The Impact of Mobility and Migration on Health-Related Risk and Vulnerability among People Who Use Drugs in Ottawa-Gatineau

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Contribution of Authors

Yoko S. Schreiber is the primary author of the thesis and manuscript, and was responsible for drafting of the study protocol, creating the survey tool, collecting **all** the data, performing the data analysis, conducting the full literature review and writing the entire manuscript.

Dolly M. Lin acted as an interviewer for data collection, and was responsible for geographical mapping of the data. She authored the paragraph on geographical mapping in the methods section and created all maps.

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Zachary Marshall provided content expertise for development of the survey tool and review of the manuscript.

Tim Ramsay co-supervised this thesis and provided expertise on analytical questions and methodology, and critically reviewed the study protocol and thesis manuscript.

Mark Tyndall supervised this thesis and provided expertise on content and methodology, and provided guidance in all phases of this thesis.

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Abstract

Migration and mobility processes are thought to be important (yet complex) modulators of health related risk and vulnerability as experienced by people who use drugs. Few studies in Canada have examined this relationship, and there is no research available addressing this specific aspect of health and well-being in people who use drugs in Ottawa-Gatineau. While migration can be defined as a permanent (or near permanent) relocation process, mobility refers to a person's temporary or short-term movement between geographic locations (Joint United Nations Programme on HIV/AIDS, 2001). Understanding how the reasons for mobility and migration, typically described as “push and pull” factors, and the processes itself impact on the local community is invaluable for informing intervention in terms of type, location and timing and identifying solutions to reduce the inequalities resulting in and from the migration process.

This cross-sectional study aimed to assess the prevalence and geography of mobility and migration among study participants, characterize the circumstances surrounding the mobility and migration process, and explore their impact on health related outcomes, among people who use drugs in Ottawa-Gatineau, Canada. Understanding the prevalence, patterns and characteristics of mobility and migration events may offer greater insight into the associated health risks, which in turn will assist in the development of targeted health and social services for this group. We hypothesized that the act of moving itself, as well as type of mobility and migration (i.e. specific push and pull factors), may be associated with health

risk behaviours and health outcomes. People 18 years or older currently living in Ottawa-Gatineau, and who used illicit drugs in the past six months were recruited using respondent-driven sampling. Geography of lifetime migration was mapped, and health related outcomes and access to social support services were evaluated against lifetime and recent migration and travel. Quantitative analysis of health and social support related outcomes was carried out by comparison of means and proportions between groups, and complemented by qualitative exploration of push and pull factors and effects of the last mobility and migration events.

Our study identified a heterogeneous inner-city population of people who use drugs where widespread homelessness, incarceration, low income and a high degree of mobility and migration placed individuals at varying levels of health-related vulnerability. Participants moved to Ottawa-Gatineau from all over Canada and other countries, but most arrived from within Ontario. Multiple factors were involved in the decision to migrate and in choosing Ottawa-Gatineau in particular. Escaping a negative environment and seeking out family connections were the most commonly cited “push and pull” factors, respectively. Maintaining family connections was also identified as a major reason for mobility or lack thereof among travelers and non-travelers alike. There was evidence to suggest that the mobility and migration processes affected health, drug use and access to resources among some of the participants and for a wide variety of reasons. Comparing the two groups using t-test for means and Chi-square (or Fisher’s exact) test for proportions, we found crack cocaine and injection drug users who migrated recently to be poorly connected to harm reduction services and thus at particularly high risk for blood-borne infections and other drug-related

harms. Similarly, participants using crack cocaine or injection drugs and who traveled were significantly less likely to access social support services.

In this study we have shown that within a broad cohort of people who use drugs in Ottawa-Gatineau, subjects are a highly mobile group, and face a considerable number of environmental challenges that predispose individuals to increasing risk behaviour even when using drugs only occasionally. This vulnerability is greatest in the period following migration. While push and pull factors may vary by place, a common theme identified in this study is the perceived and actual positive influence of family. Further research employing a combination of quantitative and qualitative methods using a socioecological, intersectionality and lifecourse approach (Egan, et al., 2011) may provide added insights into the role of family in modulating vulnerability through social connectedness and support among drug users as they navigate the mobility and migration process.

Background

Mobility and migration processes have been intricately linked to important health and social outcomes. While migration can be defined as a permanent (or near permanent) relocation process, mobility refers to a person's temporary or short-term movement between geographic locations (Joint United Nations Programme on HIV/AIDS, 2001). Specific definitions of the mobility and migration process may vary by context, and can describe permanent and temporary movement of people across international, inter-regional, inter- and intra-municipal borders. In this study, we defined migrant as a person who has undergone migration across city boundaries, defined as living in a new city or town for at least 3 months or longer. Societal and individual level "push and pull" factors influence a person's decision to move (Greenwood, 1985) (Norris & Clatworthy, 2003), and can include political environment, socio-economic determinants, and personal reasons (Trujano, 2008). As such, migration and mobility are a function of place of origin, destination and a person's characteristics (Clatworthy & Norris, 2007), and can either positively or negatively affect health risk behaviour and health outcomes. The impacts of mobility and migration processes have been described in various at-risk populations, including people who use drugs, sex workers, refugees and displaced people, and migrant workers.

People who use drugs are also a highly mobile group. In 2006, 26% of injection drug users surveyed as part of a Health Canada surveillance initiative reported a change of address within the past 6 months (Health Canada 2004), and the proportion of injection drug users

who migrated approached 50% in some US settings (McCoy et al. 1996). According to the Canadian 2006 census, 15% of Ottawa-Gatineau's general population were migrants, defined there as persons who were residing in a different census subdivision five years prior, and 4.3% were recent migrants who moved to Ottawa-Gatineau within the year prior to census (Statistics Canada, 2006). However the number of migrants among people who use drugs is not known. In addition to the effects of an often transient lifestyle, people who use drugs carry a disproportionate burden of illness. Mental illness, blood-borne infections such as HIV and Hepatitis C, and high risk behaviour are prevalent in this population. Substance misuse may also interfere with home responsibilities, interpersonal relationships and social life, education, and work (Ottawa Public Health, 2013). Furthermore, people who use drugs may experience inadequate access to social resources and health care. Stigma and discrimination are known to be associated with poorer mental and physical health among people who use drugs, possibly by acting as barriers to accessing health and social resources (Ahern, et al., 2007).

Epidemiological studies estimate there to be 3000 – 5000 injection drug users in Ottawa and an additional 2100 in Eastern Ontario (Millson, et al., 2004), ranking Ottawa second after Toronto in proportion of the population who inject drugs in Ontario (Ottawa Public Health, 2013). Other common substances being misused include alcohol, prescription opioids, cocaine and crack cocaine, cannabis, speed and ecstasy. Specifically, the prevalence of problematic alcohol use among Ottawa's population was highest in the province and accounted for 110 deaths and 970 hospitalizations within the last year. In addition, 45% of people living in Ottawa report a lifetime history of cannabis use, and 5.2% have used cocaine or crack cocaine. In 2012, there were 48 deaths attributable to drug use. Forty of these were

related to overdoses, and 8 to infectious diseases (Ottawa Public Health, 2013). Most recent estimates indicate that in Ottawa, 6.2 / 100,000 people are diagnosed with HIV each year. The prevalence of HIV among people who inject drugs exceeds that of other urban centres in Ontario at 12.6%, and 73% are positive for Hepatitis C (Ottawa Public Health, 2013) (Ottawa Public Health, 2013). Unemployment, unprotected heterosexual contact, Aboriginal ethnicity and needle sharing were associated with HIV positive status in Ottawa's injection drug users (Leonard, et al., 2004) (Millson, et al., 2004) . Over the past year, drug misuse led to 505 hospitalizations. Most were due to injury or non-fatal overdose, but mental health diagnoses represented the second most common drug-related reason for admission. It is well known that (Ottawa Public Health, 2013) people who use drugs are particularly vulnerable to mental health disorders, including psychoses, depression and schizophrenia (Degenhardt & Hall, 2001) (Fischer, et al., 2005) (Hall, et al., 2008) (MacLeod, et al., 2004).

Strategies to curb and reduce the risks of substance misuse rely on four principles: prevention, treatment, enforcement and harm reduction (MacPherson & Rowley, 2001). Some of these programs require participants to abstain from any drug use, which may represent a barrier for some who are unable or unwilling to stop using drugs but seek to stabilize their use and mitigate associated risk. Harm reduction strategies, in contrast, recognize drug use as a “continuum” of risk and potential harm (CAMH, 2002). The Centre for Addiction and Mental Health defines harm reduction is “any program or policy designed to reduce drug-related harm without requiring the cessation of drug use" (CAMH, 2002). Harm reduction approaches therefore aim to move an individual from higher to lower levels of potential drug-related risk. Examples of harm reduction programs are Needle and Syringe Programs (NSP) and Safe Inhalation Programs (SIH). Ottawa’s public health unit operates an

office-based and mobile NSP along with 15 other NSP through partner agencies. Twelve of these also provide safe inhalation kits. Mobile units distribute one third of all needles and syringes, and over 80% of safe inhalation kits. Most recent data from Ottawa Public Health documents an increase in use of harm reduction services, but it is unclear whether this is driven by increased uptake of harm reduction by existing drug users or an increase in numbers of people of who use drugs. Wait times for treatment services continue to be long, ranging from days to months. Furthermore, several of Ottawa's treatment programs are subject to limiting legal barriers and medical exclusion criteria. Despite ongoing efforts at prevention and harm reduction, age standardized hospitalization rates attributable to drug use have remained stable since 2006 (Ottawa Public Health, 2013), indicating the need for a more comprehensive and multi-faceted approach in ensuring favourable health outcomes among people who use drugs.

Aside from direct risk of drug use to the individual, substance misuse is closely linked to homelessness and public disorder and crime and associated harms. In a local study 65% of people who use drugs injected publicly at least once in the preceding six months. Homelessness was an important predictor of public injection (Navarro & Leonard, 2004). Drug related disorder also includes publicly discarded syringes and drug paraphernalia, drug dealing, and injection related litter. A recent study in Ottawa observed public injecting and drug dealing to occur predominantly in the Byward market/Rideau-Vanier, in an area close to a shelter (Shaw & White, personal communication). Drug related charges account for 18% of crimes committed by males and 41% by females in Ontario. Cannabis offences are the most frequent drug related charges, followed by offences linked to cocaine (Brochu, 2005).

Homelessness and marginal housing is prevalent among people who use drugs, and have been shown to negatively impact access to care and health related outcomes, including overdose (Tyndall, et al., 2001). In survey of people who inject drugs in Ottawa, 9 out of 10 have experienced homelessness within the past year (Shaw, et al., 2013). It is estimated that there were 7,308 homeless individuals and families in 2012 in Ottawa, which harbours nine shelters with a combined 964 bed capacity. The numbers of shelter users has increased in the past year, and duration of stay has remained stable at 49 days for women and 59 days for men. Among those who have experienced homelessness in their lifetime, the average length of involvement with shelters (lifetime) is over 6 years. Eliminating homelessness continues to be challenging in Ottawa, as low income housing is scarce and annual increases in rent are not matched by proportional increases in Ontario Works or Disability benefits. Currently, persons receiving support from Ontario Works and Ontario Disability Support Program spend on average 124% and 70%, respectively, of their income on rent (Brown, 2013). Migrants and mobile persons are at particularly high risk of experiencing unstable housing. When moving to Ottawa from out of province or out of country, this risk is heightened by delays in qualifying for Ontario social support programs. During the first three months after arrival, individuals are also not eligible for OHIP coverage. While basic medical care is still covered by the province or territory of origin, extended health and social support services are often not accessible to those without a valid Ontario health card.

Anecdotal evidence suggests that Ottawa-Gatineau appears to include a non-negligible mobile population with a high proportion of people who use drugs, although exact numbers are not known. To date, no studies have offered insight into the extent of mobility

and migration or the complex social and structural conditions shaping migration patterns, and their consequences on health outcomes, among people who use drugs in Ottawa-Gatineau.

We hypothesize that people who use drugs who are mobile or migrate are not a homogenous group, and that specific attributes of the migration and mobility process are linked to individual resiliency. Both the act of moving itself and specific attributes of the mobility and migration process may be associated with health risk behaviour and health outcomes. For example, we hypothesize that migration prompted by economic factors such as moving for work or education carries with it a smaller risk of detrimental effect on health risk behaviour and health outcomes. In contrast, migration or mobility that is driven by escapism may be associated with higher health risk behaviour due to poor social connectedness and limited access to health resources. The frequency of moving as well as geographic factors may further amplify the potential negative impact of mobility. Individuals who do not migrate or move may engage in fewer health risk behaviours and enjoy better health due to, for example, stronger connections to local outreach and health services. Assessing for an association between types of mobility and migration, and health related outcomes, will allow for a better understanding of the heterogeneity of the mobility and migration effects observed in people who use drugs. This in turn will assist us in developing targeted interventions that aim to improve health outcomes including access to health and social services among this vulnerable group.

Specifically, this study aims to: 1) Describe migration and mobility patterns among people who use drugs in Ottawa-Gatineau, particularly assessing the proportion of people who move, the frequency of migration, and the types of migration (including identifying

"push and pull" factors that are associated with migration and mobility); and 2) examine the association between history and type of mobility and migration, health outcomes and access to health and social services.

Literature Review

Mobility and Migration

Definitions

The term “migration” describes movement across international or internal borders permanently or for an extended period of time. In this study, we used moving across municipal borders and remaining at the new location for a minimum of three months duration to define migration. A migrant was considered any person who has undergone a migration event. We further distinguished between lifetime and recent (within the preceding year) migration history. Mobility, on the other hand, refers to movement between two places that is temporary (Joint United Nations Programme on HIV/AIDS, 2001), in this study defined as leaving Ottawa-Gatineau for overnight or longer within the preceding twelve months.

Traditionally, migrants were described as persons whose decision to move was “taken freely,” and “without intervention of an external compelling factor” (Joint United Nations Programme on HIV/AIDS, 1998). More modern definitions refer to migrants as individuals who move across international or internal borders for a wide variety of reasons, such as accessing economic opportunities, escaping sociocultural isolation or political oppression. Establishing a clear and comprehensive definition of migration and mobility in

terms of geography, temporality and context is an important prerequisite to the study of its effect on vulnerability and health outcomes (Deane, et al., 2010). Depending on definitions used, migration and mobility patterns and their associations may therefore differ between populations and locations.

Migration and mobility should not be considered as fixed activities (Joint United Nations Programme on HIV/AIDS, 1998), but as dynamic processes that takes into account individual level and environmental factors. These may act differentially during all three stages of the moving process (at origin, during transit, and at destination), and can have both positive and negative effects on health outcomes and an individual's resiliency towards health risk behaviour at each stage. Mobility and migration can thus be thought of "both as a response and a risk factor itself" (Deane, et al., 2010). The contexts under which migration and mobility take place may affect risk directly by modulating the immediate risk environment (e.g. local HIV prevalence) or indirectly by creating conditions that influence individual risk behaviour (Haour-Knipe, et al., 2013).

Risk and Vulnerability

Whereas risk can be defined as the probability of experiencing a poor health outcome that is directly related to individual behaviour, vulnerability employs a broader concept of health as determined by the "structural conditions that reduce people's ability to avoid or control risk." (Haour-Knipe, et al., 2013). Vulnerability is largely determined by the interaction of environment type (physical, social, political, cultural, and economic) and level (micro vs.

macro) as experienced by the individual (Rhodes, 2009). Focusing on structural factors that modulate vulnerability allows for identification of opportunities for intervention that do not rely on behavioural approaches alone (Organista, et al., 2004).

As much as mobility and migration are dynamic processes, so is an individual's risk at any given time and place. For the purpose of understanding the effects of migration and mobility it is therefore more useful to view risk as a trajectory that follows sequences of transitions mapped by broader upstream contexts, as opposed to solely focus on resultant downstream risk behaviour.

Push and Pull Factors

Both distal structural factors (sociocultural, political, economic) and proximal immediate individual level factors at origin and destination influence a person's decision to move and subsequent health outcomes. These determinants include physical environment, availability and quality of housing, employment and education opportunities, access to health and social support services, identification with and integration into community and social networks, social capital, political environment, legal issues, personal security and freedom, and experiences of stigma and discrimination based on gender, ethnicity, social status and drug use (Carballo & Mourtala Group, 2005) (Satcher, 2010). "Big events" may further catalyze the migration process (Friedman, et al., 2009). For example, rising incidence and spread of syphilis and HIV in Eastern Europe was largely fuelled by economic transition, lower

welfare, budding of informal economies and changes in public health in conjunction with a higher rate of mobility and migration among the population (Rhodes, et al., 1999).

Examples of "push and pull" factors are many, however the complexity of their interactions makes generalizable interpretations difficult. For example, Millson et al. (Millson, et al., 2003) showed that people who use drugs in rural settings were less likely to receive treatment than their metropolitan counterparts. This may prompt individuals to move from rural to urban environments in order to access resources and thereby reduce risk. Drug users who migrated out of the metropolitan Vancouver area in fact experienced less risk by decreasing their drug use and securing stable housing at destination (Rachlis, et al., 2008) (Rachlis, et al., 2010).While the prospect of reducing risk draws some migrants to one place in particular, others may migrate or travel for the purpose of enhancing their drug use and integrate into a drug using community. In a study of young homeless drug users, participants moved along commonly traveled routes for the purpose of drug use, income generation, and to escape law enforcement (Lankenau, et al., 2008). These factors were also identified among street-entrenched youths in Vancouver, who felt pushed towards entering the downtown east side, a neighbourhood in Vancouver's core where drug trade and drug use networks are well established, by negative environments and lack of low-income housing opportunities at origin. At the same time, individuals were attracted to the neighbourhood by a "desire for excitement, independence and belonging." As entrenchment into the local drug scene and its associated conditions deepened, e.g. through the need for money making to support increasingly problematic drug use, youths actually found themselves even more excluded from mainstream society in terms of opportunities for employment, education, housing and stable social support networks (Kerr, et al., 2009). It becomes evident that push

and pull factors do not act in isolation, but can act in concert to propel an individual along a trajectory of varying vulnerability along the moving process.

The social influence of peers and families on moulding individual behaviour and providing a sense of connectedness cannot be neglected as a key factor in shaping the mobility and migration process and its effects. Firstly, a change in one's established pattern of social interaction may have negative impacts on health and well-being (Berry, et al., 1987). Secondly, peers, family and friends may act as role models and exert their social influence by persuasion, social comparison, sanction, and information exchange (Akers, 1985) (Fisher, 1988) (Hall & Wellman, 1985) and may function as key modulators of individual risk behaviour. The magnitude and direction of effect of peer and family influence may further be compounded by co-existing economic dependence. Lee and colleagues also showed that health risk behaviour was more prevalent when individuals were integrated into a local social network than during the migration process (Lee, et al., 2002). Integration into the unstable social networks that typically characterize a drug using milieu may intensify individual risk despite an initial sense of belonging and connectedness, as discussed by Kerr et al. (Kerr, et al., 2009). On the other hand, social isolation from peer networks, family supports and mainstream society and institutions, may deprive individuals from positive social supports and resources (Fernandez & Harris, 1992), lead to further economic marginalization, and impact vulnerability and risk at both origin and destination. These findings underline that the nature of the interaction between members of social network, as well as its consistency and direction (positive vs. negative) may function as important push and pull factors as individuals seek integration into a particular community.

Mobility and Migration Effects

Numerous reports have implicated mobility and migration as a driver of health risk behaviour and health outcomes among people who use drugs, (Callaghan, et al., 2007) (Deren, et al., 2003) (Gelpi-Acosta, et al., 2011) (Hahn, et al., 2007) (Haw & Higgins, 1998) (Kerr, et al., 2009) (Maas, et al., 2007) (Magis-Rodriguez, et al., 2004) (Paschane & Fisher, 2000) (Rachlis, et al., 2008) (Rachlis, et al., 2010) (Rhodes, et al., 1999) (White, 2003) (Yang, 2006), with younger ages and males representing the largest sub-group of migrants (Magis-Rodriguez, et al., 2004) (Yang, 2006). The stress of having a mobile lifestyle in particular has been shown to lead to an increase in drug use and related risk behaviours (Denner, et al., 2005) (Kim-Goodwin & Bechtel, 2004) (Sanders & Sambo, 1991). However, the odds of increased drug use as a result of migration were somewhat curtailed when adjusted for environmental factors, as well as family and peer influences (Yang, 2006). Studies on mobility have also implicated short-term travel as being independently associated with high risk drug using practices (Hahn, et al., 2007) (Lankenau, et al., 2008).

Paschane and colleagues further identify recent migration as an important driver of drug use and risk behaviour, and go on to question the assumption that drug use and related behaviour is constant over time and space (Paschane & Fisher, 2000). Participants in their study were six times more likely to engage in risky injection practices during the transition period following arrival than more established drug users. Newcomers have no established networks on which to rely for acquisition of drugs and drug paraphernalia, and may not be aware of locally available harm reduction and social support services. Post-migration

processes and new physical and social environments exert considerable stress on a person's adaptive resources, and thereby may prevent individuals from making the leap into meaningful and positive social integration. As a consequence to these maladaptive processes, members of this already vulnerable group become even more socially and economically marginalized. These findings are supported by observations among Puerto Rican drug users arriving in New York City, and Mexican migrants moving across the Mexico-US border. In both groups, recent migration or newcomer status was a significant predictor of high risk injection practices, such as shooting gallery use, paraphernalia sharing (Deren, et al., 2003), as well as high risk sexual practices (Gelpi-Acosta, et al., 2011) despite higher availability of social support and harm reduction services at their destination. The authors postulate that cultural norms acquired at origin perpetuate certain risk behaviours, and recommend identifying structural barriers that impact individuals' ability to access these services.

These barriers may be cultural, logistic or economic in nature. Language can also impede access to services and impact quality of care as migrants arrive at their destination. This has been well described among immigrants worldwide (Flores, 2006) (Jones & Gill, 1998) (Karago-Odongo, 2008). Language barriers have largely been ignored in Canadian studies, possibly because language interfaces are limited to few geographical regions (e.g. Eastern Ontario and Quebec) and ethnic minorities, including First Nations, Métis and Inuit. The French-English language interface may prove problematic for Francophones attempting to access services on Ontario, and for Anglophones traveling to Quebec destinations. For First Nations, Métis and the Inuit, cultural differences and views of health and well-being that lie outside the framework for Western medicine may further alienate individuals from services that are already poorly adapted to minority sub-groups. The Canadian health care

system also requires new residents to live in one province for a minimum of three months before becoming eligible to obtain a provincial health card. Because access to medical resources is fixed, lack of a health card for the appropriate jurisdiction may exclude individuals from benefiting from extended health and social support services outside of emergency care. Residents of the Ottawa-Gatineau area in particular may be faced with this issue, given the close proximity of the two cities along the Ontario-Quebec border and the majority of services being concentrated on the Ontario side.

Population Sub-groups

First Nations, Métis and Inuit people of Canada represent a particularly vulnerable population, as members of this group who live in urban centres do not benefit from the social and cultural supports typically provided by their home communities. Rural to urban migration by Aboriginal people has increased dramatically over the past decade (Interagency Coalition on AIDS and Development, 2009) and increasing rates of HIV are found preferentially among Aboriginal people in urban settings (Canadian Aboriginal AIDS Network, 2008) (Craib, et al., 2003). In addition, Callaghan et al. (Callaghan, et al., 2007) demonstrated high rates of reciprocal movement between on and off reserve among people who use drugs, leading to concern of spread of blood-borne infections from high to low prevalence areas. Injection drug use is the primary risk category for blood-borne infections like HIV and Hepatitis C among Canadian First Nations, Métis and Inuit (Public Health Agency of Canada, 2010). While Aboriginal ethnicity was associated with injection drug use in the I-track study (Health Canada, 2004), Aboriginal status was not found to predict high risk behaviour among migrants in Alaska.

Geography

Political, economic and sociocultural environments vary by locality. Push and pull factors and their effect on the moving individual may therefore differ across regions and between cities. Geography also delineates borders for high and low prevalence areas of blood-borne infections associated with drug use. Both mobility and migration have been shown to contribute to rising HIV incidence (Frischer, 1998) by acting as a population bridge (Joint United Nations Programme on HIV/AIDS, 2001) and establishing interactions between low and high prevalence areas (Coffee, et al., 2007). Increasing drug trade fuelled by economic instability and marginalization have further facilitated the spread of HIV along trafficking routes (Rachlis, et al., 2007).

Studies examining the effect of mobility and migration on health outcomes typically categorize mobility and migration into a dichotomous variable (history of migration; or high vs. low mobility) and use regression analysis to investigate for associations between mobility and migration and study outcomes ((Rachlis, et al., 2007) (Rachlis, et al., 2008) (Rachlis, et al., 2010). Spatial-geographical analysis, on the other hand, is predominantly being used in conjunction with network analysis in order to compare social vs. actual distances within a specific population. The latter is particularly useful in outbreak investigations and delineation of risks of communicable diseases such as HIV among a network of injection drug users (Hixson, et al., 2011) (Kivela, et al., 2007) (Kruse, et al., 2009) (Rothenberg, et al., 2005) (Rothenberg, 2007), for example, or in examining health service availability and usage between different neighbourhoods (Davidson, et al., 2011) (Kaukinen & Fulcher, 2006) (Kissane, 2010) (Pang & Lee, 2008) (Sellstroem, et al., 2011) (Shannon, et al., 2008).

This type of analysis is often limited to local populations and micro-environments, and there have been no Canadian studies among people who use drugs that aim to characterize geospatial mobility and migration patterns extending beyond neighbourhoods and municipal boundaries. Using geospatial analysis to describe and understand mobility and migration processes can be challenging, as standard approaches fail to capture the dynamism between determinants of the moving process and the locally unique social, political and economic dimensions that shape place at any given point in time. More often than not, migration and mobility are described as discrete events, where mapping techniques merely capture a snapshot in time. The use of fixed-interval data, as opposed to lifetime events, allow for incorporation of additional detail surrounding migration and mobility events (Newbold, 2001), but still leave important gaps in describing mobility and migration as a process. Geospatial mapping techniques that allow for a temporal axis and linkage to data on local environments along with qualitative surveys that explore vulnerability as experienced by the individual may provide a more comprehensive characterization of mobility and migration processes.

Respondent-Driven Sampling

Background and Applications

Conducting research on vulnerable or hidden populations such as people who use drugs is challenging, as social prejudice may prevent individuals from acknowledging membership in that group. Since our aim is to estimate patterns of mobility and migration in this population, obtaining a representative sample is important. Low response rates and biases observed in more traditional sampling methods, such as snowball-sampling, targeted sampling and key-informant sampling have led to the development of respondent-driven sampling (RDS). This method was first described by Heckathorn in 1997 (Heckathorn, 1997) (Heckathorn, 2002), and relies on a chain-referral system that aims to produce a population sample independent of the initial participants, or "seeds." There are a number of methodological elements of RDS that make it superior to other recruitment methods including greater external validity, reduced sampling bias, and biases that can (at least, theoretically) be assessed and adjusted for in the analysis. It has been applied with good success among migrants (Reed, et al., 2012) (Qiu, et al., 2012), and illicit drug using populations internationally (Abdul-Quader, et al., 2006) (Burt & Thiede, 2012) (Frost, et al., 2006) (Hathaway, et al., 2010) (Kral, et al., 2010)(Lansky, et al., 2007) (Malekinejad, et al., 2008) (Oteo-Perez, et al., 2012) (Platt, et al., 2006) (Rudolph, et al., 2011) (Stormer, et al., 2006) (Wang, et al., 2005) (Wang, et al., 2007),and locally (McWilliam, et al., 2008) (Pilon, et al., 2011). RDS also allows for rapid recruitment. In a systematic review assessing the use of RDS for HIV biological and behavioural surveillance, Malekinejad et al. (Malekinejad, et al., 2008) found that of 123

eligible studies using this methodology in an injection drug use or sex work population, over 90% achieved their intended sample size.

Sampling Process

Starting with a small convenience sample of representative and well-connected "seeds", RDS employs a peer referral system wherein participants are compensated both for survey completion and for each successful referral to the study. Seeds are presented with a finite number of coupons that are to be given out to individuals who may be eligible to participate. Only persons presenting with a coupon and meeting eligibility criteria can participate in the study. Once enrolled, these persons become recruiters themselves by in turn being provided with recruitment coupons. This process continues until sample size is reached and the sampled population reaches "equilibrium," i.e. is independent from initial seeds.

Statistical Inference

The superiority of RDS over other convenience sampling methods rests on three assumptions: 1. Recruiters must know recruitees as members of the population of interest, 2. Personal networks are linked and include all members of the target population; 3. The size of the sample is small compared to the population of interest: 4. Personal network size is accurately recalled; and 5. Recruitment is random within the recruiter's network (Heckathorn, 1997) (Heckathorn, 2002) (Heckathorn, 2007) (Lansky, et al., 2012) (Salganik & Heckathorn, 2004).While the RDS process typically allows for rapid recruitment of the required number of participants and is therefore a popular recruitment method, the validity of

its assumptions and statistical inferences has been called into questions when applied in the real world. Determining if the third assumption holds true is problematic, as hidden populations generally have no established sampling frame and thus the denominator cannot be known. RDS further relies on integral social networks to reach a diverse sample, and operates on the premise that peers know (i.e. are linked) their referrals. Extremely marginalized members of the population of interest may be isolated and unlinked, and therefore may not be included in the study. Lastly, RDS was initially proposed to reduce several biases by adjusting for homophily and recruiter's personal network size. It has since been shown that important biases remain, often undetected, and that estimate variances were larger than what was used in sample size calculations (Lansky, et al., 2012) (McCreesh, et al., 2012) (Wejnert, 2009) (White, et al., 2012). Presenting effect estimates in their unadjusted form while recognizing the limitations of RDS may therefore be preferable.

Ethics

Since study participants are members of a vulnerable population, safeguards aimed to maintain the principles of ethics during the recruitment process are of particular importance. The process of compensating peers for successful referrals has raised concerns of coercion (Scott, 2008), although few studies using RDS have included a formal assessment of harmful effects related to the recruitment process. As opposed to other chain referral methods such as key informant sampling, establishing contact with the research team remains a voluntary act in RDS. Voluntariness to participate can be maintained more rigorously by thorough informed consent at the time of presentation. There have been concerns regarding recruiters coercing eligible persons to participate in the study (McWilliam, et al., 2008) (Scott, 2008).

Semaan and colleagues propose inclusion of an "Ethics checklist" during the consent process in order to identify situations of coercion or harm experienced as a result of the recruitment process (Broadhead, 2008) (Semaan, et al., 2009). Lastly, concerns have been raised about the use of coupons as revenue-generating modality, which may fuel economic exploitation of more vulnerable community members (Scott, 2008). Use of a recruitment quota has been suggested to limit the potential financial benefit and to avoid fostering "professional recruiters". The amount of the reward is to reflect compensation for time and effort spent to complete the study, and is not exceed an economically "reasonable" amount (Lansky & Mastro, 2008) (Semaan, et al., 2009).

Article Manuscript

The Impact of Mobility and Migration on Health-Related Vulnerability and Resilience among People Who Use Drugs in Ottawa-Gatineau

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Abstract

Background

People who use drugs are considered to be a highly mobile group. Specific aspects of mobility and migration have been linked to health-related vulnerability and resiliency with the potential for both positive and negative individual health effects. This cross-sectional study aimed to assess the prevalence of mobility and migration, characterize the circumstances surrounding the mobility and migration process, and explore their impact on health related outcomes among people who use drugs in Ottawa, Canada.

Methods

Respondent-driven sampling was used to recruit participants. Inclusion criteria were illicit drug use within the last six months, age ≥ 18 years, and currently living in Ottawa-Gatineau. We collected survey data on demographics, drug use, migration, and self-reported health needs. Participants were considered to have migrated to a specific city if they had resided there for ≥ 3 months, whereas mobility was defined as travel outside the city for overnight or longer. Both univariate analysis and qualitative methods were used.

Results

Four hundred and one participants were recruited. Seventy-nine percent were male and 23% self-identified as Aboriginal. Fifty percent had a history of injection drug use, and 23% used injection drugs currently. Crack cocaine users represented 64% of the sample. Most (91%) participants had a lifetime history of migration (intra-regional, inter-regional, inter-provincial or international), and 18% migrated recently (within the last year). There were no

differences in HIV and HCV prevalence, self-reported general health, hospitalizations or access to health and social services between migrants and non-migrants. People who currently used crack cocaine or injection drugs and who migrated recently were significantly less likely to use harm reduction services (OR = 0.38; 95% CI (0.19 – 0.77)). Among this group, travel was also significantly associated with lower access to social support services (OR = 0.55; 95% CI (0.32 – 0.95)). Escaping a negative environment was the most frequently identified driver of migration, while presence of family at destination factored as a major attractant for last migration and planned future moves. Travel was linked to both positive (family) and negative (drug seeking) push and pull factors and entailed health risk accordingly.

Conclusions

People who use drugs are a mobile group. Both the act of moving itself and the conditions under which the migration or mobility process takes place impact individual level risk and vulnerability, with the greatest increase in risk occurring in the immediate period following migration. Presence of family is an important modulator, both actual and perceived, of risk and vulnerability among drug users during the mobility and migration process.

Introduction

Mobility and migration processes have been intricately linked to important health and social outcomes. Whereas mobility refers to a person's temporary or short-term movement between geographic locations, migration is considered a permanent (or semi-permanent) relocation process (Joint United Nations Programme on HIV/AIDS, 2001). Specific definitions of the mobility and migration process may vary by context, and can describe permanent and temporary movement of people across international, inter-regional, inter- and intra-municipal borders. Upstream and downstream environmental and individual level "push and pull" factors influence a person's decision to move (Greenwood, 1985) (Norris & Clatworthy, 2003) and can include sociocultural, political, programmatic, economic and behavioural determinants. Mobility and migration should not be considered as fixed activities (Joint United Nations Programme on HIV/AIDS, 1998), but as dynamic processes that are subject to individual specific interplays of push and pull factors at any given point along the process (origin, transit, or destination). As such, mobility and migration can be viewed as modulators of risk trajectories wherein individuals navigate through varying degrees of vulnerability. Whereas risk can be defined as the probability of experiencing a negative health outcome that is directly related to individual behaviour (Haour-Knipe, et al., 2013), vulnerability is largely determined by the interaction of environment type (physical, social, political, cultural, economic and policy) and level (micro vs. macro) as experienced by the individual (Rhodes, 2009). Focusing solely on individual level risk fails to identify upstream structural factors that shape mobility and migration processes. This leads to missed opportunities for interventions that would go beyond individual-centred harm reduction approaches commonly used by local public health units. The impacts of mobility and migration processes have been

described in various at-risk populations, including people who use drugs, sex workers, refugees and displaced people, and migrant workers.

People who use drugs are also a highly mobile group. In 2006, 26% of injection drug users surveyed as part of a Health Canada surveillance initiative reported a change of address within the past 6 months (Health Canada 2004). Numerous reports have implicated mobility and migration as a driver of health risk behaviour and health outcomes among people who use drugs, (Callaghan, et al., 2007) (Deren, et al., 2003) (Gelpi-Acosta, et al., 2011) (Hahn, et al., 2007) (Haw & Higgins, 1998) (Kerr, et al., 2009) (Maas, et al., 2007) (Magis-Rodriguez, et al., 2004) (Paschane & Fisher, 2000) (Rachlis, et al., 2008) (Rachlis, et al., 2010) (Rhodes, et al., 1999) (White, 2003) (Yang, 2006) . Epidemiological studies estimate there to be 3000 – 5000 injection drug users in Ottawa and an additional 2100 in Eastern Ontario (Millson, et al., 2004). According to the Canadian 2006 census, 15% of Ottawa-Gatineau's general population were migrants (i.e. moved from another census subdivision within the previous five years), and 4.3% migrated to Ottawa-Gatineau in the previous year, however number of migrants among people who use drugs is not known (Statistics Canada, 2006). In addition to the effects of an often transient lifestyle, people who use drugs carry a disproportionate burden of illness further magnified by inadequate access to social resources and health care. Stigma and discrimination act as barriers to accessing resources and economic opportunities, adding layers of risk for individuals already prone to experiencing mental health disorders and acquiring blood-borne infections, such as HIV and Hepatitis C (HCV), as a result of substance misuse.

Substance misuse is prevalent in Ottawa, with problematic alcohol use occurring in up to 45% and accounting for 110 deaths and 970 hospitalizations within the last year. In addition, 45% of people living in Ottawa report a lifetime history of cannabis use, and 5.2% have used cocaine or crack cocaine. In 2012, drug use led to 505 hospitalizations, and 48 deaths from overdose and infectious diseases. The prevalence of HIV among people who inject drugs exceeds that of other urban centres in Ontario at 12.6%, and 73% are positive for Hepatitis C (Ottawa Public Health, 2013) (Ottawa Public Health, 2013). Several harm reduction programs such as safe inhalation and needle and syringe distribution and exchange programs operate in Ottawa-Gatineau, however HIV-rates and age standardized hospitalization rates attributable to drug use have remained stable since 2006 (Ottawa Public Health, 2013). Treatment centres are subject to limiting legal barriers and medical exclusion criteria, and wait times continue to be long.

Migrants and mobile persons are at particularly high risk of experiencing unstable housing. When moving to Ottawa from out of province or out of country, this risk is heightened by delays in qualifying for Ontario social support programs and extended health benefits. Homelessness and marginal housing is prevalent among people who use drugs, and have been shown to negatively impact access to care and health related outcomes, including overdose (Tyndall, et al., 2001). In a survey of people who inject drugs in Ottawa, nine out of ten have experienced homelessness within the past year (Shaw, et al., 2013). A local study found homelessness to be an important predictor of public injection (Navarro & Leonard, 2004), and 65% of people who use drugs in Ottawa injected publicly at least once in the preceding six months. Ottawa's drug scene is largely concentrated in the downtown

area near the Byward market, where public injecting and drug dealing is most noticeable in areas surrounding downtown shelters.

Despite ongoing efforts at prevention, treatment and harm reduction, there remains a need for a more comprehensive and multi-faceted approach in ensuring favourable health outcomes among people who use drugs. The additional impacts of mobility and migration process on health and access to social services, and vulnerability as a whole remains poorly understood. Both proximal determinants such as physical and social environment, psychosocial stress, lifestyle and access and use of health and social support services, as well as distal factors such as culture, ethnicity and social status at origin and destination factor into health inequities experienced by mobile populations (WHO, 2010). Social exclusion, a "dynamic and multidimensional process" driven by economic, political , social and cultural influences acting at "individual, household, group [and] community levels [and] characterized by unequal access to resources and capabilities and rights" may add to health inequity (Social Exclusion Knowledge Network of the Commission on Social Determinants of Health, WHO). Mobility and migration may reinforce the potential for social exclusion among groups already facing discrimination at individual and institutional levels. Efforts to eliminate health inequity should therefore employ strategies that facilitate access and effective health service delivery by removing or reducing physical, social, cultural and, if applicable, linguistic barriers, as well as address the manifold social determinants that underlie discrepancies in health (WHO, 2010).

The factors that shape health inequity in a population are specific to the local social, political, economic, physical and cultural environment, and individual level factors further

mould vulnerability experienced by any given person. People who use drugs are not a homogenous group, and specific attributes of the mobility and migration process dictate its impact on downstream vulnerability, risk behaviour and health outcomes. To date, no studies have offered insight into the complex social and structural conditions shaping migration patterns, and their consequences on health outcomes, among people who use drugs in Ottawa-Gatineau. Specifically, this study aims to map unmet needs by describing migration and mobility patterns and associated health outcomes among people who use drugs in Ottawa-Gatineau. Exploring the reasons people move, and move to Ottawa-Gatineau specifically, and assessing how the mobility and migration processes affect access to social and health resources and outcomes, will assist in identifying opportunities for targeted interventions for this vulnerable group.

Because interactions between proximal and distal as well as structural and individual level determinants are complex and are typically "underinvestigated" by quantitative methods (Weine & Kashuba, 2012), we used a combined quantitative and qualitative approach.

Methods

Population

This study was conducted as a cross-sectional survey of people who use drugs in Ottawa-Gatineau. People 18 years or older currently living in Ottawa-Gatineau, and who used illicit drugs in the past six months were eligible to enrol. Substance use was defined broadly in order to include participants from a wide spectrum of drug related vulnerability, and included use of marijuana only (for non-medicinal purposes), use of opioids, benzodiazepines or stimulants without a medical prescription or in a manner (frequency or route) not prescribed, use of crack cocaine, injection drugs, crystal meth or other illicit stimulants. Consumption of alcohol and cigarettes was recorded in addition to drug use. Exclusion criteria included being unable to give informed consent (being under the influence of drugs; evidence of coercion). Ethics approval was provided by the Ottawa Hospital Research Ethics Board.

Recruitment

Respondent-driven sampling (RDS) was used to recruit participants. A convenience sample of four seeds with at least one of the following characteristics was initially selected based on their community connectedness: Female, Aboriginal ethnicity, and history or current injection drug use. Nine additional seeds were selected during the study period to boost enrolment. Each seed and subsequent participant was provided with three referral coupons to be handed to peers eligible for the study. Participants received a 20$ gift card for completing the survey, and were eligible for a 5$ gift card for each successfully referred peer, to a

maximum of 15$. Participants were assigned a unique identifier composed of initials and year of birth, which was recorded in the recruitment log and on the participant's study coupon. Participants were invited to check in person or by phone approximately two weeks after survey completion for eligibility of redemption for recruitment efforts, and were asked to present their original study coupon as well as personal identification when redeeming recruitment incentives. Once all three recruitment incentives were redeemed, the original study coupon was collected by the study coordinators. Recruitment continued until the target sample size was reached. Participants were required to provide informed consent and complete an "Ethics checklist" (see Appendix A) aimed to assess motivation to participate and recruit, and identify evidence of coercion or harm resulting from the recruitment process.

Sample Size

Due to the exploratory nature of this study, effect sizes were not available. Standard sample size calculation was therefore based on a target to obtain a reasonably precise estimate of ±5%. Using a conservative estimate by assuming proportions of migrants or mobile individuals to be 50%, the sample size was calculated to be n=385, as shown in the following calculation:

$$n = p(1-p)\left[\frac{Z_{1-\alpha/2}}{E}\right]^2$$

$n = 0.5(1 - 0.5)\ [1.96 / 0.05]^2 = 385$

Data Collection

Data was collected by an interviewer-administered questionnaire (see Appendix A) at two sites in downtown Ottawa. Questions on mobility and migration, and effects on health, social support services and drug use were developed de novo based on literature review. Only one answer was allowed for each multiple choice question unless otherwise indicated. Multiple choice-type questions on mobility and migration were complemented by open-ended questions where participants were invited to elaborate on reasons for migration and travel, and their effects on health, access to social support services, and substance use. Demographic variables and details concerning substance use were collected. Participants were asked to provide a detailed history of lifetime migration (defined as a permanent change in location after $\geq$ 3 months of residing in one place), and mobility (defined as travel outside the Ottawa-Gatineau area for overnight or longer) in the preceding twelve months. Mobility within the metropolitan area was not captured. Migration and travel histories encompassed **all** types of geographic moves, including regional, inter-provincial or inter-territorial, and inter-national. Attributes of the migration process including push and pull factors and effect on health, drug use, and social supports were recorded for the last move (to Ottawa-Gatineau). Travel details were collected for the three most recent trips. Information on general health, hospitalizations in the past six months, self-reported HIV and Hepatitis C (HCV) status and access to health, social and harm reduction services was also collected.

Outcome Measures

Lifetime history of migration, and recent migration (within the last year) were used in the analysis. Push and pull factors identified through open-ended questions were categorized into themes by reasons for migration. History of travel in the past twelve months was used as the mobility variable. Outcomes included access to health services, access to social support services, and use of harm reduction services (if applicable), as well as history of hospital admission within the last six months. Health services use was defined as visiting a community health centre, the hospital emergency department, a public health clinic, a primary care physician, a medical specialist, or other health related service. Access to social support services included use of an outreach worker, alcohol or drug counsellor, social worker, or other social support worker. Harm reduction use was defined as accessing local needle and syringe programs or safe inhalation kit distribution sites, as applicable (for injection drug users and crack cocaine users, respectively).

Analysis

Outcome measures were compared between groups for lifetime history of migration, recent history of migration, migration reason, and history of travel. Groups were further stratified by current crack cocaine (smoked) or injection drug use using Cochran-Mantel-Haenszel method. Adjusted odds ratios are presented only when Cochran-Mantel-Haenszel Chi-square was significant. Population proportions were compared using Chi-square of Fisher's exact test, as applicable. Population means were compared using 2-sample t-test. Wilcoxon Rank

Sum test was used when continuous variables were not distributed normally. Statistical analysis was carried out using SAS statistical software (version 9.3, ©2002-2010 SAS Institute Inc., Cary, NC, USA).

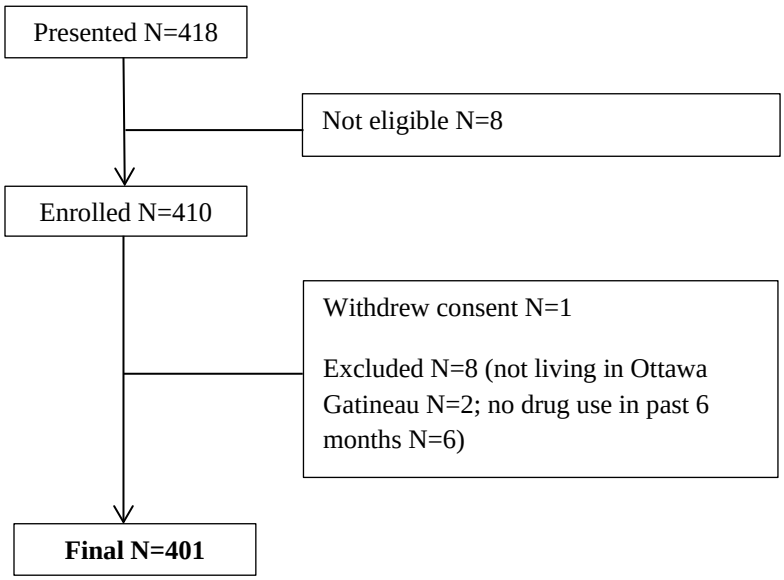
Proportional city maps were created with ESRI ArcGIS 10. City names were verified with Googlemaps Canada, DMTI, or the CGNDB for historical city names. When multiple cities shared the same name, the largest city was used (e.g. Victoria, BC, vs. Victoria, ON). Cities unmatched by geocoding were manually matched by renaming townships to their corresponding municipality names.). Aboriginal reserves and self-governance lands were identified from Census Canada 2006.

Results

Recruitment

Four-hundred and eighteen (418) potential participants presented for enrolment over a 12-week period, of which 410 were deemed eligible at enrolment. One participant withdrew consent, and eight were excluded after enrolment for not meeting inclusion criteria (Figure 1), leaving n=401 for analysis.

Figure 1: Enrolment



Because of slow recruitment from some seeds at the study onset, nine additional seeds were selected over the course of the study. Seeds included six women, seven current injection drug users, and five Aboriginal people. Recruitment was not uniform among seeds, as 71.7% of participants trace back to one seed. Table 1 shows select characteristics of seeds

(pre-defined), first-wave recruits, and subsequent recruits. Although analysis methods specific to RDS were not carried out, this table indicates that the final sample composition differed from the initial seeds and primary recruits with respect to certain participant characteristics.

Table 1: Characteristics of Seeds, primary and subsequent recruits

	Seeds (%)	Primary Recruits (%)	Subsequent Recruits (%)	Total N=401
Gender				
Male	7 (54)	13 (76)	296 (80)	316 (79)
Female	6 (46)	4 (24)	75 (20)	85 (21)
Ethnicity				
White	7 (54)	6 (35)	271 (73)	284 (71)
Aboriginal	5 (38)	9 (53)	82 (22)	96 (24)
Other	1 (8)	2 (12)	18 (5)	21 (5)
IDU				
Never	2 (15)	4 (24)	194 (52)	200 (50)
Previous	4 (31)	7 (41)	99 (27)	110 (27)
Current	7 (54)	6 (35)	78 (21)	91 (23)

Only 11.3% of participants recruited the maximum of 3 peers, while 41.2% recruited no one. Referral compensation was collected by 60.5% of participants, of which 93.5% redeemed all their eligible incentives.

Referral by relatives was the most potent motivator to participate in the study (39%), followed by a desire to help the community (34%) and the incentive (33%) (Table 2). Nearly half the participants cited helping peers access opportunity and financially through participation in the study as the most important motivator to recruit, while 35% were most motivated to recruit by the referral incentives (Table 3).

Table 2: Motivation to participate, (N=400)*

Motivation to participate	**N (%)**
Incentive	131 (32.8)
To help community, community activism	136 (34.0)
Self-help, reflection	35 (8.8)
Referral by relatives	156 (39.0)
Referral by support program	4 (1.0)
Experience and interest in research	70 (17.5)
To access information	8 (2.0)
To share own experience	32 (8.0)
To kill time	13 (3.3)
Unsure	4 (1.0)

*one questionnaire not completed

Table 3: Motivation to recruit, (N=400)*

Motivation to recruit	**N (%)**
Incentive	140 (35.0)
To help community, community activism	87 (21.8)
Self-help, reflection	11 (2.8)
Experience and interest in helping research	61 (15.2)
To help peers access information and opportunity	117 (29.2)
To help peers financially	78 (19.5)
To support community resources	9 (2.3)
To complete the study process	9 (2.3)
Depends on experience in study	8 (2.0)
Kill time	5 (1.3)

Unsure	34	(8.5)
No answer	2	(0.5)
Not motivated to recruit	2	(0.5)
N/a (not provided with recruitment coupons)	22	(5.5)

*one questionnaire not completed

None of the participants reported being coerced or forced to participate, and no participants reported experiencing any harm as a result of being asked to participate. There were no reports of use of the referral coupons as currency, although store-cards were on occasion being sold for cash. However, some participants indicated a preference for store-cards over cash as a participation and referral incentive.

Demographics and Risk Variables

Our sample included 21% women and 79% men, with a mean age of 43.3 years. Approximately one-quarter identified as Aboriginal and most (67.6%) reported English as their first language. Three-quarters of the population lived in the downtown core. Half of the participants reported having ever injected drugs, and 23% injected currently. Smoking crack cocaine was common among this population at 64%, and overall two-thirds smoked crack cocaine and/or used injection drugs at the time of enrollment (Table 4). Lifetime history of incarceration was prevalent at 84%, with 29% having been in jail, detention or prison with the past 12 months. More than half of the participants lived in unstable housing conditions, which included living in shelters, rooming or boarding houses, at a friend or partner's place, or on the street. Most (70.8 %) received support from social assistance or through the Ontario Disability Support Program (ODSP), although 18% reported no formal income.

Table 4: Types and frequency of drug used

Substance	**%Frequency** ***Never***	***Everyday / Most days***	***2-3 times / week***	***2-3 times / month***	***Once a month or less***
Alcohol	23.7	19.2	22.2	15.2	19.7
Cigarettes	11.0	85.6	2.5	0.5	0.5
Non-injection drugs					
Marijuana	17.7	49.1	16.5	10.0	6.7
Crack cocaine	35.9	17.5	17.7	13.5	15.5
Opioids	92.3	1.8	0.8	1.8	3.3
Benzodiazepines	91.5	1.8	1.3	1.3	4.2
Crystal Meth	96.3	0.8	0.8	0.5	1.8
Injection drugs					
Cocaine	77.5	3.0	3.5	4.5	11.5
Heroin	81.5	1.5	4.0	4.0	9.0
Opioids	23.0	26.0	10.0	13	28
Speedball	93.0	0.5	0.0	2.0	4.5
Crack Cocaine	83.0	3.0	4.0	4.0	6.0
Crystal Meth	97.5	0.0	0.0	0.0	2.5

Outcomes

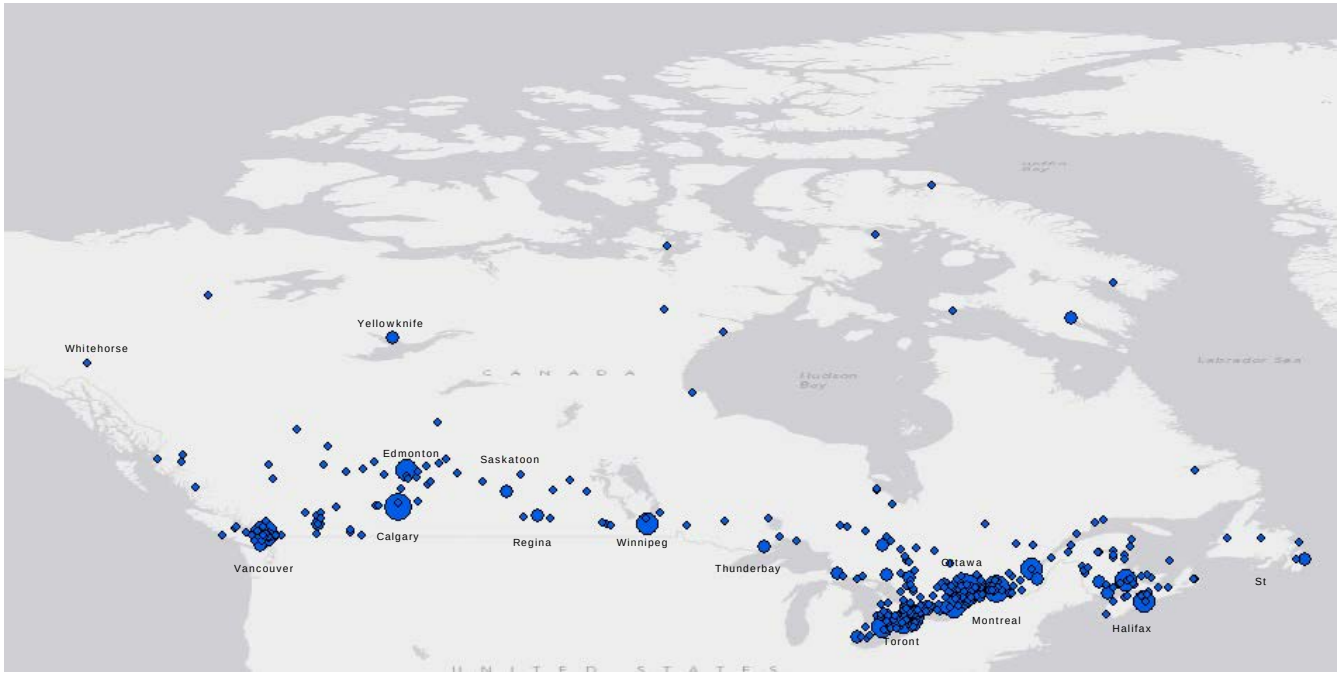
Overall self-reported HIV prevalence was low at 5.0%, however an additional 12% did not know their status. Twenty-nine percent (29%) of participants self-reported to be HCV-positive, however 14% did not know their status. Among people who inject currently, 13% and 71% were HIV and HCV positive, respectively. Although general health was reported as "good" or "fair" by most participants (35.9% and 28.2%, respectively), hospitalization rates were high: 15.5% of participants were hospitalized in the past six months, and were admitted a mean number of 2.3 times (SD 5.0). Community health centre was the most commonly used health service (45%), followed by hospital emergency department and family

physicians. Participants were poorly connected to social support services overall. Thirty five percent (35%) had no access to social supports currently, and one-fifth or less had access to a social worker, outreach worker or alcohol and drug counsellor.

Migration

The vast majority (91.5%) of participants reported a lifetime history of migration, and 17.8% had migrated within the last year. Mean lifetime frequency of migration was 6.53 (SD 9.64); two participants migrated over 100 times. Figure 2 shows all cities named during lifetime migration histories. Montreal to Ottawa-Gatineau, Toronto to Ottawa-Gatineau and Vancouver to Ottawa-Gatineau were the top three pathways of migration.

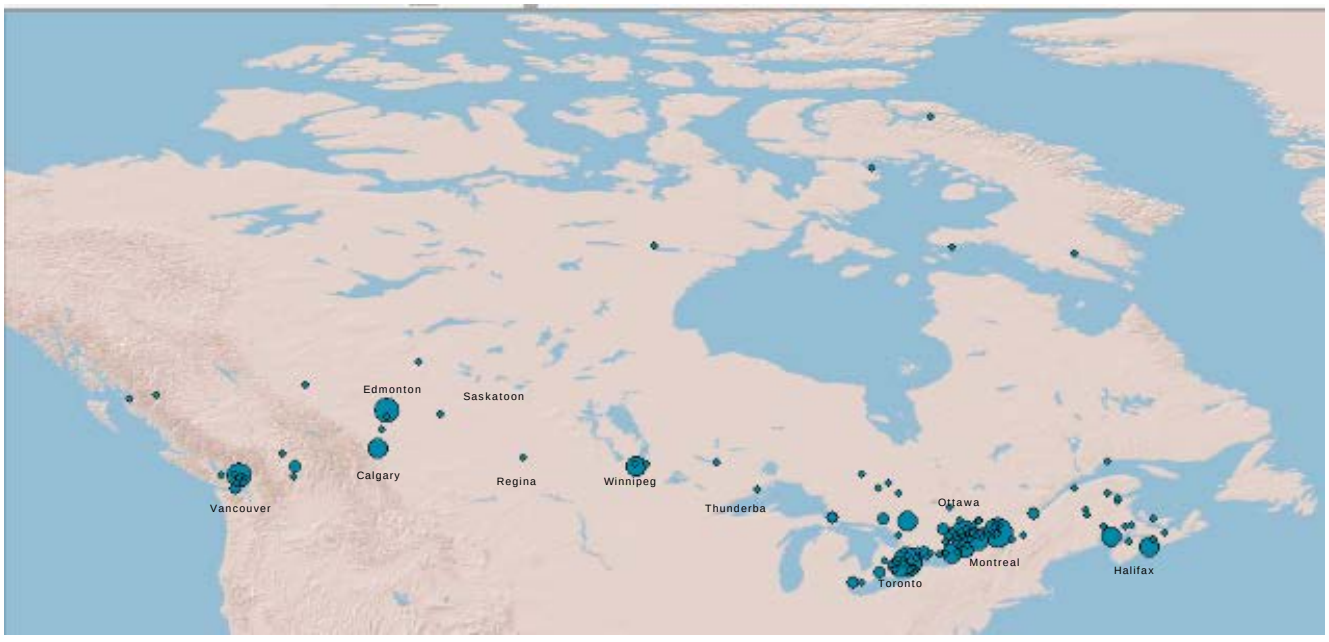
Figure 2: Lifetime migration destinations



LEGEND	
•	Cities frequented by 1-5 separate participants
•	Cities frequented by 6-17 separate participants
•	Cities frequented by 18-43 separate participants
•	Cities frequented by 44-116 separate participants
•	Cities frequented by 117-401 separate participants

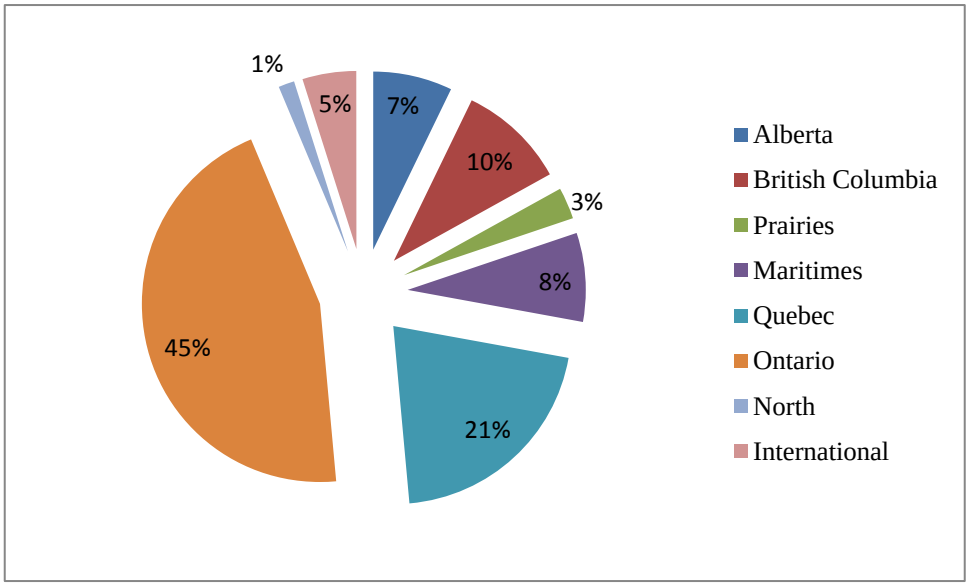
In order to determine participants' origins prior to moving to Ottawa-Gatineau, we mapped all 130 origins of the last migration with sizes indicated as proportional to the frequency of participants that migrated to Ottawa-Gatineau from a particular city (Figure 3). The vast majority (43%) of migrants moved to Ottawa from Ontario, nearly one quarter of those from Toronto alone (Figure 4). Twenty percent arrived from Quebec, however more than half of those migrated from Montreal. Vancouver was the third most common metropolitan origin with 14 participants out of 34 from British Columbia. There were 5% international migrants to Ottawa.

Figure 3: Last city prior to migration



LEGEND	
	Cities that 1-2 participants last migrated from
	Cities that 3-5 participants last migrated from
	Cities that 6-9 participants last migrated from
	Cities that 10-14 participants last migrated from
	Cities that 15-42 participants last migrated from

Figure 4: Origins of last migration, by region or province (n=367)



Among the 34 participants who never moved, 18 (52.9%) remained in Ottawa-Gatineau to stay close to family. Those who migrated were asked to identify push and pull factors relating to their last migration (to Ottawa-Gatineau). Connecting with family also proved to be the top reason to migrate and to move to Ottawa-Gatineau specifically. Escaping a harmful environment was another potent driver of migration, with 18.3% (67/367) participants leaving to get away from drugs or have a "fresh start," and 13.9% (51/367) to get away from a negative social circle (see Appendix B for examples of answers). Eighteen percent (17.9%) of participants were motivated to move because of loss of social support services at origin or to access resources elsewhere, but interestingly only

6.8% chose Ottawa-Gatineau for that reason. Tables 5 and 6 list reasons for moving and choosing Ottawa-Gatineau, respectively, for the last migration event.

Table 5: Reasons for moving away (last migration)

Reason*	**N=367 (%)**
For family	59 (16.1)
For partner	23 (6.3)
Friends / Access social circle	23 (6.3)
Work / work opportunities	57 (15.5)
Get away from drugs	40 (10.9)
Get away from social circle	51 (13.9)
To have a “fresh start”	27 (7.4)
Links to Ottawa / return “home:	19 (5.2)
Loss of resources / To access resources	66 (18.0)
Legal reasons	14 (3.8)
Way of life	9 (2.5)
To access drugs	1 (0.2)
Not own choice	30 (8.2)
Other (e.g. education, health)	16 (4.4)
Not specified	7 (1.9)

*Participants were allowed to state more than one reason

Table 6: Reasons for choosing destination (Ottawa-Gatineau)

Reason*	**N=367 (%)**
For family	75 (20.4)
For partner	17 (4.6)
Friends / Access social circle	18 (4.9)
Work / work opportunities	28 (7.6)
To access resources	29 (7.9)
Legal reasons	4 (1.1)
To access drugs	1 (0.2)
Perception of less drug / risk in OG	2 (0.5)
Links to Ottawa / "home"	56 (15.3)
City characteristics (e.g. size, location)	20 (5.4)
Other (e.g. education, health)	3 (0.8)
Not own choice	21 (5.7)
Not specified	90 (24.5)

*Participants were allowed to state more than one reason

When asked about plans to move away, 40% of participants expressed a wish to leave Ottawa-Gatineau permanently, however two-thirds of those had no immediate plans to move ("move in a year or after"). During qualitative data collection on reasons for wishing to move away, participants quoted a strong dislike of the city and lack of connectedness, along with a desire to connect to family elsewhere as the most common reasons for wishing to move away.

We asked participants to rate the effect of the last migration (to Ottawa-Gatineau) on health, drug use and access to social supports. Among those whose health was affected (56.9%), half of the participants experienced improvement in health, and half suffered a deterioration in health following the migration process. Seventy-one percent saw their drug use affected. Of those, 46.7% noted an increase in drug use after moving to Ottawa-

Gatineau, and 12.5% started to use drugs in Ottawa-Gatineau. Conversely, access to social services improved for approximately 73.5% of migrants whose access was affected by the migration process. Less than half (41.7%) did not note a change in access to services following the migration process.

Those who migrated during their lifetime were similar to non-migrants in all demographics except for language (Table 7). Francophones were less likely to have moved in the lifetime compared to those whose first language was English.

Table 7: Demographics for non-migrants vs. lifetime history of migration, (N=401)

		No migration History	Migration History	p-value
Age (mean, yrs)		44.6	43.2	0.51
Gender				0.09
	Male	23	294	
	Female	11	73	
Ethnicity				0.14
	White	26	246	
	Aboriginal	8	85	
	Other	0	36	
Incarceration				
	Ever (vs. never)	27 (vs.7)	309 (vs. 57)	0.46
	Lifetime number (mean)	9.8	10.6	0.84
	Last 12 months (vs. other)	11 (vs. 16)	86 (vs. 223)	0.34*
	Number of days in last 12 months (mean)	56.5	51.0	0.51*
IDU				
	Ever (vs. never)	19 (vs. 15)	182 (vs. 185)	0.48
	Current (vs. all other)	10 (vs. 24)	81 (vs. 286)	0.33
Other drugs				
	Crack cocaine and/or	25 (vs. 9)	245 (vs. 122)	0.42

	injection (vs. other)			
	Marijuana only (vs. other)	3 (vs. 31)	73 (vs. 294)	0.17
Education				0.43
	Any college / university	7	112	
	HS graduate	7	89	
	HS not completed	16	136	
	Elementary / grade school	4	30	
	None	0	0	
Income				
	Welfare (vs. no welfare)	13 (vs. 21)	102 (vs. 265)	0.20
	ODSP (vs. no ODSP)	13 (vs. 21)	156 (vs. 211)	0.63
Housing				0.66
	Own place	9	117	
	Friend / partner's place	3	13	
	Rooming / boarding house	4	50	
	Shelter	15	154	
	On the street / outside	1	17	
	Other	2	16	
Language				0.0013
	English	15	256	
	French	17	77	
	Other	2	34	

*non-normal distribution therefore Wilcoxon Rank Sum test was used

Outcomes (HIV and HCV sero-prevalence, self-reported general health, hospitalisations, and access to health, social and harm reduction services) were similar in those with lifetime history of migration and those without.

In order to test the hypothesis that specific push and pull factors associated with the migration process drive health risk and health risk behaviour, we categorized qualitative responses from Tables 5 and 6 and looked for associations with study outcomes. Push and pull factor categories are shown in Table 8. We found no significant associations between categories of push and pull factor and health outcomes, including general health, HIV and HCV sero-prevalence, and services use.

Table 8: Push and Pull Factor Categories

PUSH Factors	
Negative Environment	Get away from drugs Get away from social circle or family situation Get away from violence, abuse, law, police Loss of resources To have a "fresh start"
PULL Factors	
Family Connection	To be with family To visit family
Access to Resources	Access to treatment programs Access to health resources Access housing
Social Circle Connection	To visit with friends To join / move with partner General city environment "Home"
Work and Education	For work For work opportunities For education
Non-categorizable Factors	
Other	Not own choice (e.g. moved with parents) Under the influence when made the decision

Recent migration

When we compared recent (within the past year) migrants with remote migrants (migration more than one year ago) or those who had never migrated, we found that recent migrants were significantly younger and more likely to be male ($p<0.0001$ and $p=0.032$, respectively) (Table 9). Recent migrants were also more likely to experience unstable housing (86% vs. 59%, $p<0.0001$). The two groups did not differ in terms of ethnicity, history of incarceration or drug use.

Table 9: Demographics for recent migrants compared to remote or non-migrants, (N=398)**

		No recent migration 1yr	**Recent Migration**	**p-value**
Age (mean, yrs)		44.45	37.62	<0.0001
Gender				0.032
	Male	253	63	
	Female	74	8	
Ethnicity				0.62
	White	231	40	
	Aboriginal	69	22	
	Other	27	9	
Incarceration				
	Ever (vs. never)	276 (vs. 50)	58 (vs. 13)	0.59
	Lifetime number (mean)	10.4	11.0	0.64*
	Last 12 months (vs. other)	79 (vs. 197)	18 (vs. 40)	0.75
	Number of days in last 12 months (mean)	55.1	36.1	0.25*
IDU				
	Ever (vs. never)	171 (vs. 156)	29 (vs. 42)	0.08
	Current (vs. all	77 (vs. 250)	14 (vs. 57)	0.49

	other)			
Other drugs				
	Crack cocaine and/or injection (vs. other)	224 (vs. 103)	43 (vs. 28)	0.19
	Marijuana only (vs. other)	65 (vs. 262)	11 (vs. 60)	0.50
Education				0.95
	Any college / university	96	23	
	HS graduate	79	17	
	HS not completed	125	25	
	Elementary / grade school	27	6	
	None	0	0	
Income				
	Welfare (vs. no welfare)	86 (vs. 241)	29 (vs. 42)	0.0142
	ODSP (vs. no ODSP)	154 (vs. 173)	13 (vs. 58)	<0.0001
Housing				<0.0001
	Own place	119	6	
	Friend / partner's place	12	4	
	Rooming / boarding house	44	10	
	Shelter	124	43	
	On the street / outside	14	4	
	Other	14	4	
Language				0.87
	English	220	49	
	French	78	15	
	Other	29	7	

*non-normal distribution therefore Wilcoxon Rank Sum test was used

**date of last migration event missing for 3 participants

We did observe important differences in health outcomes between recent migrants (within the last year) and those with no or remote history of migration ("non-recent migrants"). Recent migrants were less likely to be HCV-positive. Adjusting for drug use showed that this effect was driven by the group using high risk drugs (crack cocaine and/or injection drug use). There were also no differences in self-reported HIV prevalence and general health between recent and non-recent migrants. Both groups experienced similar access to health care and social support services, but harm reduction use was significantly less prevalent in recent migrants (Table 10).

Table 10: Outcomes for recent migrants compared to remote or non-migrants

Outcome	**Crude OR (95% CI)**	**Adjusted OR (95% CI)**	
		No High Risk Drugs	***High Risk Drugs***
HIV positive	0.25 (0.03 – 1.87)		
HCV positive	0.38 (0.19 – 0.75)	0.14 (0.01 – 2.47)*	0.46 (0.22 – 0.96)*
Hospitalization in the past six months	0.75 (0.35 – 1.60)		
Fair or poor general health	0.91 (0.54 – 1.5)		
Health care services use	0.76 (0.41 – 1.41)		
Social support services use	0.80 (0.47 – 1.36)		
Harm reduction use	0.54 (0.32 – 0.91)	1.74 (0.49 – 6.14)*	0.38 (0.19 –0.77)*

* Because Breslow-Day test showed non-homogeneity, the effect of recent migration on this outcome was analyzed separately among those who use high risk drugs and those who use other drugs.

Mobility

Mobility was less prevalent than migration in our study populations. Of our sample, only 32.4% had travelled in the past twelve months, with a mean=1.63 (SD 6.18) number of trips and mean trip duration of 10.4 days (SD 19.57). A similar proportion (37.2%) planned to travel in the next six months. Travellers did not differ from non-travellers in demographics (Table 11) except in age and receipt of social assistance.

Table 11: Demographics by travel history in preceding twelve months, (N=401)

		No travel	**Travel**	**p-value**
Age (mean, yrs)		44.3	41.3	0.013
Gender				0.17
	Male	209	108	
	Female	62	22	
Ethnicity				0.17
	White	183	89	
	Aboriginal	59	34	
	Other	29	7	
Incarceration				
	Ever (vs. never)	227 (vs. 44)	109 (vs. 20)	0.85
	Lifetime number (mean)	10.5	10.6	0.77*
	Last 12mths (vs. other)	69 (vs. 158)	28 (vs. 81)	0.37
	Number of days in past 12 months (mean)	53.8	46.2	0.98*
IDU				
	Ever (vs. never)	136 (vs. 135)	65 (vs. 65)	0.97
	Current (vs. all other)	60 (vs. 211)	31 (vs. 99)	0.70
Other drugs				
	Crack cocaine and/or	188 (vs. 83)	82 (vs. 48)	0.20

	injection (vs. other)			
	Marijuana only (vs. other)	53 (vs. 218)	23 (vs. 107)	0.66
Education				0.07
	Any college / university	70	49	
	HS graduate	67	29	
	HS not completed	107	45	
	Elementary / grade school	27	7	
	None	0	0	
Income				
	Welfare (vs. no welfare)	69 (vs. 202)	46 (vs. 84)	0.04
	ODSP (vs. no ODSP)	122 (vs. 149)	47 (vs. 83)	0.09
Housing				0.28
	Own place	83	43	
	Friend / partner's place	10	6	
	Rooming / boarding house	30	24	
	Shelter	123	46	
	On the street / outside	13	5	
	Other	12	6	
Language				0.56
	English	179	92	
	French	65	29	
	Other	27	9	

*non-normal distribution therefore Wilcoxon Rank Sum test was used

Those who did not travel identified financial constraints (59.4%), access to social supports such as housing and other support services (41.5%), health concerns (30.0%), and drug-related issues including access to drugs (28.5%) as reasons for staying in Ottawa-Gatineau. A large proportion (23.2%) of participants also chose not to travel in order to stay

close to family, friends and "home." Reasons for travelling are listed in Table 12. Visiting family and friends was the most important motivator for travel in this population.

Table 12: Reasons for travel

Reasons for Travel	**N=248 (%) (Participants, total all three trips)**
Visit family or friends	125 (50.4)
To access resources / treatment	10 (24.8)
Entertainment / Vacation	39 (15.7)
Work	25 (10.1)
Get away from drugs or negative environment	8 (3.2)
Other (including legal reasons)	15 (6.0)
Not specified	26 (10.5)

The 130 participants who travelled took a total of 248 trips. Most trips were taken within Ontario (140/248) and Quebec (86/248). Toronto and Kingston were the most frequently visited cities in Ontario, and Montreal and Quebec City in Quebec. Participants infrequently travelled to Nunavut (2), Western Canada (17), the Maritimes (8) and internationally (5). Participants typically stayed with family and friends (60.0% of trips), but a large proportion (23.2%) of travellers experienced unstable housing during their trips.

Participants reported on travel effects on health, drug use and access to social supports, as shown in Table 13.

Table 13: Qualitative travel effects

Effect reported		Trip1 N=136	Trip2 N=74	Trip3 N=18	Total N=248
Health					
	Better	35	19	10	**64**
	Worse	21	13	8	**42**
	Not specified	4	0	0	**4**
	No effect	*76*	*42*	*32*	***138***
Drug Use					
	Less	51	25	11	**116**
	More	24	15	12	**50**
	Not specified	5	1	1	**7**
	No effect	*56*	*33*	*26*	***103***
Supports					
	Better	13	5	1	**19**
	Worse	12	8	6	**26**
	No effect	*111*	*61*	*43*	***203***

Health was affected by travel in less than half of participants, with approximately 60% citing a positive effect. This was mostly attributed to improved mental and emotional well-being, family supports and being away from the Ottawa-Gatineau environment. Those who experienced a negative effect on health experienced housing issues, no access to resources and supports, stress related to travel itself, an increased drug use. Of those whose drug use was affected by travel (58.5%), most used less often while travelling. Reasons for using less included not wanting to use in front of family members and traveling for work. Trips that led to an increase in drug use were those taken for the purpose of "partying." Social supports were affected only in a small proportion of trips, and the direction of effect varied by travel destination. Participants benefited from better access to social supports in Vancouver, BC, but experienced limited access to social services support in smaller

communities or where a language barrier existed (e.g. Montreal, QC). Lack of adequate housing while travelling was raised as a particular concern.

Travellers were younger than non-travellers (mean age 41.3 vs. 44.3 years, p=0.013), but did not otherwise differ in terms of demographics. Participants receiving social assistance but not the Ontario Disability Support Program were also less likely to travel (p=0.04). There were no differences between travellers and non-travellers in unadjusted HIV and HCV prevalence, general health, hospitalizations, health care service use and harm reduction use (Table 14). After adjustment for smoking crack cocaine and/or injection drug use, the odds of being HCV positive were significantly lower in travellers than non-travellers among people not using high risk drugs. There was a trend towards significance in less access to social services in those who travelled compared to those who did not (OR = 0.65, 95%CI (0.42 – 1.01)). When adjusted for drug use, the odds of accessing social support services among participants using crack cocaine or injection drugs were significantly lower in those who travelled compared to those who did not.

Table 14: Outcomes for travel (compared to no travel)

Outcome	Crude OR (95% CI)	Adjusted OR (95% CI)	
		No High Risk Drugs	***High Risk Drugs***
HIV positive	0.68 (0.24 – 1.92)		
HCV positive	1.21 (0.76 – 1.92)	0.06 (0.01 – 0.46)*	1.04 (0.61 – 1.76)*
Hospitalization in the past six months	0.94 (0.62 – 1.45)		
Fair or poor general health	0.99 (0.56 – 1.77)		
Health care services use	0.76 (0.45 – 1.29)		
Social support services use	0.65 (0.42 – 1.01)	0.92 (0.45 – 1.90)*	0.55 (0.32 – 0.95)*
Harm reduction use	0.70 (0.46 – 1.07)		

* Because Breslow-Day test showed non-homogeneity, the effect of recent migration on this outcome was analyzed separately among those who use high risk drugs and those who use other drugs.

Discussion

This study is the first to characterize mobility and migration patterns and their effect on health and social outcomes among people who use drugs in Ottawa-Gatineau. Inclusion criteria (any drug use in the past six months) for this study were kept intentionally broad in order to increase our reach. This allowed us to focus on an inner-city population as a whole, and capture individuals vulnerable to increasing risk behaviour. Including those individuals in our study helped shift the focus from immediate, individual-level risk to upstream structural factors that shape participants' vulnerability.

Our results show that Ottawa-Gatineau harbours an inner-city population at considerable risk for adverse health outcomes, as fuelled by individual risk behaviour as well as unfavourable socioeconomic factors. Even though substance misuse patterns varied greatly in terms of drug type and frequency of use, history of incarceration, unstable housing and limited income were prevalent. Indeed, a large proportion of participants experienced limited access to social support services and high hospitalization rates. Compared to previous studies, our overall HIV and HCV prevalence was lower than expected. While positive HIV or HCV status may have been underreported, self-reported seroprevalence rates matched those of other studies when adjusted for injection drug use. Similar to previous studies (Magis-Rodriguez, et al., 2004) (Yang, 2006), migrants tended to be younger and male.

We also described a highly mobile population, with over 90% reporting a lifetime history of migration and nearly 20% having migrated within the past year. This is in high contrast to the general population of Ottawa-Gatineau, where only 4.3% reported a migration

history within the previous year (Statistics Canada, 2006). Recent migrants may be underrepresented as they are less likely to be connected to a social network and thus included in the study. Previous reports have identified Aboriginal people as a particularly vulnerable population sub-group. The proportion of participants identifying as First Nations, Métis or Inuit was much higher than that of the general Ottawa-Gatineau population (23.2% vs. 1.6%, respectively) (Statistics Canada, 2010), however we did not identify any significant associations between Aboriginal status, migration variables and health outcomes, including drug use.

While participants moved throughout Canada, lifetime migration from Montreal and Toronto to Ottawa-Gatineau was most frequent, likely because of close proximity and access to transportation. It is interesting to note that Vancouver was quoted as the third most common origin, given the high quantity and quality of support services available there. Vancouver does, however, harbour an intense drug environment within its downtown east side from which several participants may have attempted to escape. The majority of participants moved from within Ontario and would have experienced no change in eligibility for provincial health and social support services. Drug users arriving from out-of-province face logistical barriers to access to extended health and social resources addition to those caused by disruption of support networks as a result of the migration process itself. Although the cross-sectional nature of this study did not allow for characterization of the dynamic interplay of individual and structural level factors that lead to migration over time and place, this is one of the first to describe geographic migration and mobility patterns extending beyond metropolitan and regional boundaries. As a result of broadening the geographic scope, this study did not focus on intra-city mobility and migration. Although there is

evidence to support that “place” as determined by neighbourhood characteristics and social micro-networks influence health risk behaviour, health outcomes and access to social support services (Cohen, et al., 2003) (Egan, et al., 2011) (Havens, et al., 2011) (Kim, 2008) (Latkin, et al., 2004) (Nasir & Rosenthal, 2009) (Pabayo, et al., 2013) (Rhodes, 2009) (Rogers, et al., 2012) (Sampson, et al., 1997), one would presume that migration and mobility effects on social and physical support network disruption are more pronounced secondary to inter-city, inter-regional and international movement.

Participants with lifetime history of migration reported increased drug use following the migration process, with some participants initiating drug use in Ottawa-Gatineau. At the same time, access to social support services improved as a result of the migration process. Interpretation of these findings with respect to current risk and outcomes is limited as we did not collect information of temporality. It is conceivable that drug use increased immediately after arrival, but that over time participants benefited from local social support services. Nevertheless, overall access to social support services among the study population remained generally poor, indicating a need to enhance visibility and access to these important resources.

We identified recent migrants as a particularly vulnerable subgroup among people who smoke crack cocaine and/or inject drugs. Following migration, these individuals are thought to undergo a period of adjustment to the new environment, which can lead to significant stress and taxation of adaptive resources (Paschane & Fisher, 2000). Our study showed recent migrants who smoke crack cocaine or inject drugs to be significantly less likely to use harm reduction services than their more established counterparts. Paschane et al

(Paschane & Fisher, 2000) similarly identified a six-fold increase in likelihood of sharing injection equipment during this adjustment period. This risk behaviour may largely be influenced by both lack of established social networks among drug users, and low access to social support and harm reduction services. For participants wanting to escape a negative environment at origin and hoping for a "fresh start" at destination, long wait times for low-income housing and drug addictions treatment centres, in addition to logistical barriers created by prohibitive admission criteria, may thwart any reasonable effort to avoid renewed entrenchment into the local drug scene and its associated risk environment. Efforts to increase awareness among recent migrants of locally available resources and removing barriers to accessing these services may offset the heightened risk profile that drug users experience during the adjustment period. A "one stop shop" facility that hosts an array of services, ranging from harm reduction, addictions treatment, primary health care, social support services, housing and logistical support, for example, may improve accessibility, efficiency and quality of service delivery by geographic proximity of complementary service thus minimizing delay in access, redundancy, and enhancing visibility. Such a facility could also serve as a hub of positive social networks, laying the foundation for individuals to build social capital.

Migration can be considered a catalyst of change. The effect of migration on vulnerability and risk may be partly determined by the conditions surrounding the migration process as opposed to the migration process itself. The interplay between specific structural and individual level "push and pull" factors may either positively or negatively influence post-migration outcomes. While quantitative analysis of push and pull factors and study outcomes showed no significant associations, several important themes were identified using

qualitative tools, including open ended questions on reasons for moving and associated effects on health, substance use and access to services. Escaping from a drug or harmful environment was a common driver of migration in our study. At the same time, presence of family at destination exerted a significant "pull" effect. Studies in cities with well-established "drug neighbourhoods" such as Vancouver described a desire to be involved in local drug scenes as an attractant (Kerr, et al., 2009). In contrast, Ottawa-Gatineau was largely thought of as "home," a place of family, and a "quiet" city. Interestingly, a large proportion of participants expressed a wish to move away from Ottawa-Gatineau for the same reasons that initially drove them away from their last location. This raises the concern that connections with positive support networks, including family, were not established.

Mobility was less common than migration in our population. Similar to migrants, those who travelled were younger. Financial constraints, and specifically being on welfare, represented a major barrier to travel. Those who did travel predominantly visited nearby cities including Toronto and Montreal. The latter was particularly thought of as a "party" city, where participants engaged in intense drug use. Lack of housing during travel placed some individuals at greater risk. Among those who smoke crack cocaine or inject drugs, travellers were significantly less likely to be connected to social support services locally and at destination compared to non-travellers, highlighting the fact that short-term mobility also impacts vulnerability. Similar to migration, participants travelled primarily to visit family or friends. This group reported a decrease in drug use when surrounded by family members and an overall improvement in emotional health while traveling, again highlighting the positive role family can have on individual risk behaviour. Conversely, those who enjoyed strong connections with family members locally refrained from travelling. Similar to migration,

mobility can be considered a catalyst for change. Depending on the specific push and pull factors, travel can thus be considered an agent of vulnerability or resilience. How mobility effects modulate individual risk and vulnerability over time remains unknown.

Persons who are mobile or who migrate may experience significant disruptions in their social networks, leading to social isolation at destination and/or upon return. Social exclusion is known to magnify social disadvantage, which in turn reinforces health inequity (WHO, 2010). Social networks can offset the deleterious effects of social exclusion, and are instrumental in shaping an individual's vulnerability to environmental stressors. Several studies have documented a protective effect of presence and size of social network towards non-fatal overdose among people who use (Pabayo, et al., 2013) (Havens, et al., 2011). Although presence and size are important, quality of the social network ultimately dictates the direction of its effect on vulnerability. Positive networks have been associated with a lower likelihood of substance misuse in female youths (Mason, et al., 2010) and non-fatal overdose in drug users. In contrast, social networks that include a high density of injection drug users have been shown to exert a negative influence on individual behaviour and health (Cohen, 2004) (Latkin, et al., 2004) (Umberson, et al., 2010). Positive or enabling social networks are fundamental in building social capital, and provide an important counterbalance to experienced discrimination, stigma and social isolation all of which act to reduce social capital (Webber, et al., 2013). There is evidence to suggest that investing in positive social networks can increase social capital and consequently lead to economic gains (Flap, 1999), positive behaviour (Zambon, et al., 2010), and strengthening of social status and identity (Song, 2011). It is thus conceivable that interventions that strengthen positive social relationships and network can lead to improved health outcomes (Webber, et al., 2013).

Data presented in this study suggests that positive relationships with family did not materialize into reliable and supportive social networks. Further research on why these connections failed to develop may identify important steps along the trajectory of increasing risk. Smith et al. (Smith & Rapkin, 1996) have demonstrated that male injection drug users had smaller network sizes and relied on family as much as friends, in contrast to men at risk for HIV through heterosexual contact who sought support from more traditional family sources. They identified several barriers that impeded positive support through family member leading to unmet desires to connect, including high interpersonal costs of receiving support, geographic isolation or unavailability, stigma from family, and history of negative interactions. There appears to be a role for early interventions aimed to foster positive and lasting relationships with family members and other support figures before individuals become entrenched in the same environment they were trying to leave behind. Examples of such interventions are family conflict resolution, social network counseling combined with motivational interviewing, and reinforcing a positive structural environments, e.g. access to low income housing, that promote both "geographic and social rootedness" (Keene, et al., 2010). Motivational interviewing is a counseling technique that addresses ambivalence to change by examining barriers to and eliciting a person's own interest in making changes, e.g. substance use. Combining motivational interviewing with social network counseling, wherein a person's social network size, composition and effect on behaviour is analyzed, has shown promise in reducing substance related risk behaviour and increased readiness for receiving further counseling and support in adolescents (Mason, et al., 2011).

Using respondent-driven sampling, we recruited a large and diverse sample of people who use drugs. Compensation for survey completion and referral was an important motivator, yet not the only or most important one for recruitment. We showed that the main reasons for study participation and referral emanate from a strong sense of solidarity to the community and interest in helping its members as well as the community as a whole. This study is one of the first to formally document evidence of risk associated with RDS. There is no evidence that the RDS process led to undue risk among the study participants. Although potentially under-reported, coercion or harm related to the recruitment process was not identified. We did not observe coupons being used as currency, which would have biased our study towards inclusion of more financially disadvantaged persons.

Our study has several limitations. While RDS has been shown to harbour fewer biases than more traditional sampling methods (Heckathorn, 1997) (Heckathorn, 2002) (Heckathorn, 2007), certain limitations remain. Firstly, recruitment bias may have been introduced by differential recruitment by seeds. If recruitment patterns truly matched association patterns, this would negatively affect the diversity of our sample. Heterogeneity in recruitment degree would have increased the likelihood of well-connected members to be included, however this was curtailed by limiting maximum number of coupons to three. We also observed several participants distributing coupons to strangers. Because of this occurrence, the assumption underlying RDS that participants recruit from their peer network is not entirely valid. We have therefore chosen not to present odds ratios adjusted for personal network size. Our survey was only offered in English, hence we may have missed a francophone sub-group that may be particularly poorly connected to services because of language barriers.

Secondly, RDS operates under the theory that the sample population can reach independence from its seeds after a certain number of waves of recruitment and by adjusting for personal recruitment network size (Heckathorn, 1997) (Heckathorn, 2002) (Heckathorn, 2007). Adjustment for personal network aims to reduce recruitment bias by accounting for the different inclusion probabilities based on a participant's social network size. This theory rests on the assumption that personal network size is constant over time and indeed accurately known by each individual. Secondly, social network size may not be the sole determinant of probability of inclusion. Network structure, network dynamics and network density also affect inclusion probabilities but are not routinely measured (Abdul-Quader, et al., 2006) (Goel & Salganik, 2010) (Rudolph, et al., 2013). Biases in RDS-weighting by social network size alone may still be introduced by discrepancy of in-degree and out-degree of social networks (i.e. ties named by a participant are not reciprocal), and non-random recruitment from within the social network by selecting recruits with close ties, willingness to help particular recruits, or recruit characteristics, for example. Lastly, there is evidence to suggest that there exists recall bias for personal network size that increases with increasing network size (Rudolph, et al., 2013). We feel this assumption does not always hold true, and therefore chose not to perform an RDS adjusted analysis and account for personal network size, but to clearly recognize the limitations of the recruitment process and potential biases.

Sampling frames are unavailable for hidden populations, thus it not possible to determine whether our sample accurately represented the population of interest. Because effect sizes are unknown, the sample size calculated for this study relied on approximately equal proportions of migrants and non- or remote migrants. Proportions of comparison

groups were unbalanced, as over 90% of the participants had a lifetime history of migration. This limited the power of the analysis to detect any differences in study outcomes between groups, especially when outcome measures occurred infrequently (e.g. HIV positive status). For this reason, and because there is evidence to suggest that health of migrants approximates that of the host or receiving population over time, analysis was carried out comparing recent migration (with-in the past year) to remote or no migration.

Using a cross sectional study design may have introduced recall bias. There is evidence to suggest that events occurring more than six months before the survey time-point are reported less accurately (Groves, et al., 2009). For this reason, most variables involving risk behaviour in this study are evaluated for occurrence within the six months preceding the interview. We aimed to further minimize recall bias by focusing on attributes of the most recent migration process and on current drug use behaviours and access to support services. The cross-sectional nature of this study only allows for a limited characterization of risk and resilience along a temporal geographic trajectory, and causality cannot be inferred. A prospective cohort would allow for a more comprehensive assessment of upstream structural and personal level factors associated with the migration process and their impact on individual level risk and vulnerability in real-time.

Self-reporting of HIV and HCV status, hospitalizations, and general health may lead to an underestimation of these health measures, especially when associated with stigma in the case of HIV or HCV, and can lead to social desirability bias in the responses. However, studies have shown that self-reported HIV status, for example, is a reliable surrogate for HIV testing among several high risk groups, including injection drug users, sex workers and men

who have sex with men (Anthony, et al., 1991) (Latkin, et al., 1993) (Salani-Mota, et al., 2011) (Vanable, et al., 2008). Linking to health databases may allow for more accurate capture of measurable health outcomes, but is limited to participants with a valid health card.

The use of surveys that contain sensitive questions (e.g. drug use, sexual practices) can lead to socially desirable responses resulting in social desirability bias, although some studies support self-reported drug use as a reliable measure (Weatherby, et al., 1994). In order to maximize accurate responses in our study, interviews were conducted by interviewers with community knowledge, in secure locations. Placing more sensitive questions near the end of the interview allowed for the development of some rapport between the interviewer and the participant. Only one visit was required to complete the questionnaire, so incomplete data due to loss of follow-up is not a concern. Lastly, generalizability to other urban communities that harbour vulnerable population subgroups such as people who use drugs may be limited, where migration associated health behaviour may be driven by unique local environmental factors (geographic, economic, social, political).

Conclusion

In this study we have shown that within a broad cohort of people who use drugs in the Ottawa-Gatineau region, subjects are a highly mobile group, and mobility is associated with increased risk behaviour. Both the act of moving itself and the conditions under which the migration or mobility process takes place impact individual level risk and vulnerability. This vulnerability is greatest in the period following migration. While push and pull factors may vary by place, a common theme identified in this study is the perceived and actual positive influence of family. Public health strategies generally aim to reduce harm by targeting individual risk behaviour (e.g. needle exchange), but often fail to identify and address distal structural factors. An understanding of the complex interplay between upstream environmental factors and their influence on the process of increased individual risk behaviour would identify additional opportunities for intervention. When applied to the concept of mobility and migration, this could contribute to a better understanding of how push and pull factors influence a person's decision to move, the move itself, and the period following the migration and mobility process when drug users appear most vulnerable. Further research employing qualitative methods may provide added insights into the role of family in modulating vulnerability through social connectedness and support among drug users as they navigate the mobility and migration process.

Final Conclusion

Migration and mobility processes are strongly associated with health related vulnerability and resilience as experienced by people who use drugs, and interactions between mobility and migration processes and health related outcomes are highly complex. Few studies in Canada have examined this relationship, and there is no research available addressing this specific aspect of health and well-being in people who use drugs in Ottawa-Gatineau. The effects and consequences of mobility and migration are of particular interest in this local community, as Ottawa-Gatineau includes a large proportion of migrants from other Ontario and Quebec communities, as well as from First Nations, Métis and Inuit communities (Statistics Canada, 2006). In our study, participants moved to Ottawa-Gatineau from all over Canada and other countries, and for a wide variety of reasons. Understanding how the reasons for mobility and migration and the processes itself impact on the local community is invaluable for informing intervention in terms of type, location and timing and identifying solutions to reduce the inequalities resulting in and from the migration process. At origin, increasing low-income housing, de-criminalization of certain drug-related behaviours, providing opportunities for alternate, legal income generation, facilitating access to treatment and harm reduction services locally, fostering advocacy, and strengthening and broadening positive community support networks may significantly reduce the "push" towards migration. Any of the aforementioned measures also need to be implemented at destination or else the moving cycle continues indeterminately. If migration does occur, then attention needs to be given that high risk individuals, particularly recent migrants or those already

further along the risk trajectory, including people who smoke crack cocaine or inject drugs, become integrated into a positive social support network upon arrival. The role of family, both as a "pull" factor at initiation of the migration and mobility process, and as a potential catalyst to social integration or isolation on arrival, needs to be further explored.

In contrast to other research that has mainly focused on people who inject drugs in particular, our inclusion criteria of "any drug use" allowed for the sampling of a broader inner-city population with members experiencing varying degrees of vulnerability. Heavy alcohol consumption, non-injection drug use, and homelessness are known stepping stones to higher risk activities such as injection drug use and sex work and associated harms (Anthony, 2012) (Baral, et al., 2013) (Cheng, et al., 2013) (Malta, et al., 2008) (Pauly, et al., 2013) (Shannon, et al., 2009) (Vanyukow, et al., 2012). Including this population in our study helped shed light into the needs of a generally vulnerable population, an important first step in targeting prevention efforts aimed at modulating structural influences that shape individual risk trajectories.

RDS allowed for the rapid recruitment of participants in this study. While this process has been applied worldwide in the sampling of hidden population, among sex workers (Reed, et al., 2012) (Simic, et al., 2006) (Weir, et al., 2012) and people who use drugs in particular (Abdul-Quader, et al., 2006) (Burt & Thiede, 2012) (Frost, et al., 2006) (Hathaway, et al., 2010) (Kral, et al., 2010) (Lansky, et al., 2007) (Malekinejad, et al., 2008) (Oteo-Perez, et al., 2012) (Platt, et al., 2006) (Rudolph, et al., 2011) (Stormer, et al., 2006) (Wang, et al., 2005) (Wang, et al., 2007), it has only been applied once in the Ottawa area (McWilliam, et al., 2008) (Pilon, et al., 2011). Using RDS for this study, aside from its

methodological advantages, confirmed its utility in accessing local, hidden populations, although the absence of a sampling frame precludes any conclusions on whether our sample was representative of the population of interest. Considering the high level of risk already faced by members of this population, we formally documented ethical implications of using RDS as a recruitment strategy. There was no evidence that the RDS process or study participation led to undue harm among participants.

Summary

Our study identified a heterogeneous inner-city population of people who use drugs where widespread homelessness, incarceration, low income and a high degree of mobility and migration placed individuals at varying levels of health-related vulnerability. Multiple factors were involved in the decision to migrate and in choosing Ottawa-Gatineau in particular. Escaping a negative environment and seeking out family connections were the most commonly cited "push and pull" factors, respectively. Maintaining family connections was also identified as a major reason for mobility or lack thereof among travelers and non-travelers alike. There was evidence to suggest that the mobility and migration processes affected health, drug use and access to resources among some of the participants. Using quantitative methods, we found crack cocaine and injection drug users who migrated recently to be poorly connected to harm reduction services and thus at particularly high risk for blood-borne infections and other drug-related harms. Similarly, participants using crack cocaine or injection drugs and who traveled were significantly less likely to access social support services. No associations were apparent between specific push and pull factor categories and health outcomes. Environmental and individual level factors are likely to exert their influence on individual vulnerability through dynamic and reciprocal processes that vary over space and time. As such, quantitative measures may be ill-fitted to provide a comprehensive understanding of the complex interplay of factors resulting in, and affecting the outcome of mobility and migration processes. Further research employing qualitative methods may provide further insights into the role of specific factors and their impact on

vulnerability among drug users while they navigate through the mobility and migration process.

Implications

This study is the first to describe mobility and migration patterns and their impact on health and social outcomes in a population of drug users in Eastern Ontario. Keeping inclusion criteria broad with respect to drug use allowed for comprehensive characterization of an inner-city population, with members at varying levels of risk for adverse health outcomes. Studies investigating for links between drug use and health and social outcomes often focus on those who inject drugs and who are at immediate risk of drug-related harms such as overdose and blood-borne infections. This in turn narrows the scope of possible interventions towards harm reduction strategies that are geared towards modifying individual level risk behaviour, e.g. through needle and syringe exchange. Including people with any drug use in this study showed that this population faces a disproportionate burden of ill health as evidenced by high hospitalization rates. Homelessness and history of incarceration, which were prevalent in this population, place individuals further along the trajectory of risk and vulnerability. These findings help shift the attention toward upstream structural factors that need to be addressed, for example by increasing availability of low-income housing, in order to prevent further downstream harms.

This holds particularly true as these factors relate to mobility and migration. Our findings indicate people who use drugs to be a highly mobile population, and access to resources (including housing) or escaping from the law represent triggers for migration and travel. Addressing upstream environmental determinants at origin thus may reduce mobility and migration and its associated effects on health and social services use. A comprehensive national strategy that addresses socioeconomic disadvantages and inequities of health among

all drug users across boundaries is needed to avoid geographic and socio-political fragmentation of services. Unequal access to care, services and opportunity leads to the creation of pockets of high and low risk environments, which in turn drive people from one place to another.

Our findings highlight the important role social networks play in both sending and receiving communities. Negative social networks marked by violence, abuse, drug use, and discrimination function as powerful push factors, while positive networks formed with family and a sense of "home" exert significant pull. To date, strategies to decrease risk among drug users largely aim to contain negative environmental and individual level determinants. The apparent draw of family as a "way out" of the drug scene points to the need for interventions that foster positive relationships and resilience (as opposed to striving for absence of harmful influences). These may include family counseling and social-network based motivational interviewing (Mason, et al., 2011).

This study underlines the heightened disadvantages faced by recent migrants as they learn to navigate their new environment. Recent migrants, specifically those using high risk drugs, are experiencing barriers in accessing harm reduction services above those already experienced by locals. New arrivals to the city may not be familiar with available health and social resources, or be too preoccupied to establish social networks for immediate gains (e.g. procurement of drugs). A "one stop shop" facility that houses harm reduction, primary health care, addiction services and social services, had been suggested by one participant. Such a facility would increase visibility of services, facilitate timely access, and provide a first link to additional and more targeted community supports.

Following dissemination of the study's findings, consultation with community members and stakeholders will be key in determining next steps in designing, implementing and evaluating interventions that target migrant and mobile drug users or address upstream "triggers" of mobility and migration processes. Secondly, the relationships between mobility and migration and health-related risk and vulnerability need to be further investigated in the contexts of time and place, both at the macro (national) and micro (local neighbourhood) level. Documentation of who moves, their motivations for moving, the geography of mobility and migration, and the characteristics of origin and destinations prospectively in order to capture social, economic, and political variability over time, is a pre-requisite to understanding these relationships (Deane, et al., 2010). Linking mobility and migration data to health databases would allow for a more robust, complete and detailed assessment of health utilization and outcomes. Thirdly, the role of social networks and specifically the perceived positive effect of family in mitigating or propagating risk needs to be explored in more depth.

Mobility and migration are processes resulting from the dynamic relationship between macro and micro-environments and the individual occurring over space and time. As such, no single method in itself would allow for a comprehensive assessment of these complex processes. Borrowing from literature on men who have sex with men, research combining "socioecological, intersectionality and lifecourse" approaches are necessary (Egan, et al., 2011). The results of a focus-group project that functioned as a KTE event for this study highlight how qualitative information add colour and detail to findings from this study:

http://www.youtube.com/watch?v=jpccoWpxPuI

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Appendices

Appendix A: Survey Instruments

Ethics Checklist

The Ottawa-Gatineau Migration Study

Ethics Checklist

Before we start the questionnaire, I will ask you a few questions on how you became involved in this study:

1. What motivated you to participate in this study?

_____
_____

2. What will motivate you to recruit your peers for this study?

_____
_____

3. Do you feel that you were coerced, or forced to participate in this study? If yes, please explain why.

_____
_____

4. Have you experienced any harm by being asked by your peers to participate in this study?

_____
_____

Thank you. We will now start with the questionnaire.

Participant ID: _____
Coordinator initial: _____
Date: _____ **(dd/mm/yr)**
Study Site: _____

Questionnaire

The Ottawa Hospital | L'Hôpital d'Ottawa

The Ottawa-Gatineau Migration Study

COUPON #:

INTERVIEWER (Initials):

DATE: (d/m/y)

SITE:

You've agreed to participate in an ongoing project that aims to address some of the harms and barriers faced by people who use illicit drugs and develop relevant health and HIV programs for people in the community. In this interview I will be asking you questions about your overall health and welfare, moving history, and drug and sex related behaviours. Anything you tell me in this interview will remain TOTALLY CONFIDENTIAL. At no time will your name ever appear on any materials.

SECTION 1 – MOBILITY AND MIGRATION

1. When did you start living in Ottawa-Gatineau?_____(mm/yr)

2. What area of the city do you live in?
- ❑ Downtown Core (Market, Centre and Lower Town, the Gl**e**be, and Sandy Hill)
- ❑ Far West Ottawa
- ❑ West Ottawa
- ❑ East Ottawa (Vanier and Overbrook)
- ❑ South Ottawa
- ❑ Chelsea, QC
- ❑ Aylmer, QC
- ❑ Hull, QC
- ❑ Gatineau, QC
- ❑ Other (Specify:_____)

3. What type of place to you live in right now?
- ❑ Your own apartment/house
- ❑ A friend's or partner's place
- ❑ Rooming/Boarding house
- ❑ Shelter
  - ❑ Salvation Army
  - ❑ Ottawa Mission
  - ❑ Shepherds of Good Hope
  - ❑ Other (specify): _____
- ❑ Street/Outside
- ❑ Other (specify):_____

4. Have you ever been in detention, prison, or jail overnight or longer?
- ❑ Yes
- ❑ No

If no, → **Go to** question 7.
If yes:

5. How many times have you ever been in detention, prison, or jail? _____

6. Have you been in detention, prison, or jail within the last 12 months?
- ❑ Yes
- ❑ No

If yes, what is the total amount of time you have spent in detention, prison, or jail, in the last 12 months? _____ (days/weeks/months)

Migration

7. In which city where you born?: _____

8. On this map of Canada, mark all places that you have ever lived in **for 3 months or longer**. Show from where to where you have moved by numbering the cities in sequence (1 = place of birth).

If Ottawa-Gatineau is the place of birth, and participant has never moved:

9. What is the main reason that keeps you in Ottawa?

_____

→ **Go to** Question 14.

If Ottawa-Gatineau is not the place of birth or Ottawa-Gatineau is place of birth and participant HAS moved:

10. When did you move to Ottawa-Gatineau? _____ (mm/yy)

11. Thinking back to your move to Otttawa-Gatineau, what prompted you to move?
_____

12. Why did you specifically choose Ottawa-Gatineau?
_____

13. Has the move affected your:

Health:

- ❑ Yes.
  Specify:_____
  _____
- ❑ No

Drug use:

- ❑ Yes.
  Specify:_____
  ____
- ❑ No

Access to social supports:

- ❑ Yes.
  Specify:_____
  _____
- ❑ No

****

14. Would you like to move away from Ottawa?

- ❑ Yes
- ❑ No
- ❑ Don't know

If no or don't know, go to question 18.

If yes:

15. Why do you want to move? _____

16. Where do you want to move to? _____

17. When do you want to move?

- ❑ Within the next month
- ❑ In one to 6 months
- ❑ In 6 months to one year
- ❑ In a year or after

Mobility

18. How many times have you travelled (spent at least one night) outside the Ottawa-Gatineau area in the past 12 months?: _____

If no travel in past 12 months:

19. What is the main reason that has kept you from travellingDid you stay in Ottawa-Gatineau because of:
    Health:
    - ❑ Yes
    - ❑ No

    Drugs:
    - ❑ Yes
    - ❑ No

    Access to support services:
    - ❑ Yes
    - ❑ No

    Financial reasons:
    - ❑ Yes
    - ❑ No

    Other (specify): _____

→ **Go to** Question 37.

If travel in the past 12 months:

20. Where have you travelled to in the past 12 months? (drop-down menu of ON, QC and Baffin Island locations, include an "other- specify" option, *check all that apply*).

21. Indicate your last three trips; list the most recent first *(multi-city trips are considered ONE trip)*:
    1) _____
    2) _____
    3) _____

For each of these trips (1, 2 and 3, if applicable):

TRIP 1 to: _____

22. When did you go? _____ (mm/yr)

23. How long was your trip? _____ (days/weeks/months)

24. Where did you stay?

- ❑ A friend's or partner's place
- ❑ A family member's place
- ❑ Hotel/motel
- ❑ Rooming/Boarding house
- ❑ Shelter/Hostel
- ❑ On the street
- ❑ Other (specify:_____)

25. Why did you go on this trip? _____

26. Has Did this trip affect your:

Health:

- ❑ Yes.
  Specify:_____
  _____
- ❑ No

Drug use:

- ❑ Yes.
  Specify:_____
  _____
- ❑ No

Access to support services:

- ❑ Yes.
  Specify:_____
  _____
- ❑ No

→ **Go to** Question 37 if no other trips.

TRIP 2 to: _____

27. When did you go? _____ (mm/yr)

28. How long was your trip? _____ (days/weeks/months)

29. Where did you stay?

- ❑ A friend's or partner's place
- ❑ A family member's place
- ❑ Hotel/motel
- ❑ Rooming/Boarding house
- ❑ Shelter/Hostel
- ❑ On the street
- ❑ Other (specify:_____)

30. Why did you go on this trip?: _____

31. Has this trip affected your:

Health:

- ❑ Yes.
  Specify:_____
  _____
- ❑ No

Drug use:

- ❑ Yes.
  Specify:_____
  _____
- ❑ No

Access to support services:

- ❑ Yes.
  Specify:_____
  _____
- ❑ No

→ **Go to** Question 37 if no other trips.

TRIP 3 to: _____

32. When did you go? _____ (mm/yr)

33. How long was your trip? _____ (days/weeks/months)

34. Where did you stay?

- ❑ A friend's or partner's place
- ❑ A family member's place
- ❑ Hotel/motel
- ❑ Rooming/Boarding house
- ❑ Shelter/Hostel
- ❑ On the street
- ❑ Other (specify:_____)

35. Why did you go on this trip?: _____

36. Has this trip affected your:

Health:

- ❑ Yes.
  Specify:_____
  _____
- ❑ No

Drug use:

- ❑ Yes.
  Specify:_____
  _____
- ❑ No

Access to support services:

- ❑ Yes.
  Specify:_____
  _____
- ❑ No

****

37. Do you plan to travel in the next 6 months?

- ❑ Yes
- ❑ No
- ❑ Don’t know

SECTION 3 - DRUG USE

38. When did you last use (consume / fix / smoke)?

- ❑ Today
- ❑ Yesterday
- ❑ 2-6 days ago
- ❑ 1 week ago
- ❑ 2 weeks ago
- ❑ 3-4 weeks ago
- ❑ 1-3 months ago
- ❑ 4-6 months ago
- ❑ More than 6 months ago

39. In the past 6 months, did you use any of the following drugs or substances without injecting (that were not prescribed to you)?

Non-Injection Drugs	No	Everyday/ most days	2-3 times per week	2-3 times per month	Once a month or less
Alcohol	❑	❑	❑	❑	❑
Cigarettes	❑	❑	❑	❑	❑
Crack cocaine	❑	❑	❑	❑	❑
Marijuana	❑	❑	❑	❑	❑
Oxycodone	❑	❑	❑	❑	❑
Fentanyl patches	❑	❑	❑	❑	❑
Dilaudid	❑	❑	❑	❑	❑
Benzos	❑	❑	❑	❑	❑
Crystal Meth	❑	❑	❑	❑	❑
Other (_____)	❑	❑	❑	❑	❑

40. Have you ever injected drugs?

- ❑ Yes
- ❑ No

If no, →Go to question 43

41. In the past 6 months how often did you inject the following drugs?

Injection Drugs	Not at all	Everyday/ most days	2-3 times per week	2-3 times per month	Once a month or less
Cocaine	❑	❑	❑	❑	❑
Heroin	❑	❑	❑	❑	❑
Morphine	❑	❑	❑	❑	❑
Dilaudid	❑	❑	❑	❑	❑
Oxycodone	❑	❑	❑	❑	❑
Fentanyl patch	❑	❑	❑	❑	❑
Speedball	❑	❑	❑	❑	❑
Methadone	❑	❑	❑	❑	❑
Crack/rock cocaine	❑	❑	❑	❑	❑
Crystal Meth	❑	❑	❑	❑	❑
Other (_____)	❑	❑	❑	❑	❑
Other (_____)	❑	❑	❑	❑	❑
Other (_____)	❑	❑	❑	❑	❑
Other (_____)	❑	❑	❑	❑	❑

42. Have you ever been on Methadone treatment?

❑ Yes
❑ No

If yes, are you on currently on Methadone treatment?

❑ Yes
❑ No

SECTION 4 - GENERAL HEALTH

43. In general, how would you rate your health?

- ❑ Excellent
- ❑ Very good
- ❑ Good
- ❑ Fair
- ❑ Poor

44. Over the last 6 months, have you used any of the following health services?

Check all that apply or "none"	*Most often*
❑ Community Health Centre (specify:_____)	❑
❑ Hospital ER	❑
❑ Ottawa Public Health Clinic, including Sexual Health Clinic	❑
❑ Family Doctor's Office	❑
❑ Specialty clinic (specify:_____)	❑
❑ Other (specify:_____)	❑
❑ None	

45. Do you have a:

Check all that apply or "none of the above"

- ❑ Outreach Worker (specify:_____)
- ❑ Alcohol & Drug Counsellor
- ❑ Social Worker
- ❑ Other support worker (specify:_____)
- ❑ None of the above

46. In the last 6 months, did you use any of these other harm reduction services?

or "none of the above"

- ❑ Needle Exchange at Oasis
- ❑ Needle Exchange at Ottawa Public Health/Clarence Street
- ❑ Site Van
  Safe crack kits❑
- ❑ Other (specify):_____
- ❑ None of the above

47. In the last six months, have you been admitted to hospital?

- ❑ Yes
- ❑ No

If yes, specify:

Number of times:____

Reason(s) and duration for each of your admission(s):

_____, _____ (days/weeks/months)
_____, _____ (days/weeks/months)
_____, _____ (days/weeks/months)
_____, _____ (days/weeks/months)

_____, _____ (days/weeks/months)
_____, _____ (days/weeks/months)

48. What was the result of your most recent HIV testRegarding your HIV status, are you:

- ❑ HIV-positive (year of positive test_____)
- ❑ HIV-negative
- ❑ Don't know
- ❑ Refused to answer
- ❑ Never been tested

49. What was the result of your most recent hepatitis C testRegarding your Hepatitis C status, are you:

- ❑ HCV-positive (year of positive test_____)
- ❑ HCV-negative
- ❑ Don't know
- ❑ Refused to answer
- ❑ Never been tested

SECTION 5 - DEMOGRAPHICS

53. What is your year of birth? ____

54. What gender do you identify with?
- ❑ Male
- ❑ Female
- ❑ Trans-gender

55. What ethnic group or family background do you identify yourself with?:
Check all that apply
- ❑ Caucasian
- ❑ Hispanic
- ❑ South Asian
- ❑ East Asian
- ❑ Black African
- ❑ Caribbean
- ❑ Aboriginal (Indicate sub-group)
  - ❑ Métis
  - ❑ Inuit
  - ❑ First Nation (Specify: _____)
    - ❑ Status ❑ Non-Status
- ❑ Other (Specify:_____)

56. What is your first language?
- ❑ French
- ❑ English
- ❑ Other (Specify: _____)

57. 10. What was the highest level of education that you completed?
- ❑ None
- ❑ Elementary/ grade school
- ❑ High school not completed
- ❑ High school graduate
- ❑ Any college/ university

58. What is your main source of income? _____

59. 11. Do you receive money from any of these sources each month?
(*check all that apply)*
- ❑ Welfare
- ❑ ODSP
- ❑ Other
- ❑ N/A / none of these

FINISH

Thank you for completing the questionnaire.

To compensate you for your time, you will receive a 20$ store-card from the study coordinator.

Also, if you would like to connect with community resources, we can provide you with a list of options.

Please let me know if you would like a copy.

Appendix B: Participant Responses

Examples of Prompts for Moving

"Trying to get away from drugs and friends"

"Dad is a truck driver, not my choice, went with family"

"To get away from drugs [and] to get away from abusive relationship"

"HIV heath care resources; [I] was moving frequently because of lifestyle as junkie/prostitute"

"Looking for a new start (broke up with my girlfriend)"

"Work opportunity looking for a new start"

"Get away from heroin in Vancouver"

"For something different; wanted to travel"

"Getting away from the drugs"

"Toronto too crowded, too fast"

"Couldn't find work in London; there was nothing in London so came back here to get work"

"Girlfriend at the time was accepted into the 'city college'"

"Because of relapse (kicked out of Renfrew rehab program)"

"Wanted a change"

"Move away from Vankleek Hill because driver license suspended due to fines. Need a car for everything. And a fresh start"

"No work in Montreal"

"Following parents (military placements)"

"Born and raised on an Indian Reserve; wanted a better life"

“Brampton was too small”

“Wanted to get out of mom's house; did not have a good relationship with my mother”

“Wanted independence from mom, freedom, and learn how to fend for himself; didn't have to help mom with finances anymore”

“Smoking too much crack in Edmonton”

“Started making a home in Ottawa in 2001; missed Ottawa so came back to it”

“The high price of living up north”

“Got enough of the bush in Notre-Dame ; too quiet”

“To be in court: waiting for settlement claims for grandfather's business rights since mother's death, competing with cousins”

“To pick up the settlement check”

“Wanted to travel”

“Get away from the cops”

“Was homesick”

“Met a couple in London and they wanted to come to Ottawa for a treatment program so he came to support them”

“To come and live close to brother”

“Seeking rehab from cocaine”

“Boredom, lack of opportunity in Calgary”

“Had to move because I was kicked out; there was no shelter where I was”

“Hated my life; Montreal was a place where I got into trouble so wanted to leave”

“Had no place to stay”

“School; scholarship”

“Children's Aid told me to go and live on my own; they supported me for a bit until he turned 21 and then I got welfare”

“Get away from people and drugs in Calgary”

“To change air from Montreal”

“Work reasons and want to have some fun”

“Moved away from Sunshine Coast to get away from dope after OD’d”

“Gatineau not as many resources”

“Finished detox program in Luskville, came to another treatment center (for concurrent disorders) in Ottawa”

“Was on a drug run and travelled to Ottawa with company vehicle”

Examples for Choosing Ottawa

“Came to Ottawa to shop from Igloolik”

“Union Mission treatment center”

“Knew people and services here”

“Ottawa is home; family is here”

“Ottawa is a good place to be for people who don't have money; lived here for 4 years before and thought this would be a good place to raise a child; had a doctor here”

“Big brother lived here, would be a good way to 'get clean'”

“Had a friend that I was able to live with until I found my own place”

“I know Ottawa city, didn't want to go to a strange city”

“Came to visit friend in Ottawa and got a job here”

“Statistics for work, weather and services were good in Ottawa”

“It was quiet [in Ottawa] according to what I heard”

“Shelters here a little cleaner, less violence and trauma, knew people here already”

“Because no one knew me here”

“Better opportunity, cleaner: less violence less diseases, better hospitalization”

“The bride was from Ottawa too”

“Was on my way to Fort McMurray, and ended up in Salvation Army and got a job in Ottawa”

“Ottawa is [my] hometown; family and friends are here”

“Closest place to Quebec where my family is; disability is hard to get in Quebec”

“Kids are here”

“Family here, familiarity”

“Smaller city to Montreal”

“Heard there were lots of job opportunities”

“Parents were here”

“Thought sister was here”

“Raised here so knew the area”

“Son lives here”

“Came here once in grade 7 and liked it so came back”

“It was close”

“Got homesick”

“Heard it had really good programs”

“Treatment center is here”

“According to MoneySense, Ottawa has the best place to live in for the past 3 years”

“I have lived here before and liked it”

“Family”

“Dad chose Ottawa because of work”

“Construction work available here, father works here”

“Family support”

"Junkie city"

“Housing (had a place to stay); proximity to casino”

“Friends; easy to get around (smaller city)”

“Because close to Montreal, can't work in Montreal”

“My hometown is Ottawa”

“Thought there would not be dope, or be less dope in Ottawa”

“No particular reason”

“Addiction services and male sexual abuse project are both located in Ottawa”

“Ottawa is bigger than my home town and not too big; liked Ottawa”

“Don't know anybody in Ottawa

“Because the settlement check is supposed to be picked up here”