any prescription. Of these sites, 52 (33%) clearly stated that no prescription was needed, 83 (53%) offered an "online consultation" and 22 (14%) made no mention of a prescription (Beau Dietl & Associates, 2006). At the same time, a couple of studies in the US which asked NMUPO users about their sourcing found that Internet sales still played a relatively minor/secondary role as a sourcing pathway (Cicero et al., 2008b; Inciardi et al., 2007). This share is likely to consistently increase, rather than decrease, in the coming years. While the problematic and challenges of governing and enforcing laws in respect to the Internet are well discussed elsewhere (e.g., (Jerian, 2006)), it suffices to say here that the Internet as a supply route for the sourcing of prescription drugs for the purpose of non-medical use will be and remain extremely difficult at best with available means of criminal law and enforcement. There are important efforts underway to control or curtail this form of 'virtual' drug trade, yet it is unlikely that these will significantly change the availability of prescription drugs through these pathways for those who have access to a computer/the internet and a credit card (i.e., the majority of Canadians).

A key component in the wider policy debate regarding possible legal and regulatory control mechanisms towards non-medical prescription drug use concerns tighter control of medical care and drug providers (i.e., physicians and pharmacists), e.g., by way of more intensive scrutiny or auditing regarding compliance with drug control, prescribing, dispensing and reporting requirements, as well as different models or variations of 'prescription monitoring programs' (PMPs). PMPs are mechanisms in which – either by way of hard-copy prescription and dispensing records or electronic data entry/monitoring programs, data are collected regarding the prescription and dispensing activities of select prescription drugs by physicians and pharmacists, and the time and amounts of respective drugs prescribed or dispensed to individual patients. By

way of PMPs – in theory – irregular prescribing or dispensing by medical professionals (e.g., overprescribing) or deviant patient behavior (e.g., multiple doctor-shopping) can be prevented or detected and enforced. In Canada, PMPs or so-called 'triplicate prescription programs' are in place in some provincial jurisdictions, yet – based on the primary and relatively independent responsibility of the provinces in the delivery of health care – are designed and operate quite inconsistently (El-Aneed et al., 2009; College of Physicians and Surgeons of Alberta: 2004).

Also in the context of the critical fact that the prescription drugs under discussion here are first and foremost medical or pharmaceutical products developed for and employed in key areas of medical (e.g., pain, mental health, sleep disorder) care, there are some important theoretical considerations and empirically documented experiences with the above mentioned control mechanisms which are relevant for sensible policy development. Very specifically, a key challenge is to select, devise and design control mechanisms (e.g., PMPs – see also below) that are effective in preventing non-medical use of prescription drugs or related harms, while avoiding possible forms of 'collateral harms' in the areas of medical care where the prescription drugs under discussion are needed and employed in the interest of patient care, individual and public health (Joranson et al., 2002; Joranson & Gilson, 2006; Simoni-Wastila, 2001; Simoni-Wastila et al., 2004a; Brushwood, 2003; Fischer et al., 2008c; Fishman, 2006; Hurwitz, 2005).

Relevant empirical experiences in this respect come mainly from the US. In general – even though the US today by far report the highest medical PO consumption rate in the world – it is widely accepted that the phenomenon of 'opiophobia' has for decades hindered and compromised sufficiently effective, available and accessible pain care in the US (and continued to do so elsewhere in the world, also accepting the overwhelming evidence that most regions of the world are catastrophically and inhumanely underserved with respect to pain care). 'Opiophobia' has been hindering adequate pain care in the US and elsewhere since the early parts of the 20th century, when original forms of opioid (e.g., morphine) addiction became more widely prevalent and led to initial restrictive – and punitive - legal monitoring and controls over opioid drugs (which are different than for most other forms of pharmaceutical drugs (Morgan, 1985; Bennett & Carr, 2001; Rhodin, 2006). Reports on the addictive properties of opioids in conjunction with the tight and punitive legal controls over opioid-based prescription medicines created a mythology or culture of fear ('phobia') regarding the potential use of these drugs in medical care among medical providers until the present, thus hindering and limiting adequate, accessible and effective health and medical care involving these substances (ibid). It has been recognized that 'opiophobia' needs to be recognized and prevented, i.e. in physician training & education, as well as a critical component in potential interventions aiming to address non-medical use of prescription drugs and diversion.

One of the main tools implemented in the US to control the non-medical use of psychoactive pharmaceuticals are so-called prescription monitoring programs (PMPs). The first PMP was established in New York State in the 1910s, and PMPs now exist in about two thirds of the US

states (Office of Diversion Control, 2008). The central objective behind PMPs essentially is to centrally monitor and control the prescription and dispensation of certain controlled drugs by a central authority in order to prevent or enforce 'doctor-shopping', prescription forgeries, counterfeits, diversion etc. (i.e., drug abuse on the demand side) as well as over-prescribing or –dispensation (e.g., physician or pharmacist misconduct). Earlier PMPs relied on the use of duplicate or triplicate prescription copies, one of which would be sent to a designated agency for data collection and monitoring of the prescribed/dispensed drug. Current or modern versions of PMPs rely on electronic data entry, monitoring and analysis, much of which in advanced systems can happen in real-time (or close to real time). All PMPs in the US are state-based, and there is no federal-level PMP or central database, although the PMP databases are regularly accessed by federal control authorities and there are incentives from the federal level for states to establish modern (i.e., electronic) PMPs (Fishman et al., 2004; Brushwood, 2003; Office of Diversion Control, 2008).

While there is wide-spread belief and promotion by government and enforcement authorities that PMPs are effective tools in preventing the non-medical use and diversion of controlled drugs, the available empirical evidence suggests a much more complex and mixed picture which is nonetheless critical for evidence-based and sensible policy development in this area (Brushwood, 2003; Office of Diversion Control, 2008). The first piece of critical evidence is that overall, PMPs appear to be associated with lower levels of prescription of controlled substances, or that they lead to decreases in prescriptions when established. In Idaho, New York, Rhode Island, and Texas, the prescribing levels of Schedule II drugs decreased by rates of between 50% and 64% after the introduction of PMPs (Fishman, 2006). In 1989, US states with PMPs had 1.8% of all prescriptions written for Schedule II substances, while in states without PMPs the percentage was 4.7% (Wastila & Bishop, 1996). Curtis et al. examined levels of opioid prescriptions in US states, based on prescription drug insurance claims in a large nation-wide database in 2000. Claim rates by states varied widely, from <20 claims to >100 claims for POs per 1,000 total claims. The authors concluded that the "presence of a statewide [PMP] is associated with lower claim rates" (Curtis et al., 2006). While PMPs appear to be associated with overall lower or decreased levels of prescriptions of controlled drugs, there is at this point "little evidence to demonstrate that [PMPs] actually prevent drug misuse and diversion" (Joranson and Gilson in (Brushwood, 2003; Fishman, 2006). In other words, while overall prescriptions for controlled drugs in PMP jurisdictions tend to be lower, there is little or no concrete evidence that these reductions occur by eliminating diversion, misuse or abuse of controlled drugs.

The second key piece of evidence is that PMPs may in fact lead to considerable unintended negative consequences with respect to access to or the quality of clinical care. Concretely, this refers to the so-called 'chilling effect' of PMPs, by way of which physicians are less likely to prescribed stringently controlled drugs at all, or prescribe them later in the course of symptoms or in lower doses or concentrations, which could be triggered by fear of monitoring, potential problems or the inconvenience of regulatory procedures (e.g., (Brushwood, 2003)). This 'chilling

effect' – which is of course crucially problematic for an area like pain care which has fought hard in recent years to increase quality care by increasing access and dosing in most cases - has been documented in practice by comparing relevant prescription or care practices (e.g., for pain care) as well as physician attitude surveys (e.g., (Wastila & Bishop, 1996). For example, a study of opioid prescribing practices for acute lower back pain in US states found significant inter-state variation for early opioid prescriptions which was "almost fully explained by state level contextual factors" ((Webster et al., 2009):162), i.e. the presence or non-presence of PMPs. Furthermore, there is evidence for compromised clinical care associated with the introduction or operation of PMPs, largely due to the so-called 'substitution effect' which Fishman describes as follows: "It is well established that when physicians are faced with barriers to prescribing a certain type of medication they will often prescribe around that barrier, turning to drugs that are less scrutinized, even if they are less efficacious and/or more harmful" ((Fishman, 2006), see also (Fishman et al., 2004)). Specifically, after BDs were added to the scope of PMP requirements in New York State in 1989, the BD-prescription rate decreased, but "increases were seen in alternative drugs that were often therapeutically less optimal, held a greater chance of toxicity, and carried equal or greater abuse potential" (Fishman, 2006; Weintraub et al., 1991). While BD-related overdoses slightly decreased, there was a 30% increase in non-benzodiazepine sedative-hypnotic overdoses in the year following the introduction of the PMP requirement (ibid.). More recently (2004) in California it was discovered that the state's triplicate PMP clearly had resulted in comparably lower levels of OxyContin prescribing, California had a disproportionately high rate of Schedule III opioid prescribing (e.g., hydrocodone (Vicodine) (Fishman, 2006)). These patterns are notable since hydrocodone was noted to be more prevalent in PO-related emergency room visits in the US in 2002 than OxyContin (Paulozzi et al., 2006).

8. Issues not addressed/Conclusions

The non-medical use of prescription drugs, and related harms, is a substantial – and at least in the case of POs a growing – problem in Canada which has only recently begun to be noticed and attended to by researchers and policy makers (see (Fischer et al., 2008c)). In many ways, Canada thus finds itself on the verge of a very important policy formation or development phase, in which the right choices for policy development have to be made and errors and mistakes should be avoided. What makes the area of non-medical use of prescription drugs complex and challenging for policy development is that this phenomenon does not represent a form of drug use that is exclusively limited to or defined as 'illegal' (as more conventional forms of illegal drug use, like cannabis or cocaine use, are defined), yet that it involves the form of drugs which are important pharmaceutical substances which play an important role in key areas of medical care (e.g., pain, psychiatric, sleep disorder care). In that context, policy development must include and consider aspects and considerations from many different angles and fields, yet policy decisions or measures aiming to tackle the problem of non-medical use of any of these prescription drugs can easily do considerable harm or undermine the availability, accessibility or quality of care in these related medical areas, which cannot and should not be the outcome of policy making (see also (Joranson & Gilson, 2006; Hurwitz, 2005; Fishman, 2006). Especially with an eye on criminal law or criminal justice oriented measures or policy development aiming at the problem of non-medical use of prescription drugs, we want to explicitly urge for extreme caution and restraint, and an employment of available tools only after consideration of best possible available evidence and with a principle preparedness to retract any possible measures employed if these demonstrate to lead to negative or undesired effects in the population or any relevant realm of policy action.

We want to offer or repeat key reasons for that. First of all, policy and control to psychoactive substances use – especially in regards to so-called 'illegal drugs' – has traditionally been dominated by criminal law and justice mechanisms in Canada, even though these have generally not been in the interest of the individual health of users or public health, and in many key ways caused or amplified problems towards these (see (Fischer, 1999; Giffen et al., 1991)). With the exception of specific targeted measures in which deterrence is proven to work (e.g., in the prevention of impaired driving) and punishment seems normatively and socially desired (e.g., drug-selling for profit by non-addicts), the powers of the criminal law enforcement and punishment and criminal justice should be used and applied with utter caution. This point is made especially with regards to the – at least theoretical – possibility of a more active or intensified 'criminalization' approach to the – large and growing – populations of non-medical prescription drug users in Canada. Such users include many young people, and individuals from all socio-economic, cultural and regional parts of Canadian society.

As elaborated on in Section 6, a variable of key importance is that it is empirically absolutely unclear for Canada at this point to which extent the various forms of non-medical use of

prescription drugs in this country occurs for medical or health-related reasons, e.g., due to dependence, un-diagnosed or –treated co-morbidity, psychological distress, limited availability, accessibility or affordability of proper medical care involving prescription drugs, or a form of self-medication, etc.. As several studies cited above have documented, the presence of key co-morbidities (e.g., pain or psychiatric disorders) in prescription drug misusing populations is enormously high (e.g., (Novak et al., 2009; Subramaniam & Stitzer, 2009; Rosenblum et al., 2007). In addition, many incidents of prescription drug dependence or non-medical use may actually originate or be associated with a history of medical care involving these drugs, in which a course of medical drug use was not adequately terminated, dependence may have been arisen, etc. Any of these causes or dynamics – presumed to be highly prevalent and present in the current total of incidents of non-medical prescription drug use, even though specific data for Canada do not exist at the present moment – are first and foremost health problems, and ought to be remedied by health-based interventions or improvements to health care, rather than criminal law, enforcement or criminal justice measures. Much additional research on these issues is urgently needed to empirically underscore and illustrate the above arguments, yet on the basis of these broad-stroked considerations alone, the role and place for criminal justice based measured in an overall evolving strategy to address the phenomenon of non-medical prescription drug use will likely appropriately be (especially compared to health-based or –focused interventions or measures) rather secondary and targeting very specific and limited aspects of the problem.

A further additional point to be offered is that current assessments, interventions or calls for measures aiming at the problem of non-medical use of prescription drugs predominantly see and analyze the root of the problem on the individual level (e.g., in the form of deviant individuals seeking to 'get high', i.e. by trying to exploit the psychoactive effects of the prescription drugs under examination in this paper, or 'addictive' personalities or behaviors, etc.) and offer suggested mechanisms of remedies on how to recognize such individuals and keep them from accessing or 'abusing' relevant substances. These perspectives – to a large and problematic extent – limit or prevent possible views and explanations for the large/rising non-medical prescription drug use problem in Canada that relay or refer more to possible system (or systemic) determinants or dynamics. For example, the comparably high – i.e., as compared to other industrialized countries or global regions – levels of overall prescription drug use in Canada may document easy availability and accessibility of these drugs when needed for appropriate or best possible medical care, yet may also reflect overly generous usage – i.e., contributing to 'prescription drug rich environments' - when not critically important or indicated and/or prevent alternative interventions from being employed (Fischer et al., 2008b). In 2001, the INCB in a press release for its annual World Drug Report explicitly lamented the "widespread overuse and overconsumption" of narcotics and psychotropic medications (including POs and BDs) in the industrialized world, which – as critically facilitated by "aggressive marketing … improper or even unethical prescription practices … and easy availability" of relevant substance has lead to an extensive and growing problem of misuse, diversion and related problems (International

Narcotics Control Board, 2001). Among other measures, the INCB called for a "more rational prescription culture" as one of the key steps needed to curtail these problems.

To concretely illustrate for the case study of Canada: The medical use levels of POs on a population level in Canada is about double that of Australia, 4-times that of the UK and 20-times that of Japan (International Narcotics Control Board, 2008a). Without examining specific data, it is most unlikely to assume that the overall prevalent levels of severe/chronic pain in Canada are double those of Australia, 4-times those of the UK and 20-times those of Japan. In Canada, as well as in many other industrialized countries, the overly generous prescription levels or the 'overprescribing' of BDs have been an issue of discussion for decades, yet have not really led to fundamental changes or restrictions (Rogers et al., 2007; Busto et al., 1996; Hamilton et al., 1990; Schiralli & McIntosh, 1987). It is an important health system reality that, even in the context of a system of public or socialized health care (meaning that care is predominantly paid for by public, i.e. tax-generated funds) physicians in the Canadian health care system are still financially rewarded, i.e. have a financial incentive, by writing/issuing a prescription, and are not paid for, i.e. do not have a financial incentive, to avoid writing a prescription for a prescription drug when seeing a patient. On the other end, within the Western, industrialized and distinct socio-cultural parameters of health, health care and doctor-patient relationships, a large proportion of patients – also as influenced by direct-to-consumer advertising by pharmaceutical companies - presenting with health problems or symptoms expect a quick and tangible cure to come in form of a pharmaceutical drug or 'pill', and often make specific requests which drug they would like to have prescribed (Mintzes et al., 2002; Gilbody et al., 2005; Stevenson et al., 2000; Maddox & Katsanis, 1997). Even before the currently observed spikes in non-medical use of prescription drugs, Canada used the be the country with the by far highest per capita consumption of codeine consumption in the world, largely reflecting the fact that 'mass products' of over-the-counter-pharmaceuticals (e.g., cough syrups or pain medications for non-severe pain) were available including codeine and therefore used in high quantities (see (International Narcotics Control Board, 2002; Romach et al., 1999). Canada is also a society with one of the lowest usage rates of alternative forms, e.g. homeopathic etc., of medicine among Western/industrialized countries (e.g., (Fernandez et al., 1998; Hollenberg, 2006).

All of the above mentioned systemic indicators may play an important role in facilitating or fuelling currently observed high/rising levels of non-medical use of prescription drugs in Canada, and respective revisions or interventions – beyond the primary focus on 'deviant patients' - thus ought to be considered as potentially important action points or targets for prevention or policy measures.

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