The Influence of Social Support in the lives of People Living With HIV/AIDS in Winnipeg, Manitoba, Canada

by

Alina A. N. Cameron

A Thesis submitted to the Faculty of Graduate Studies of

The University of Manitoba

in partial fulfilment of the requirements of the degree of

MASTER OF SCIENCE

Department of Community Health Sciences

University of Manitoba

Winnipeg

Copyright Information

Abstract

The purpose of this study was to examine the social support landscapes of People living with HIV/AIDS (PLWHA) in Winnipeg, Manitoba through secondary analysis of the Positive Prevention Study (PPS) data. This social support information was combined with key demographic information to determine any measurable impact upon the transmission risk behaviours of the PPS participants. The PPS (2009) was a cross sectional study which interviewed 135 PLWHA in Manitoba about their experiences, risk behaviours, and social support. For the current research, descriptive analyses of key demographic variables, measures of positively and negatively perceived social support, and sexual and substance use related risk behaviour variables are presented. Descriptive, univariate, and multivariate analyses were utilized to investigate prospective associations between these classes of variables. The majority of PPS participants reported at least some level of positively perceived social support. Continuing HIV transmission risk behaviours were reported amongst participants regardless of time since diagnosis. Several key demographic variables and measures of social support were found to be associated with risk behaviours in both simple and multivariate analyses. Depending upon the source of social support, or how it was perceived, these associations could have been protective of, or contributed to, participants exhibiting more types of risk behaviours. Recommendations include strengthening capacity of health care providers to provide continued risk prevention education beyond time of diagnosis (in clinical setting), bolstering knowledge transferring efforts using peer led prevention programs, focusing programs upon those most at risk of continued transmission risk behaviour, and ensuring the continued existence of positively perceived support programming.

Acknowledgements

Thank you to the participants of the Manitoba HIV+ Client Survey: Positive Prevention Study (PPS). Your willingness to share your stories allowed this work to happen. This is your information, this is for you. For being so brave and for teaching me so very much, I thank you.

Dr. Carole Beaudoin: Thank you for being such an open, encouraging, enthusiastic, and caring advisor. The countless hours you spent instructing, advising, leading, and working with me fueled my passion for epidemiology, and gave me the knowledge to go forth on my own. Thank you, for all of your time and extraordinary effort, your openness with your knowledge, your encouragement, and your friendship. You were with me when I wrote this, as you always will be.

Dr. Marissa Becker, thank you so very much for stepping in and carrying my banner when Carole was no longer able to. For sharing your valuable time and knowledge, and your exacting patience with me, thank you. You understand that "life happens" and that means the world to my new family and I. Your assistance and advice fuelled my successes, which spilled over into a growing confidence in my work. This is no small feat as we did this work 800km apart. Your encouragement always kept me grounded and forging onward. It has been a pleasure. Many thanks.

The Positive Prevention Study Team: Thank you for the opportunity to be a part of this project from inception to final analyses. The level of knowledge I gained about the research process is immeasurable. This process immersion was a wonderful way to learn, to apply what I had gained in instruction, and to make something meaningful.

There was a tremendous amount of preparation required for the PPS, including: study design, interviewer training, advertisement, recruitment, arranging spaces for interviews to happen, tracking remuneration, and safe storage of materials. Thank you to The Nine Circles and Green Desk staff for your help with all of these logistics.

To my committee members Dr. Javier Mignone, Dr. Lawrence Elliott, and Mr. Mike Payne; I thank you for your guidance, time, and for sharing your valuable expertise in the field. Above all I am very thankful for your tremendous patience with me. It is always a privilege working with you.

The Manitoba HIV Program: Thank you for study support and coordination.

Health Canada Research Ethics Board: Thank you for your assistance in sorting out the special considerations behind the ethical requirements for this work.

Public Health Agency of Canada/National Microbiology Laboratory (PHAC/NML): Thank you to the staff at the NML/PHAC for arranging the data usage license, the data transfer,

and support. A special thank you to Cathy Jorowski for going to bat for me so many times. Thank you.

AIDS Community Action Program, PHAC: thank you for funding the original study (PPS) that serves as the basis for this work.

Community Health Sciences staff: thank you for your assistance in navigating the administrative side of my work, and for your patience with me. Especially Theresa Kennedy, thank you so very much for all of the help and support over the years.

Thank you to my husband Alex and to my daughters Elizabeth and Fiona, both of whom were born during my time as a masters student. I am ever so grateful for you giving me the time to see this work through, and for putting up with me during this process. I am so sorry.

Thank you to the village of people who helped my family and myself, in so many ways over the last few years, including: My in-laws Marcia and Scotty Cameron, my Mother Barbara Dlugosz and Father Antoni Tablowski, my Step-mother Basia Tablowska, and my Step-father Slavek Kiraga, my siblings (Thomas, Kaz, Alina, Jessica), my best friends Amber and Daryl Kereluk, and my family and friends in Thunder Bay and Winnipeg. Thank you for taking such loving care of my daughters, and me. I could work well knowing my children were safe, intellectually stimulated, fed, (mostly) clean, happy, and loved.

Thank you. Meegwich. Dzein kuje.

Dedication Page

This work is lovingly dedicated to the late Dr. Carole Beaudoin.

Instructor, Advisor, Mentor, and Friend.

Table of Contents

List of Abbreviations

AIDS	Acquired Immunodeficiency Syndrome
GED	General Educational Development
HIV	Human Immunodeficiency Virus
PLWHA	People living with HIV/AIDS
PPS	Manitoba HIV+ Client Survey: Positive Prevention Study
UNAIDS	The Joint United Nations Programme on HIV and AIDS

List of Tables

List of Figures

List of Copyrighted Material

CHAPTER 1

Introduction and Study Objectives

1.1 Introduction

1.1.1 The HIV Epidemic

Despite our scientific knowledge of the Human Immunodeficiency Virus (HIV), and our best transmission prevention efforts, the decades long global epidemic continues. The most recent Global Report, from the Joint United Nations Programme on HIV and Acquired Immunodeficiency Syndrome (AIDS), estimated there were approximately 35.4 million people living with HIV/AIDS (PLWHA) globally in 2012 (UNAIDS, 2013). Although the 2013 UNAIDS report found a decrease in the number of new cases globally for 2012 (as compared to 2001), it is important to note that globally there were more people than ever living with HIV/AIDS (UNAIDS, 2013). This uptick in prevalence of the virus has occurred with the help of modern antiretroviral pharmaceuticals which are helping PLWHA live longer and healthier lives (UNAIDS, 2013). However, pharmaceuticals alone cannot stop the HIV pandemic. With so many more PLWHA there is a need for improvement when it comes to transmission prevention efforts, especially those targeting the high risk behaviours that perpetuate the HIV virus in populations (UNAIDS, 2013). The importance of this task is highlighted by the fact that the very first two of the goals laid out by the UN Political Declaration on HIV and AIDS Targets and Elimination Commitments are to reduce sexual and injection drug HIV transmissions by 50% by 2015 (UNAIDS, 2013). Globally speaking, much work remains to be done to find effective prevention efforts that bring about the long term behavioural change required to stop HIV transmission (UNAIDS, 2013).

The Canadian landscape of the epidemic reflects much of what was happening globally. Since the late 1990s the Canadian national HIV prevalence rate has been increasing (Public Health Agency of Canada, 2014). The Public Health Agency of Canada (PHAC) attributes this increase to continuing new HIV infections and new antiretroviral treatments which are greatly improving the health outcomes, and life spans, of PLWHA (Public Health Agency of Canada, 2014). It should be noted that national HIV incidence numbers, as reported by the Public Health Agency of Canada, always carry with them a degree of uncertainty. For example; in 2008 (at around the time of data collection for the current study) there were an estimated 2,300 to 4,300 new cases in Canada (Public Health Agency of Canada, 2010). This incidence includes an estimate of the number of Canadians who may be living with HIV and are not aware of their infection (Public Health Agency of Canada, 2014). However variable this number may be, the general prevalence representation of HIV remains the same in Canada; the number of PLWHA is continuing to increase (Public Health Agency of Canada, 2014).

In the province of Manitoba, at the time of data collection for the PPS (2009), the crude HIV rate was found to be higher (8.7/100,000 population), as compared to the ten year average crude rate for the province (7/100,000 population) (Manitoba Health, Public Health Planning, Primary Health Care Division, 2010; Manitoba Health, Public Health Planning, Primary Health Care Division, 2011). In fact, at the end of 2009, Manitoba had the third highest incidence of HIV (ages 15 years and older) compared to all other Canadian provinces and territories (Public Health Agency of Canada, 2010). Several common themes present themselves when one examines the demographic information associated with those new cases. For example; the largest proportion of new cases (38%) are in the 30-39 year age range and the main risk exposure

category reported in 2009 was heterosexual contact (31%) (Manitoba Health, Public Health Planning, Primary Health Care Division, 2010).

In addition to the increase in preventable morbidity and mortality there is also an expanding national fiscal burden due to the broadening prevalence of HIV/AIDS (Kingston-Riechers, 2011). The Canadian Aids Society estimated that the 2011 value of treating PLWHA (who tested positive in 2009) was $768,100,000 CDN (or $250,000 CDN per person) over their remaining lifetimes (Kingston-Riechers, 2011). Taking into account the costs of health care, plus the loss of labour productivity and costs associated with loss of quality of life, this estimate ballooned to over $1,300,000 CDN per person (Kingston-Riechers, 2011). In their comparison Canadian AIDS Society reported these estimates had increased since 2001 by roughly 22%, and attributed this to longer life spans which were translating into increased treatment courses (Kingston-Riechers, 2011). Since this Canadian Aids Society report was published the HIV/AIDS prevalence rate has continued to increase nationwide which is additionally contributing to this economic load.

1.1.2 The Importance of Social Support in HIV-Related Risk Behaviour Prevention Strategies

Besides the financial burden, longer life spans for PLWHA mean there are associated challenges relating to long term reduction in HIV-related risk behavior (Gore-Felton & Koopman, 2008). The longer someone lives with HIV the more time they have to potentially exhibit risk behaviours and transmit the HIV infection in the absence of prevention measures thereby contributing to incident infections (Fisher & Smith, 2009). High risk behaviours can also lead to the acquisition of co-infections, such as other sexually transmitted infections, or the

transmission of drug-resistant strains of HIV, both of which have the potential to complicate already intricate health care regimes (Fisher & Smith, 2009).

Therefore, in order to decrease the incidence of HIV there must be a reduction in risk behaviour among PLWHA (Golden, Wood, Buskin, Fleming, & Harrington, 2007). Although the risk behaviours of PLWHA contribute to HIV transmission, it is important to recognize that these behaviours do not occur within a vacuum. Transmission reduction strategies which are solely aimed at the self regulatory processes of the individual are commonly unsuccessful in creating positive behavioural change, especially over the long term (Reynolds et al., 2010). Successful prevention strategies, which lead to sustained positive behavioural change, must also take into account the environmental, biological, developmental, and contextual aspects of an individual's life which influence health outcomes and behaviours (Cockerham, 2007; Ewart, 1991; Gore-Felton & Koopman, 2008; Johnson et al., 2010; Metsch et al., 2008; Reynolds et al., 2010; Rosario, Schrimshaw, & Hunter, 2006; Traube, Holloway, & Smith, 2011)

Existing studies have firmly established that risk behaviour is influenced by both individual and social cultural level factors (Friedman, Cooper, & Osborne, 2009; Latkin & Knowlton, 2005). In particular, the relationship between social support and HIV-related risk behaviours has been gathering interest in the research community in recent years (Heckman et al., 1998; Johnson et al., 2010; Neaigus et al., 1994; Qiao, Li, & Stanton, 2014). Social support greatly influences physical and mental health outcomes in those living with chronic illnesses, such as HIV (Hough, Magnan, Templin, & Gadelrab, 2005; Kyle & Sachs, 1994; Rodgers, 1995). People living with a chronic disease are more likely to use effective coping strategies to adjust to life with the disease if they have adequate positive social support (Hough, Magnan, Templin, & Gadelrab, 2005; White & Cant, 2003). Higher levels of positively perceived social

support have a protective effect upon individuals, meaning they are better able to cope with their diagnosis and exhibit less high risk behaviours (Qiao et al., 2014).

These findings become especially poignant when considering that research has shown diagnosis with HIV often causes a reconfiguration of patients' social support networks which negatively affects their quality of social support (Barroso, 1997; Burgoyne & Saunders, 2000; Friedland, Renwick, & McColl, 1996; Hays, Magee, & Chauncey, 1994; Hough et al., 2005; Leserman, Perkins, & Evans, 1992; Rodgers, 1995; Turner, Hays & Coates, 1993). As individuals navigate through life with HIV they often encounter issues of stigma, and disclosure, meaning that social support landscapes can and often do change (Hudson, 2001). Further, as PLWHA become more ill their relationships can begin to suffer due to a lack of an ability to maintain them (Hudson, Lee, Miramontes, & Portillo, 2001). A lack of adequate social support can lead to increased risk of mortality, morbidity, and a higher level of HIV-related risk behaviour (White & Cant, 2003). As well, studies have also shown that having low perceived social support was a strong predictor of psychological distress (Hudson et al., 2001; Leserman, Perkins, & Evans, 1992). It is believed that as time since diagnosis increases, and social support networks deteriorate, positively perceived social support can act as a buffer against HIV-related trauma symptoms (Rzeszutek, M. et al., 2015).

Therefore, having an effective strategy to encourage the development and maintenance of positive social support networks could therefore have a major effect upon the health outcomes, and HIV-related risk behaviours, of PLWHA. It is thought that continued, positive social support can serve to improve coping strategies thereby helping PLWHA maintain long term positive changes to their HIV-related risk behaviours (Antonucci & Akiyama, 1987; Barroso, 1997; Darbes, Chakravarty, Beougher, Neilands, & Hoff, 2011; Friedland et al., 1996; Hays et

al., 1994; Hough et al., 2005; Kalichman, DiMarco, Austin, Luke, & DiFonzo, 2003; Kyle & Sachs, 1994; Leserman et al., 1992; Purcell et al., 2006; Rodgers, 1995; White & Cant, 2003).

The questions this line of reasoning poses, therefore, includes: What types of social support are helpful or are not helpful in the lives of PLWHA living in Manitoba? What aspects of social support are informative to risk behaviour research and therefore important to risk behaviour prevention strategies? Are any aspects of social support predictive of risk behaviour in Manitoba? These fundamental questions are the basis of the current report.

1.1.3 Purpose and Context of the Research

In 2009, 135 PLWHA living in Winnipeg, Manitoba were interviewed as part of the Manitoba HIV+ Client Survey: Positive Prevention Study (PPS). The purpose of this study was to examine the social support landscape of the PPS participants, and to examine how perceived social support may have influenced HIV-related risk behaviours, six months or more after diagnosis with HIV (including: sex, alcohol use, non-injection, and injection drug use), through secondary analysis of the PPS data.

Significance of the current research

Most HIV related social support research, relating to risk behaviours, has taken place outside of Canada. The ability to generalize these results to the Manitoba population is therefore unknown as little corresponding social support research has been done in the province involving PLWHA. Knowledge about the social support landscape of PLWHA in Manitoba would be helpful in several ways. Most importantly, by defining the relationships in the lives of PLWHA it may become possible to observe what works well and then to share that information with service providers, and other PLWHA in the province. As well, it is an opportunity to see what areas of

support could be addressed, perhaps by already available programming within the Manitoba HIV Programme.

Social support is an issue which has the potential to positively influence a number of associated factors including: increasing quality of life and overall well being, as well as decreasing mood disturbance, morbidity, mortality, sexual risks and substance use associated with transmission risk factors (e.g. alcohol, injection and non injection drug use) (Hough et al., 2005; White & Cant, 2003). Indeed, the prevalence of HIV/AIDS in Manitoba has been increasing over the past few years and the proposed study will therefore add to the evidence base needed to help start reversing this trend (Public Health Agency of Canada, 2009).

1.2 Objectives of the Study

The purpose of the study was to examine the social support landscape of PLWHA in Winnipeg, Manitoba through a secondary analysis of PPS data. Further, this social support information was combined with demographic information to determine if they have any measurable impact upon the risk behaviours of PLWHA in Winnipeg, Manitoba, Canada.

1.2.1 Research Objective 1:

Describe key demographic characteristics of PLWHA in Manitoba. The demographic characteristics to be examined include: self identified gender, self identified ethnicity, mental health status, education, age, age at time of diagnosis, time since diagnosis.

1.2.2 Research Objective 2:

To describe the social support landscapes of the PPS participants. This description will include the types of relationships within the networks (friends, partners, family, staff/volunteers at service providers/health centres/clinics, and Spiritual/Religious Leaders/Advisors or Elders), and if those relationships are perceived as supportive or not.

1.2.3 Research Objective 3:

Examine if certain demographic characteristics are indicative of positive or negative social support landscapes (e.g. with increasing time since diagnosis).

1.2.4 Research Objective 4:

Examine the associations between social support and several key HIV-related risk behaviours. Specifically, to examine the relationship between the independent variable, perceived social support (size, type of relationship, and if perceived as positive/negative) and the dependent variables: sexual risk behaviour, alcohol use, injection and non-injection drug use. (Reilly & Woo, 2004).

1.3 Ethical Considerations

1.3.1 Positive Prevention Study Ethical Approval

Ethical approval for the PPS was originally sought and obtained in 2009 from the University of Manitoba Bannatyne Health Research Ethics Board and the joint Health Canada/Public Health Agency of Canada Research Ethics Board. In addition the study obtained research approval from the Winnipeg Regional Health Authority and completed required Impact Approval documentation from the Winnipeg Health Sciences Centre.

1.3.2 Thesis Study Ethical Approval

Before the current work commenced the PPS study status was renewed with the University of Manitoba Health Research Ethics Board. The University of Manitoba Health Research Ethics Board approved a Certificate of Annual Approval for the PPS on October 26th, 2015 (University of Manitoba Health Research Ethics Board Ethics # HS11513(H2009:264)) (Appendix A). Next, ethical approval for the new analysis was obtained from all concerned

authorities (University of Manitoba Health Research Ethics Board, Public Health Agency of Canada/Health Canada Research Ethics Board). It was decided by the Health Canada Research Ethics Board that ethical approval of the University of Manitoba research Ethics Board would be sufficient but that a special data usage license had to be obtained from Public Health Agency of Canada which is the entity responsible for the secure storage of the PPS data (at the Canadian Science Centre for Human and Animal Health (CSCHAH)).

Ethical approval for the current research was obtained from the University of Manitoba Health Research Ethics Board (Ethics # HS19043 (H2015:403)) on November 19th, 2015 (Appendix B). A data usage license was obtained and signed December 15, 2015 and the data were shared, via a secure electronic information transfer, on December 23rd, 2015. In the interest of complete transparency all concerned authorities (University of Manitoba Health Research Ethics Board, Public Health Agency of Canada, Health Canada Research Ethics Board, and University of Manitoba) were made aware of this ethics process and their role within it.

1.3.3 Informed Consent and Confidentiality

Being diagnosed with HIV/AIDS continues to be a highly stigmatized status. As such, measures were taken to maintain participants' privacy and to ensure their human rights were respected. This continues to be of utmost importance to the PPS team.

Entry into the PPS was a self directed, opt-in process. The PPS was advertised via posters at several health service providers, which provided HIV specific care at the time (2009), across the City of Winnipeg including: Nine Circles Community Health Centre, Green Desk at the Winnipeg Health Sciences Centre, Mount Carmel Clinic, Kali Shiva AIDS Services, and Klinic Community Health Centre. Information pertaining to the study was also distributed by nurses and outreach workers via the Manitoba HIV Programme sites (Nine Circles Community Health

centre and Green Desk at the Winnipeg Health Sciences Centre). It was not in the PPS study design to utilize snowball sampling, however, some participants reported hearing of the study via friends and family. Participants were invited to contact the main desk at Nine Circles Community Health Centre using an alias, if they so desired, to book an appointment to be interviewed. All interviews were conducted in a private office, graciously made available by staff at Nine Circles Community Health Centre. Further specifics regarding the PPS settings and sampling are discussed further in the methodology section.

Once a participant arrived for the survey they were read the informed consent form (Appendix D). Reading this information (and the entire survey) aloud ensured all literacy levels were respected. The interviewer/author ensured participants understood the informed consent information thoroughly: that they could refuse to answer any questions without consequence, that all information collected was anonymous and would remain so, that their services at the health provider would never be impacted by their answers to the survey, that there were no legal ramifications for their participation, and that they could refuse to participate at any time even after the survey had been completed. Participants gave verbal consent as well as signed/marked the physical informed consent document itself. Participants were given a copy of their informed consent document.

To further ensure confidentiality each participant was given a unique study number for the purposes of anonymity and future withdrawal from the PPS. Only one participant ever enacted the withdrawal policy. This participant contacted Nine Circles Community Health Centre and gave them their unique survey number. This survey number was given to the study interviewer/author and the corresponding survey was destroyed using the secure document destruction protocol at the National Microbiology Laboratory. The information had not been

entered into electronic form at the time so there was no corresponding electronic file to dispose of. The signed informed consent forms and completed surveys were stored separately, yet securely, in a private office at Nine Circles Community Health Centre, until all surveys were completed.

Once the interview phase of the PPS was completed the surveys were securely transported from Nine Circles Community Health Centre, along with the informed consent forms, to the Canadian Sciences Centre for Human and Animal Health, National Microbiology Laboratory (NML), Winnipeg, Manitoba, Canada. There they were stored, albeit separately, in the principal investigator's secure office. Only those study personnel with appropriate federal security clearance were allowed access to the study data, in any form. Hard copies of the PPS survey have now been moved into Public Health Agency of Canada secure long term storage and the electronic data exists on Public Health Agency of Canada's secure database. After an appropriate amount of time these files will be sent for secure destruction. At the conclusion of this research, the author's electronic copy of the data will be destroyed, in agreement with the data usage license.

CHAPTER 2: LITERATURE REVIEW

2.1 Social support and HIV prevention

This review serves to introduce the theoretical framework used for the current research and defines social support within that context. The definition includes a review of previous research that has shown how social support is influenced by the determinants of health of interest to the study. Previous investigations, which have revealed social support's role in HIV

prevention efforts, are then examined. Subsequent sections of the review outline current research with regards to HIV related risk behaviours of interest and how they are influenced by social support and the determinants of health under study. Finally the review describes limitations in current research with regards to the influence of social support upon HIV transmission risk behaviours and prevention efforts.

2.1.1 Theoretical Framework: The Relational Regulation Theory and Main Effects Model

Social support is a multifaceted construct that, not for lack of effort, research has not been able to entirely describe (S. Cohen & Wills, 1985; Lakey & Orehek, 2011). Among the vast amount of research, however, there are a few important distinctions that can help guide meaningful measurement of different aspects of social support. One of these prominent distinctions falls along the line of whether social support is important indirectly or directly to an individual's navigation through life.

The Buffering Model and the Main (or Direct) Effects Model are two of the foremost models utilized in psychosocial research (Lakey & Orehek, 2011; Qiao, Li, & Stanton, 2014). These contrasting models serve to describe social support by the different circumstances in which it is useful. The Buffering Model explains social support as being protective to mental and physical health against times of great stress, for example, at the time of HIV diagnosis (S. Cohen & Wills, 1985; Lakey & Orehek, 2011). This model hypothesizes that those who have better social support systems can cope with a major stressor more effectively and therefore maintain better physical and mental health (S. Cohen & Wills, 1985; Lakey & Orehek, 2011). The Main Effects Model is not as pointed, and instead posits that high levels of social support confer their protective effects constantly, through ordinary day-to-day interactions, regardless of stress in an

individual's life (S. Cohen & Wills, 1985; Lakey & Orehek, 2011). Higher levels of positively perceived and received social support translate into better physical and mental health outcomes. Social support in this case can be measured by social integration and social connectedness (Lakey & Orehek, 2011).

The theories that explain these two models are the Stress and Coping Theory (for the Buffering Model) and the Relational Regulation Theory (for the Main Effects Model) (Lakey & Orehek, 2011). The Stress and Coping Theory is by far the most popular theory used in psychosocial research. This theory postulates that social support indirectly influences mental health by buffering against specific negative stressors (Lakey & Orehek, 2011). The Buffering Model can be measured by perceived social support, but it has not worked well in measuring social integration, or for recognizing the link between personality and perceived social support (Lakey & Orehek, 2011). For the current research, the Relational Regulation Theory will be used. This theoretical framework was chosen as it best explains the Main Effects hypothesis between perceived social support and mental health, which is what was measured in the PPS (Figure 1).

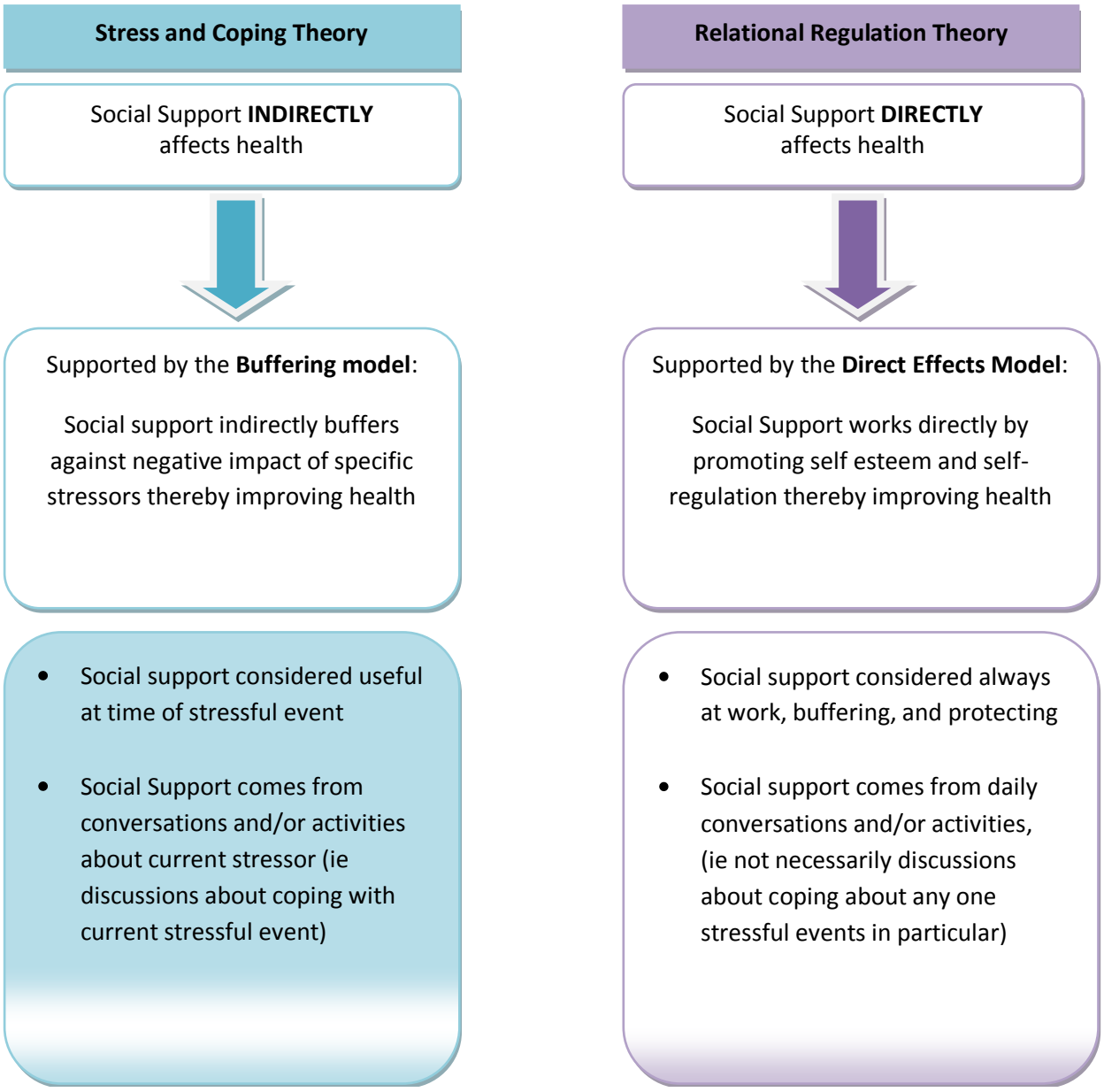
The Relational Regulation Theory of social support was developed to explain the link between perceived support to emotional and affective disturbance in adults and adolescents (Lakey & Orehek, 2011). The Relational Regulation Theory accounts for both buffering and direct effects on mental health, however direct effects are closer to what was measured in the PPS. Had the PPS been examining the effects surrounding a single highly stressful event (such as time of diagnosis), then it would have made sense to enable the Buffering Model. However the PPS measured structural aspects of social support that were not related to any one major stressor. Instead the study examined social support at various stages of life, six months or more after

diagnosis, as it related to risk behaviours. More specifically, the PPS looked at types of connectedness and several social integration measures, such as the number of people in a social support network. These are measures that are generally used in direct effects research (S. Cohen & Wills, 1985; Lakey & Orehek, 2011). Types of connectedness were examined by asking respondents about the sources of their social support networks, namely, natural sources and formal sources of social support.

Another strength of the Relational Regulation Theory is that it lends itself well to innovative intervention development (Lakey & Orehek, 2011). Many social support interventions, based upon the stress and coping theory, have been found to not perform as well as originally planned. Lakey and Orehek (2011) postulate that this is because they have assumed all people are objectively supportive, when in reality perceived supportiveness is an individualistic aspect that reflects relational influences, something that the direct effect model and Relational Regulation Theory take into account.

Figure 1:

Theoretical Framework: Comparison of the Relational Regulation Theory and the Stress and Coping Theory



2.1.2 Social Support: Sources, perception, and influences

Social Support works to improve physical and mental health by conferring some form of help or assistance to an individual. This help could come in the form of emotional support (e.g. esteem, affiliation with others), informational support (e.g. advice/information on social issues, health, employment), and instrumental support (e.g. finances, housing assistance), that an individual can acquire from relationships (Antonucci & Akiyama, 1987; Gielen, McDonnell, Wu, O'Campo, & Faden, 2001; Hough et al., 2005; Norbeck, Lindsey, & Carrieri, 1981; Turner, Hays, & Coates, 1993). In the case of Relational Regulation Theory social support helps protect an individual's mental and physical health, over the long term, by the everyday interactions which lead to ebb and flow of the items listed previously (Lakey & Orehek, 2011). Social support is therefore seen as having a shielding effect from the negative psychological effects of stress, enabling individuals to cope better with life (Lakey & Orehek, 2011). This is especially important in the case of those living with a chronic illness such as HIV, where better coping mechanisms can manifest in such ways as better quality of life, less morbidity, and reduced transmission risk behaviours (Leserman et al., 1999). In 1999 Lesserman et al. showed, via a longitudinal study that with increasing stressful events and depression, and lower perceived social support the progression from HIV to AIDS was accelerated. This progression was two to three times as quick among those with above the study median of stress and below the study median of social support (Leserman et al., 1999).

The relationships which confer social support, can be either natural (family member(s), partner(s), friend(s)), or formal sources (staff/volunteers at service providers/health centre clinic, and spiritual or religious leaders/advisors or Elders) (Hogan, Linden, & Najarian, 2002). In a study by Serovich, Kimberly, Mosack, & Lewis, 2001, perceptions of family and friends social

support were predictive of reduced negative mental health outcomes including: loneliness, stress, and depressive symptoms (Serovich, Kimberly, Mosack, & Lewis, 2001). Several categories of social support source were measured in the PPS and serve to indicate the type of connectedness an individual is associated with.

How social support is perceived is another important consideration. Not all social support networks are positive and some may actually increase transmission risk behaviours (Heckman et al., 1998; Lakey & Orehek, 2011). For example, low levels of family support in the lives of PLWHA are associated with higher levels of transmission risk behaviours (Heckman et al., 1998). It is only positively perceived social support landscapes that are associated with avoidance of risk behaviours, and an increased quality of life (Kimberly & Serovich, 1999; Turner, Pearlin, & Mullan, 1998). The Relational Regulation Theory was designed specifically to examine perceived social support (Lakey & Orehek, 2011). In the PPS, participants' perceptions of social support was determined by inquiring if they felt there were those who were helpful to their health, and if there were those who were detrimental to their health.

There are several important socio-demographic factors collected in the PPS that could exude some influence upon the social support landscapes of the participants. These variables include; gender, age, ethnicity, educational level obtained, and mental health status (S. Cohen & Wills, 1985).

Previous research has noted some poignant differences in social support according to gender (Abrefa-Gyan, Cornelius, & Okundaye, 2015; Baum & Grunberg, 1991; Cockerham, 2007). Research states those who identify as female tend to utilize larger social support networks and use those supports more often than those who self identify as male (Baum & Grunberg, 1991).

This difference in social support structure and use could be important to how the different genders deal with stress, and how they navigate through life with HIV.

Measures of age and time are important to this line of inquiry as well. Age, age at diagnosis, and time since diagnosis were all measured in the PPS (albeit, time since diagnosis was calculated after data collection by subtracting age at diagnosis from age at time of survey). It has been show that age is a structural entity, not an individual effect, upon people's health. The reason for this, as suggested by Cockerham (2007), is that individuals belong to age cohorts that move through life in an ordered sequence. This suggests that the social support landscapes of individuals could also change as they advance through the stages of life (Cockerham, 2007). Time since diagnosis has been found to influence coping strategies of those living with HIV/AIDS (Chidwick & Borrill, 1996). Chidwick and Borrill (1996) found that those who had been living with an HIV diagnosis for more than two years reported lower levels of difficulties in their lives. Age at time of diagnosis is an important aspect to consider when thinking about prevention efforts (Elford, Ibrahim, Bukutu, & Anderson, 2008). There has not been a great deal of research pointed directly at age at time of diagnosis and social support, however age at time of diagnosis is often included in psychosocial research as a variable in analysis.

Culture and ethnicity have long been established as sources of health inequity and as such are an important inclusion into the present analysis (Cohen, L., Chavez, V. & Chehimi, S., 2007). Ethnicity is a socially constructed variable which can help to describe an individual's set of customs, behavioural norms and habits with which they navigate their lifespan (Cockerham, 2007; S. Cohen & Wills, 1985; Cutrona, 1986; Triandis, 1989). Ethnicity is included in the present analysis to see if there if there culturally based influences in PPS respondents' social support landscapes and transmission risk behaviours.

Education is another important social determinant of health that has the potential to influence social support and risk behaviours (Cohen, L., Chavez, V. & Chehimi, S., 2007; Leganger & Kraft, 2003). In an Ontario based study published in 2016, Jaworsky et al. found that education did have a marked effect on social support. Specifically they discovered that those with lower education levels scored lower on their social support scores and had higher maladaptive coping (Jaworsky et al., 2015).

Research consistently finds a high rate of diagnosed mental health issues among PLWHA. The PPS asked respondents about any possible mental health diagnosis because of its potential to affect whom one contacts for support, how often, and if that contact is perceived as positive or not.

2.1.3 Prevention based upon social support

Previous research shows the most effective prevention efforts are those which target patients known to be at risk for continued high transmission risk behaviour (Medley, Bachanas, Grillo, Hasen, & Amanyeiwe, 2015). Further, these efforts are especially well received when they focus on developing practical management skills as part of the intervention (Medley et al., 2015). Interventions which address stress and social support also have the capability of slowing the progression of HIV to AIDS (Leserman et al., 1999).

2.2 HIV-Related Risk Behaviours

2.2.1 Secondary transmission risk behaviours

Beyond individual level factors transmission risk behaviours are also influenced by social, biological, developmental, and contextual features within the lives of patients living with chronic disease (Cockerham, 2007). Some of the factors, which are being included in the current

study as predictors of secondary transmission risk behaviours, are: ethnicity, gender, education, age, time since diagnosis, and mental health status.

Ethnicity and gender are contextual factors which have been shown to influence health behaviours and are therefore included in the current research (Cockerham, 2007; Heckman et al., 1998). These constructs are important to consider as they can help to discover at risk groups of people and to help build better evidence based prevention efforts geared toward them. Mental health status is an important contribution to social support networks and transmission risk behaviour. It has been previously shown that PLWHA living with a mental health issue had reduced levels of transmission risk behaviours when engaged in a mental health support program (Heckman et al., 1998). Education protects individuals by increasing their ability to understand health information. Generally, as educational attainment increases, so does health status (Cockerham, 2007). Previous research shows that PLWHA who have lower levels of education tend to report higher levels of transmission risk behaviours (Heckman et al., 1998). Age may contribute to lower levels of education, where those who are younger may have not had the opportunity to achieve higher educational attainment or gained valuable life experience (Cockerham, 2007). As a result, age is one factor which the vast majority of social support/risk behaviour research considers in analyses (Arasteh, Des Jarlais, & Perlis, 2008; Avants, Warburton, & Margolin, 2001; Barta et al., 2008; Booth, Kwiatkowski, & Chitwood, 2000; Golden, Wood, Buskin, Fleming, & Harrington, 2007; Hays, Magee, & Chauncey, 1994; Heckman et al., 1998).

2.2.2 Sexual Risk Behaviours

Most studies about PLWHA and risk behaviour use consistency of condom use as a main measure of sexual behaviour outcome (Qiao et al., 2014). Generally, the trend in research

findings is that, positively perceived social support is positively associated with consistent condom use (Qiao et al., 2014). Continued sexual risk behaviours related to HIV transmission, such as unprotected sex and also a high number of sexual partners, have been connected to a lack of helpful social support (Illa et al., 2008; Kelly et al., 1993; Purcell et al., 2006; Reilly & Woo, 2004; Strathdee et al., 2001). Purcell (2006) found a lack of social support led to avoidant behaviours, including not only continued sexual risk behaviours but also continued injection drug behaviours (Purcell et al., 2006). Reilly and Woo (2004) discovered the maintenance of long term safer sex practices was associated with positive social support networks (Reilly & Woo, 2004). Similarly, according to Kelly et al. (1993) positive social support interventions with 68 seropositive men decreased their depression and the rates of unprotected sex (Kelly et al., 1993). Looking specifically at important sources of social support, Gore-Felton et al., 2002, discovered that partner support was positively associated with the number of unprotected sexual encounters in the last three months (Gore-Felton et al., 2002).

2.2.3 Alcohol and Non-injection Drugs. Alcohol and non-injection drug use have been associated with increased sexual risk behaviour (Arasteh et al., 2008; Barta et al., 2008; Bryant, 2006; Purcell et al., 2006; Saxon & Calsyn, 1992; Stein et al., 2005). These risk behaviours have also been linked to social support network deficiencies (Heckman et al., 1998a). Heckman et al., 1998, found that a lower level of perceived social support from family members was associated with greater non-injection drug risk behaviour. Relationships with partner(s) have been found to have an association with increased alcohol use (Barta et al., 2008). The risk associated with non-injection drug and alcohol use is that they can cause a decrease in inhibition which can lead to an increase in risky behaviours, including an increased number of sexual partners and increased frequency of unprotected sex (Arasteh et al., 2008; Barta et al., 2008; Bryant, 2006; Purcell et al.,

2006; Saxon & Calsyn, 1992; Stein et al., 2005). Inhibition, due to the use of alcohol has also been linked to the increased use of non-injection drugs (Arasteh et al., 2008; Saxon & Calsyn, 1992). Purcell (2006) found that alcohol and drug use during sex was a significant correlate of unprotected sex with seropositive main partners (Purcell et al., 2006).

There is also the risk of HIV transmission with the sharing of non-injection drug use paraphernalia, such as smoking devices. Injuries to the hands and oral cavity can arise when smoking with a glass stem, particularly if it has been damaged through repeated use (Porter et al., 1997). Epidemiological evidence suggests these injuries can lead to HIV transmission via blood-to-blood contact when smoking paraphernalia is shared McMahon et al., 2003).

2.2.4 Injection Drugs

Injection drug use is another risk factor for HIV due to the potential for transmission from sharing injection equipment (e.g. needle, spoon, rinse water) with someone who is seropositive (Saxon & Calsyn, 1992). For many injection drug users social networks consist of those who share their addiction and with whom they frequently inject together. This suggests that certain positive social support networks may actually enable this type of risk behaviour. For example, Unger et al. (2006) found male injection drug users were more likely to share needles with partners who gave them emotional support (Unger et al., 2006). There is also evidence suggesting that injection drug users have a decreased ability to cope with an HIV diagnosis and that there is an increase in associated HIV risk behaviours among them (Avants et al., 2001; Booth et al., 2000). Based upon these findings those prevention effort developers would do well to consider strong positive social support as an important variable in programming.

2.3 Gaps in Current Research

When considering the breadth of research establishing social support's influence on risk behaviour it becomes immediately apparent that there are a great number of contradictions in the narratives within this literature (Qiao et al., 2014). These contradicting results, as described below, make it difficult to apply any findings to the Manitoba population under study. Further, these contradictions make it even more difficult to devise any meaningful preventative efforts. For example, Qiao et al. (2014) in an extensive literature review found that social support (either generally or HIV- specific) was generally related to fewer risk behaviours. However, this relationship was highly variable depending upon which population a study was considering (Qiao et al., 2014). Within this context the current social support research is important due to the fact that it is looking at what is happening specifically within the Manitoba population, in which limited social support research exists up to this point in time.

Inconsistencies in previous research can also be partially attributed to the fact that the effects of social support are dependent upon contextual factors. Social support is generally seen as positive and important to healthy behaviours or to positive behaviour changes, but it has also been shown to promote some types of risk behaviours. For example, Fisher et al. (1988) found that support from a drug using network can serve to reinforce HIV transmission risk behaviours (Fisher, 1988). This study showed an important consideration; when social support is embedded inside a specific network the association between that support and risk behaviours can be related to the social norms of the network (Qiao et al., 2014). In the case of HIV prevention, when social norms are inconsistent with HIV prevention strategies any social support garnered in that arena has the potential to become a barrier to healthy behaviour or positive behaviour change (Fisher, 1988).

Inconsistencies in previous research could also be due to differences in measurement of populations, recall periods, behavioural outcomes, and social support characteristics. This vast span of very pointed and contextual research does a good job of describing the variables under study but is often only useful in very specific circumstances. In their review, Qiao et al. (2014) found that research teams were using a great assortment of variables, both demographic and behavioural, without much consistency between studies in what they considered important or how variables were measured. As well, the Qiao et al. (2014) review found that research was targeting very specific, yet different, populations and using different recall periods. Much of the research reviewed utilized original measurement tools, usually to suit the specific needs of their research directives, which was to investigate more HIV oriented issues that may not be included in the standard measurement tools normally used (Qiao et al., 2014).

With the wide range of variables at play in current social support research, as it is related to HIV risk behaviours, it follows that there is also the possibility of a wide variety of different confounders at work. Most studies controlled for demographic characteristics however, there may still be risk factors which contribute to behaviours that were missed (Qiao et al., 2014), for example, level of HIV transmission prevention knowledge.

There is a lack of current research on the effects of social support on secondary HIV transmission risk behaviours, which focuses upon the different sources of social support (Qiao et al., 2014). One strength of the PPS is that it includes questions about different categories of social support sources, including natural and formal sources.

Prevention research in this field also exhibits large gaps. There is a need to identify how to tailor prevention programs to settings and populations where HIV is occurring, such as key populations (Medley et al., 2015). Basing prevention strategies upon research done in other

contextual settings may not be as effective as those done within a specific research site/population. This means the current research is actively serving to fill that very void, at least begin a solid evidence base to direct future research, including further analysis of the PPS data.

There is also a lack of focus upon the aging HIV positive population and their social support landscapes, and risk of depression (Abrefa-Gyan et al., 2015; Nanni, Caruso, Mitchell, Meggiolaro, & Grassi, 2015). This cohort seems to be one of the most at risk of HIV transmission, and associated morbidities, lending credence to this line of inquiry (Roger, Mignone, & Kirkland, 2013).

Much of previous social support research, focusing upon HIV transmission risk behaviours, fails to include theoretical models upon which to base their data collection and analyses (Qiao et al., 2014).

The gaps in social support literature contribute to an ever widening deficiency of understanding about what actually contributes to social support in the lives of PLWHA. This is of great concern, as the current review clearly indicates, because research has shown that social support makes a major contribution to not only the health and well-being of PLWHA, but also to ongoing HIV transmission risk behaviours. In order to procure meaningful programming, education and prevention efforts, especially in the context of the Manitoba HIV epidemic, this evidence base needs to be established.

2.4 Summary

HIV prevalence in Canada is continuing to increase because of continued new infections and longer life spans of PLWHA due to successful modern antiretroviral treatments. New infections continue to occur due in part to transmission risk behaviours among PLWHA. In order to curtail continuing HIV infections the transmission risk behaviours of PLWHA have to

be better understood. Most research and prevention strategies are currently aimed at the self regulatory processes of individuals. These strategies are commonly unsuccessful, especially over the long term, as they fail to recognize the developmental history of the individual, and the social and environmental contexts in which health behaviours occur. For example, evidence shows high risk behaviours can be greatly exacerbated by the social support shifts which can accompany an HIV diagnosis. While data exists from larger urban centres in North America, there is a lack of this type of evidence in Manitoba. This absence of empirical evidence is impeding the ability of decision makers to formulate meaningful choices about the factors which are at the pinnacle of the HIV epidemic. In an attempt to begin unravelling this evidence base the current study will examine the social support landscape of Manitobans living with HIV/AIDS and pinpoint how social support, and key demographic variables, influence continuing transmission risk behaviours.

CHAPTER 3: METHODOLOGY

3.1 Positive Prevention Study Design

The current research is based upon a secondary analysis of the Manitoba HIV+ Client Survey: Positive Prevention Study (PPS). The PPS was designed to ask PLWHA in Manitoba about their secondary transmission risk behaviours, what their social support networks looked like at the time, and what they did to stay healthy. The intention of this line of inquiry was to positively inform future health care and social programming within the Manitoba HIV Program. The PPS was funded by Nine Circles Community Health Centre, through the AIDS Community Action Program, Public Health Agency of Canada.

A PPS study team was created with representatives from the federal and local levels, both academic and those on the front line of care. Members of the team represented Public Health

Agency of Canada, University of Manitoba, and Nine Circles Community Health Centre. The purpose of the team was study design and implementation, survey tool creation and testing, knowledge translation.

A cross sectional survey design was chosen for the PPS because the purpose was to generalise from the study population (people living with HIV/AIDS for at least 6 months, over the age of 18) to make inferences about the larger population of people living with HIV/AIDS in Manitoba (Creswell, 2009). As well, surveying was often the study design used in comparison studies previously done.

The survey was designed by the study team, including the author, and Manitoba HIV Programme specialists. Before interviewing began the PPS survey was pilot tested out on volunteer staff members at Nine Circles Community Health Centre. Questions were fine tuned, with regards to purpose, usefulness, vocabulary, and location within the survey. At the same time the study interviewer practiced reading the interview to several team members and was trained to work respectfully and safely with study participants.

3.2 Sample Size Determination

The sample size for the Positive Prevention Study was estimated with the following calculation parameters:

1. Level of significance, $\alpha=0.05$
2. Power, $1-\beta=0.80$
3. Standard effect size, $d=0.50\sigma$ (medium)

Although the PPS collected data from one group of individuals, those living with HIV/AIDS in Manitoba, two groups were essentially to be assessed in statistical analyses, that

being, those who had exhibited the behaviour under investigation (exposed) versus those who had not (unexposed). For these two groups, and using the parameters listed above, a minimum sample size required for statistical significance was calculated at 126 (Hulley, S.B., Cummings, S.R., Brower, W.S., Grady D.G., Newman T.B., 2007).

Similar studies examining behavioural change among PLWHA used larger effect sizes, estimating that 60-70% of participants sustained transmission risk behaviour reduction (Barta et al., 2008; Golden et al., 2007; Illa et al., 2008; Purcell et al., 2006). This is where a critical distinction exists between those studies, and the PPS. Whereas previous studies assessed only those PLWHA who were in medical treatment, and only those who had been living with their diagnosis for 3 months, the PPS included those who were also not in formal health care and those with any length of time since diagnosis (6 months or more). Although advertising for the PPS was centred in health care settings, participants not currently in health care were recruited by the fact that study information was available at Nine Circles Community Health Centre. This organization provides support relating to multiple social determinants of health and is not only a health service provider. Anyone there for use of the facility beyond health care for things such as informational attainment, food bank, social services, or internet access, for example, could have also been exposed to the study advertisement (Appendix C). Further, as mentioned before, snowball sampling had been reported by several participants and this could have brought in participants that were not in care at the time of the study, and therefore not exposed directly to the PPS advertising. Because the potential time since diagnosis could be years there may very well be an associated lower level of behavioural change among the study sample. In order to correct for this a lower effect size was chosen ($d=0.50\sigma$ (medium).

3.3 Description of Study Setting

According to the provincial authority, Manitoba Health (2010a), from the beginning of the epidemic until the time of the PPS (2009), 1647 people had been diagnosed with HIV in the province, 1446 of which were still alive in 2010. Manitoba is a vast province geographically and it would be difficult, both logistically and financially, to provide the highly specialized care required by PLWHA evenly over this area. As such, these services have been concentrated in the provincial capital, Winnipeg, which was the setting of the PPS. HIV specific care is managed by the Manitoba HIV Program and occurs at two sites in Winnipeg, including Nine Circles Community Health Centre and Health Sciences Centre.

At the time of the PPS the Manitoba HIV Program (2011) was reporting that around 1,000 individuals were actively receiving care through their program. Realizing that some may be receiving care or treatment via other routes, moved to another locale, or passed away, this is still suggestive that a rather large proportion of those PLWHA in Manitoba are not receiving any specialized care or treatment for their diagnosis. This disconnect with specialized care, as a source of information about preventative behaviours, and HIV related care and treatment, may further contribute to high risk transmission behaviours.

3.4 Sampling Criteria

The PPS data collection period took place over four months in 2009. As previously discussed, participants were recruited via poster advertisements (Appendix C), word of mouth from nurses and social support staff at clinics, and via an unplanned snowball sampling event by participants. Of 135 participants who initially expressed interest in the interview, and completed the consent process, 132 met study criteria:

- Individuals 18 years of age and older

- Individuals living in Manitoba
- Individuals whom the interviewer/author assessed as able to provide informed consent and respond to questions
- Individuals the interviewer/author assessed as not posing a safety threat to the interviewer/author
- Individuals who could fully understand and respond in English
- Individuals with any level of English literacy
- Individuals having been diagnosed with HIV more than 6 months before the start of the survey: This criterion was included in order to asses any behavioural changes that may follow the intensive HIV learning curve after intervention at diagnosis (Colfax et al., 2002; Collins et al., 2001; Fisher & Smith, 2009; Fox et al., 2009). Previous studies suggest these early interventions are very good at reducing high risk behaviours, but fail to distinguish those changes as maintained over the short or long term (Colfax et al., 2002; Collins et al., 2001; Fox et al., 2009; Healthy Living Project Team, 2007; Heckman et al., 1998; Metsch et al., 2008).

3.5 Data Collection

All of the PPS interviews took place in a private office at Nine Circles Community Health Centre. A total of 135 people entered the study and 132 participated until the conclusion of the study. Two individuals were unable to complete the informed consent process, were given their honorarium and thanked for their time without having completed the survey. A third participant chose to withdraw from the PPS after the interview had ended and their survey was pulled, using their unique study id, and destroyed using secure document destruction protocol at the NML.

After the interviewer reviewed the study purpose, and the informed consent process was completed, each study participant was read the survey, one question at a time, by the interviewer/author. Each survey took approximately 45 minutes to complete. To maintain a consistency to the data collection process only one study interviewer/the author was involved. Participants were given a $10 honorarium to reimburse them for any travel costs they had incurred, because of their participation in the study, and to thank them for their time.

Once a survey was completed, the interviewer briefly reviewed the document to correct any inconsistencies whenever possible. This early review process helped maintain uniformity in the collected data. Completed surveys were stored at the interview site in a dedicated secure office, inside a locked cabinet. Only the interviewer had access to the surveys during this portion of the study.

3.6 Data Entry and Cleaning:

Once all surveys had been completed they were safely transported, along with all study materials, to the Canadian Science Centre for Human and Animal Health by the Principle Investigator and author. There the surveys were safely stored in a secure, locked office separate from other study materials (codebook, informed consent documents, study advertisements, administrative documents). These hard copies have since been moved off site to the Public Health Agency of Canada secure long term storage facility. After a specified number of years these documents will be destroyed using the secure document destruction protocol used by Public Health Agency of Canada. The collected data were initially entered into an Epinfo database, by one data-entry clerk/author, for ease of data uploading. Once data entry was finished the Epinfo file was exported to a Microsoft access file and a codebook was established

for use during data cleaning (appendix). Data was cleaned within the access dataset and then imported into SAS 9.2 software for the purposes of statistical analysis.

3.7 Data Collection Instrument:

The PPS survey was created with the intention to gather information about the lives of PLWHA in Winnipeg, Manitoba, Canada. More specifically the study inquired about their demographics, treatment access and adherence, disclosure, HIV transmission risk behaviours, and social support sources and perceptions of those sources.

The questionnaire was based upon several previously validated measurement tools including questions from the Winnipeg injection Drug Epidemiology (WIDE) study (Elliott, L., Blanchard, J., & Dinner, K.I., 1999), the Enhanced Surveillance of Sexually Transmitted Infections among Winnipeg Street Youth Study (C. M. Beaudoin, 2004), and the Epidemiology of Sexually Transmitted Infections and Blood Borne Pathogens in an Inmate Population Study (Beaudoin, C.M., Sloane, M., Wood, M., Larsen, T., Wylie, J.L., Dawood, M., Van Caeseele, P., 2009).

The first section of the study gathered demographic information, including: gender, age at time of the survey, age at time of HIV diagnosis, ethnicity, housing, level of educational attainment, and mental health status.

Next, the survey focused upon sexual behaviours both before and after HIV diagnosis. In addition to asking about specific sexual risk behaviours (oral, insertive and receptive anal, vaginal, multiple partners) the study also inquired about barriers to safer sexual practices, HIV status disclosure, and changes to sexual behaviours since diagnosis.

Alcohol use was included in the survey by asking about its use in general and its use in the last three months before the survey. This section asked if alcohol use had contributed to any

sexual HIV transmission risk sexual behaviours (unprotected oral, anal, or vaginal, or unsafe sex with multiple partners) in the last three months before the study. Finally this section asked about any changes the participants had made to their alcohol use since their diagnosis and about barriers to maintaining safer sexual practices.

Non-injection drug use was included in the PPS survey by asking about their use in general and about their use in the last three months before the survey, and if in that time it had contributed to any high risk transmission sexual behaviours (unprotected oral, anal, or vaginal, or unsafe sex with multiple partners). This section also housed questions about any changes to non-injection drug use since HIV diagnosis.

Injection drug use in general and in the last three months was inquired about in the PPS survey. A set of questions asked if injection drug use, in the last three months, has contributed to any high risk transmission sexual behaviours (unprotected oral, anal, or vaginal, or unsafe sex with multiple partners). This section also included questions focusing on any changes the respondents had to their injection drug use since their diagnosis, any needle sharing behaviours, and any barriers to safer injection practices.

The concluding section of the PPS survey related to treatment and social support. These questions centred on barriers to treatment adherence, medical care access, sources of social support, how these sources are perceived (helpful or not helpful), and who they know is aware of their HIV diagnosis. At the end of the survey are a collection of questions about what supports the participants may find helpful to preventing future HIV transmission and to successfully manage their life with HIV and treatment.

3.8 Analysis Design:

The data were received from PHAC in an access database and were uploaded into SAS 9.2 version (SAS, 2008) for biostatistical analyses.

3.8.1 Missing Data

It was evident early on that the dataset held a fair amount of missing data that was not randomly missing. Due to the nature of the survey design in some of the sections, participants were able to skip certain questions that did not pertain to them. For example, if a respondent answered 'never' to question 28. *'In the last 3 months how often have you had alcohol?'* they would then skip ahead to question 29, by passing all alcohol related questions. This would mean all those questions in the database did not have any information. This skip effect was observed in the social support and risk behaviour sections of the survey.

To account for this effect, and because data that was missing truly at random was so low in the demographics questions, a decision was made to use the SAS statistical software special missing data coding abilities to classify the missing values and give them meaning (skipped, refused, didn't know how to answer). This helped decide how to treat the missing values in further analyses. For example, when creating risk behaviour scores blanks in the questions were coded as 'no' responses, in essence creating binomial variables representing those who either exhibited the behaviour '1' or those who did not '0'.

3.8.2 Social Support Data Transformations

The next analysis step included creating useable variables from the wealth of social support and risk behaviour data that was collected. Many of these individual questions had too few answers, due to the skip effect, to have any statistical validity in analysis (below 5 responses).

Therefore, to ensure that this important data was included in a meaningful way, social support scores and risk scores were created.

The social support questions collected information about the types, and approximate numbers of social support sources that were, first of all, perceived as positive and then those which were perceived as negative (questions 43, 43a, 44, 44a) (Appendix E). For questions 43a (Appendix E) and 44a (Appendix E), however, a different approach had to be used as there was a rather large amount of very detailed information involved. Having indicated any sort of support for each of the categories (Family, Partner(s), Friend(s), Staff/volunteers at service provider/health centre/clinic, or spiritual/religious leaders/advisors or Elders) became a '1', and not having reported any of these became a '0'. These variables therefore became binomial variables showing those who reported any of those sources of social support as a '1'. Then, to further help define social support these answers were grouped into two categories. First a binomial variable was created for those who reported any 'natural' sources of social support (family, partner(s), or friend(s)='1') and a second binomial variable was created for those who had reported any 'formal' sources of social support (staff/volunteers at service provider/health centre/clinic, or spiritual or religious leaders/advisors/Elders='1'). This data transformation process, of defining natural and formal sources of social support, was then repeated for question 44a (Appendix E) which asked about people that were perceived as negative.

Social support data was then further defined by transforming the data for questions 43 and 44 (Appendix E). Binomial variables were created for those who reported at least one person perceived as helpful (or not), at least three people perceived as helpful (or not), and those who reported more than five people perceived as helpful (or not). This process was repeated for question 44 (Appendix E) which inquired about people who were negatively perceived.

3.8.3 Risk Behaviour Data Transformations

Question 22 (Appendix E) of the survey asked respondents about their consensual sexual risk behaviours including frequency of barrier use during any oral sex, receptive anal sex, insertive anal sex, vaginal sex, and sex with multiple partners. A binomial category was created for each sexual risk type in question 22 (Appendix E), indicating if a participant had ever exhibited the behaviour ('1') or had never exhibited the behaviour ('0'). For example, indicating any frequency of unprotected vaginal sex received a score of '1', whereas indicating never having unprotected vaginal sex received a score of '0'. An overall sex score was then created by tallying the binomial categories of sexual risk behaviour type, from question 22 (Appendix E), together. The lowest possible sex score was' 0' and the highest was '5', which would have indicated a participant reporting having ever done all of the following unprotected sexual activities (since diagnosis): oral, insertive anal, receptive anal, vaginal, and multiple partners. Therefore, this score describes the total of the types of sexual risk behaviours of interest exhibited since the time of diagnosis in the PPS participants.

Question 28a (Appendix E) asked respondents about their alcohol use and how it could have influenced their sexual risk behaviours including unprotected oral sex, anal sex, vaginal sex, or sex with multiple partners. A binomial category was made for each of the sexual risk behaviours listed in question 28a (Appendix E). These binomial categories indicated if a participant reported ever exhibiting that risk behaviour ('1') or if they reported never exhibiting that risk behaviour ('0'). For example, having reported any level of unprotected oral sexual activity, after alcohol use, would have resulted in a score of '1', and having reported no unprotected oral sexual activity, after alcohol use, would have resulted in a score of '0'. An overall alcohol-sex score was then created by tallying these binomial alcohol related sexual categories together. The

lowest possible alcohol related sex score was ‘0’ and the highest was ‘5’, which would have indicated a participant reporting all of the following unprotected activities (after alcohol use): oral sex, anal sex, vaginal sex, sex with multiple partners without a barrier change with each new partner, and sex with multiple partners without any barriers at all. Therefore, this score describes the total of the types of alcohol related sexual risk behaviours of interest exhibited in the last three months before the survey in the PPS participants.

This data transformation process was repeated for questions 31b (non-injection drug use) and 35b (injection drug use) in order to create scores (Appendix E). There is one distinction to highlight with the overall scores for non-injection and injection drug use. These scores included an extra behaviour risk value pertaining to sharing drug use paraphernalia. For non-injection drug use a part of question 33 asked ‘*If I smoke drugs I don’t share any of the equipment with others* ’in the last three months (Appendix E). This was turned into binomial variable indicating having shared non-injection drug us equipment (‘1’) nor not (‘0’). This binomial value was added to the overall non-injection drug risk score. This means a minimum score for the non-injection drug use was ‘0’ and the maximum could have been ‘6’. A non-injection drug use related risk score of ‘6’ would have indicated a participant reporting all of the following unprotected activities (after non-injection drug use): oral sex, anal sex, vaginal sex, sex with multiple partners without a barrier change with each new partner, sex with multiple partners without any barriers at all, and sharing any equipment. Therefore, this score describes the total of the types of non-injection drug related risk behaviours of interest exhibited in the last three months before the survey in the PPS participants.

For the injection drug score a section of question 37 asked ‘*I try not to let anyone use any of my equipment*’ in the last three months (Appendix E). This data was turned into a binomial

variable indicating having shared injection drug use equipment (‘1’) nor not (‘0’). This binomial value was added to an overall injection drug risk score. This means a minimum score for the injection drug use was ‘0’ and the maximum could have been ‘6’. An injection drug risk score would have indicated a participant reporting all of the following unprotected activities (after injection drug use): oral sex, anal sex, vaginal sex, sex with multiple partners without a barrier change with each new partner, sex with multiple partners without any barriers at all, and sharing any equipment. Therefore, this score describes the total of the types of injection drug related risk behaviours of interest exhibited in the last three months before the survey in the PPS participants.

Next an overall substance use related risk score was created by tallying all of the binomial categories created for alcohol, non-injection drug use, and injection drug use. The minimum possible overall substance use related risk score was ‘0’ and the maximum was ‘17’. This score describes the total types of substance related risk behaviours of interest, exhibited in the last three months before the survey, in the PPS participants.

It is important to note that the sexual risk behaviour data were not combined with the substance use related data, for the creation of an overall risk score, for several reasons. The first of these reasons was a difference in time scale. The sexual risk behaviour questions used by the PPS survey inquired about those types of sexual risk behaviours exhibited since time of diagnosis with HIV. The substance use related questions inquired about the types of risk behaviours exhibited in the last three months before the PPS. Because of this variation it would not have made sense to combine these variables into one overarching risk score. As well, the specific sexual risk behaviours asked about in the PPS differed from the specific sexual risks asked about in the substance use related questions. Specifically, sexual risk behaviours asked about both unprotected ‘insertive anal sex’ and ‘receptive anal sex’, whereas the substance use

related risk questions asked only about unprotected 'anal sex'. There was also a difference, between sexual related risk score and substance use related risk scores, in the way 'sex with multiple partners' information was collected. The substance use related risk question asked about completely unprotected 'sex with multiple partners' and about foregoing barrier changes between partners during 'sex with multiple partners'. The sexual risk behaviour question did not make this distinction and only asked about unprotected 'sex with multiple partners'. The consequence of this is a division in the multivariate analysis was made. Two separate regression models were built, one for the sexual transmission risk score and one for the overall substance use risk score which included alcohol, non-injection drug, and injection drug risk behaviours.

3.8.4 Univariate, and Multivariate Analyses

Descriptive analyses were carried out for all outcome variables of interest beginning with demographic information in order to report frequencies, percentages, and distributions. Gender, mental health diagnosis, education, ethnicity, age at time of survey, age at diagnosis, were all examined. A new variable "*time since diagnosis*" was created by subtracting "*age at diagnosis*" from "*age at time of survey*".

Then the new social support categories were examined with descriptive analyses, including; total score of positively perceived people reported, total score of negatively perceived people reported, any natural positively perceived sources of social support reported, any natural negatively perceived sources of social support reported, any formal positively perceived sources of social support reported, any formal negatively perceived sources of social support reported, those reporting at least one positively perceived person, those reporting at least 3 positively perceived people, those reporting more than 5 negatively perceived people, those reporting at least 1 negatively perceived person, those reporting at least 3 negatively perceived people, those

reporting more than 5 negatively perceived people, those reporting no positively perceived people, and finally, those reporting no negatively perceived people.

The new risk behaviours variables were examined using univariate analyses as well, including: overall score of the types of sexual risk behaviours exhibited since the time of diagnosis, and the scores for types of sexual risks exhibited in the last three months before the survey, that were influenced by the use of alcohol, non-injection drug use, and injection drug use. The total substance use risk score was also examined.

Appropriate univariate analyses were selected to examine associations between demographics against other demographics, demographics against social support and risk behaviour variables, and social support variables and risk behaviour variables. The specific analyses utilised are listed in the results section, but generally speaking parametric methods were used for normally distributed dependent variables, and non-parametric methods were enabled for those that were not normally distributed.

Two regression models were built in order to better understand how transmission risk behaviours were affected by the social support and demographic variables under study. A cumulative logistic regression model was chosen for the sexual risk score for several reasons. First, the dependent variable, sexual risk score, is a Poisson-distributed ordinal count variable meaning there is an inherent order to the variable's categories. This means the use of a multinomial logistic model would not have been a good fit, as it is only appropriate for a nominal dependent variable. In addition, sexual risk scores are based upon a fluctuating time parameter, time since diagnosis. This lack of a fixed time interval disqualifies it from being examined by a Poisson model, for instance, which was under consideration because of the distribution of this data (Figure 5). Poisson regression modelling was however used to examine the overall

substance use risk behaviour score. This dependent variable consists of a count based upon a fixed time frame (the last three months before the PPS survey was taken). The distribution of the overall substance use related risk score data also warranted this choice of regression model (Figure 6).

CHAPTER 4: RESULTS

4.1 Research Objective 1

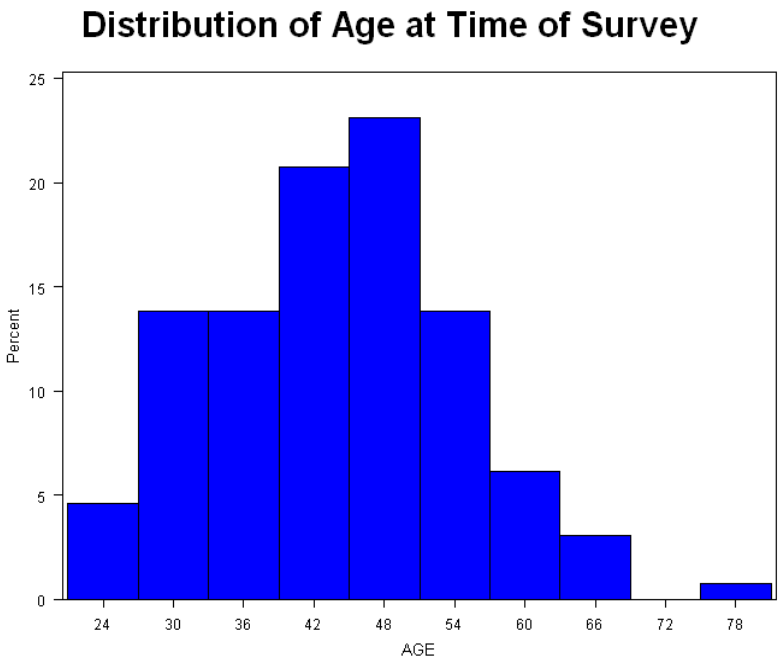
A total of 132 participants completed the PPS survey. The questions of interest to this study inquired about respondents demographic data including: age at time of survey, age at time of diagnosis, education level, mental health status, and self defined gender, and ethnicity. Time since diagnosis was then calculated and included in this list. This section reports significant findings of the descriptive and univariate analyses, performed upon these demographic variables, which were prepared to better understand the study population and to guide further analyses.

4.1.1 Descriptive Examination of Gender and Univariate Examination of Gender by Age at Time of Survey, Age at Diagnosis, and Time Since Diagnosis:

Table 1 displays the results, by self defined gender, of the initial examination upon the various age and time measurements taken. Participants were asked to self identify their gender, choosing from: Male, Female, Trans M-F, Trans F-M, Not sure/Haven't decided/Questioning, and Refused. The classifications chosen by respondents were either male (61.4% (n=81)) or female (37.9% (n=50)) (Table 1). None of the other classifications of gender were chosen by participants in this study.

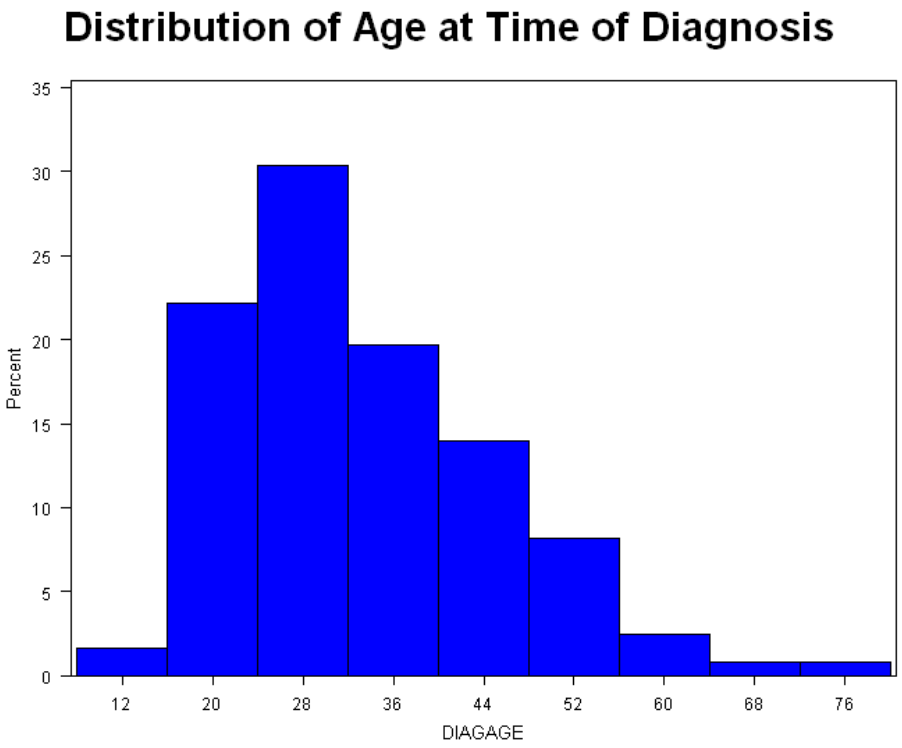
The mean age of all study participants was 43.2 years (SD=10.44) (Table 1). Keeping in mind that the PPS only interviewed adults (18 years or older), and the 2009 Manitoba provincial HIV report included all age ranges, a statistical comparison of the total mean age was not made (Manitoba Health, Public Health Planning, Primary Health Care Division, 2010). It can generally be stated though, that the study participants were slightly older, which makes sense since the younger ages were excluded from the study. Those who identified as female were slightly younger with a mean age of 39.2 years (SD=9.99) versus those who identified as male with a mean age of 45.7 years (SD=10.37) (Table 1). Comparing the gender and age results to the total population of Manitobans living with HIV/AIDS, in 2009, it seems that the study reflects this general situation. The province reported the number of male cases was greater than female cases for those 30 years of age and older (Manitoba Health, Public Health Planning, Primary Health Care Division, 2010). Age data were normally distributed (Figure 2).

Figure 2.



The mean age at time of diagnosis (Diagage) was 32.6 years (SD=11.27) (Table 1). Mean age at time of diagnosis of those who identified as male was 34.8 years (SD=12.14) and for those who identified as female was 29.2 years (SD=8.8) (Table 1). The difference between the means was found to be significant. Age at time of diagnosis data was left skewed (Figure 3).

Figure 3.



The mean time since diagnosis (TSD) was 10.5 years (SD=6.83) (Table 1). Those who had been living with their diagnosis for less than a year ended up scoring 0 on this scale. Mean TSD for those who identified as female had a mean TSD of 9.5 years (SD=5.63) and those who identified as male had a mean of 11.1 years (SD=7.46) (Table 1). The difference in means was found to not be significant. Time since diagnosis distribution is shown in Figure 4.

Figure 4.

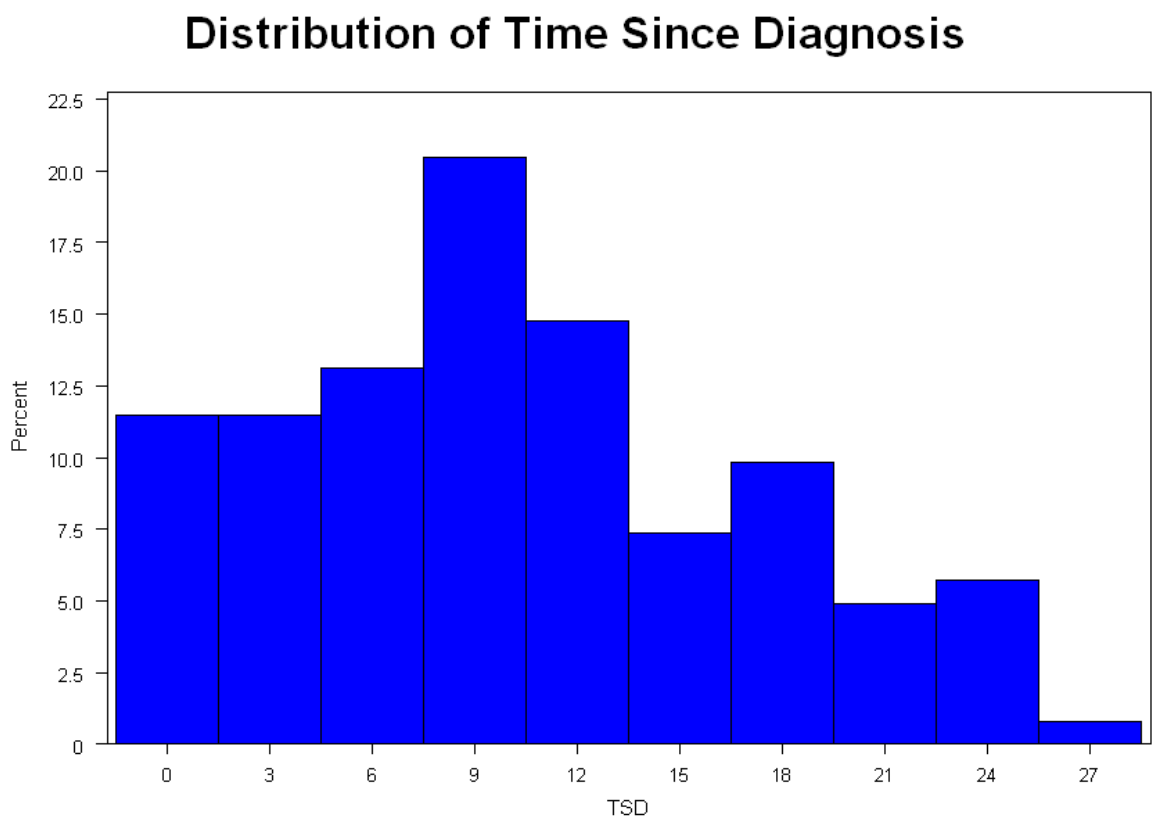


Table 1. Analysis of Age and Time Measurements by Self Defined Gender

	Total (131)		Male (81)		Female (50)		Test statistic
Age/Time Measurements	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**	
Mean age (at time of study) in years	43.2	10.44	45.7	10.37	39.2	9.99	t=3.60, p<0.05
Mean age (at time of diagnosis) in years	32.6	11.27	34.8	12.14	29.2	8.81	Wilcoxon- Mann-Whitney*, p<0.05
Mean time since diagnosis in years	10.5	6.83	11.1	7.46	9.5	5.63	t=0.19, p=n.s.

*Age at time of diagnosis data distribution skewed left, non-parametric analysis used.

4.1.2 Descriptive Examination of Education and Univariate Examination of Education by Gender, Ethnicity, Mental Health Diagnosis, Age at Time of Survey, Age at Time of Diagnosis, and Time Since Diagnosis:

With a mean age of 43 it was expected that the vast majority of respondents would have completed at least their high school or GED equivalent, but this was not the case, instead educational attainment was found to be much lower. The majority of participants reported having not completed high school or GED equivalent (Table 2). Of the six categories of educational attainment used for this variable, ranging from 'grade 8 or less' to 'university degree/college diploma', the level most reported by respondents was 'high school (still enrolled)'. A total of 52 participants (40.6%) chose this category (Table 2).

Generally, male participants reported higher educational attainment than female participants. This difference was statistically significant ($p<0.05$) (Table 2). A Fisher's exact test was used because the χ^2 comparison (of education by gender) yielded more than 25% of test cells with counts lower than 5 (Table 2). Male and female participants mostly reported the 'high school (still enrolled) category, 27.3% (n=35) and 13.3% (n=17) respectively (Table 2).

Table 2. Analysis of Education and Education Examined by Self Defined Gender

	Total (131)		Male (81)		Female (50)		Test statistic
Education (detailed variable)	N	%	N	%	n	%	
Grade 8 or less	13	10.2	3	2.34	10	7.8	
High School, not enrolled	10	7.8	4	3.1	6	4.7	
High School, still enrolled	52	40.6	35	27.3	17	13.3	Fisher's exact* $p<0.05$
High School diploma, or GED	29	22.7	19	14.8	10	7.8	
Some University or College	8	6.3	7	8.75	1	0.8	
University degree or College Diploma	16	12.5	12	15.0	4	3.1	

*This data, when compared to gender, yielded 25% of χ^2 test cells less than 5 count, therefore Fisher's Exact test was utilized.

When education was examined by ethnicity, both as detailed variables, the Fisher's exact test statistic could not be reported (Table 3). The χ^2 statistic was examined as a reference and was shown to be not significant ($p=0.45$) (Table 3). In order to examine these variables a Fisher exact statistic was enabled using education as a binomial variable (between those who finished high school or GED equivalent, and those who had not). This examination also showed no significance ($p=0.24$) (Table 3).

Table 3. Analysis of Education by Self Identified Ethnicity

Ethnicity (% of total sample population)	Aboriginal (65.1%)		Asian (1.6%)		Black (2.3%)		Caucasian (24.8%)		Latino (0.8%)		Mixed (3.1%)		Other (2.3%)		Test statistic
Education	**N**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**N**	**%**	**N**	**%**	**n**	**%**	
Grade 8 or less	8	6.3	0	0	0	0	5	3.9	0	0	0	0	0	0	Fisher's exact* Because over 80% of cells <5 count could not compute. As a reference the χ^2 was n.s. (p=0.45)
High School, not enrolled	5	3.9	0	0	1	0.8	3	2.4	0	0	0	0	1	0.8	
High School, still enrolled	39	30.7	1	0.8	0	0	7	5.5	0	0	3	2.4	2	1.6	
High School diploma, or GED	18	14.2	0	0	1	0.8	8	6.3	0	0	1	0.8	0	0	
Some University or College	5	3.9	0	0	0	0	3	2.4	0	0	0	0	0	0	
University degree or College Diploma	7	5.3	1	0.8	1	0.8	6	4.7	1	0.8	0	0	0	0	

Education as a binomial variable	**n**	**%**	**Test statistic**
Less than high school/GED	75	59.1%	Examined versus ethnicity, Fisher's exact p=0.24, n.s.
Completed high school/GED	52	40.9%	

*This data, when compared to gender, yielded 25% of χ^2 test cells less than 5 count, therefore Fisher's exact test was utilized.

Having ever had a mental health diagnosis had no effect on educational attainment, where p=0.19 (Table 4). Similarly, there was no association between education and age at time of survey (F=1.67), age at time of diagnosis (p=0.09), or time since diagnosis (F=1.62) (Tables 5, 6, 7 respectively).

Table 4. Analysis of Education by Mental Health Diagnosis (ever)

	Total		No Mental Health Diagnosis		Mental Health Diagnosis		Test statistic
Education	n	%	N	%	n	%	
Grade 8 or less	13	10.2	4	3.1	9	7.0	
High School, not enrolled	10	7.8	2	1.6	8	6.3	
High School, still enrolled	52	40.6	28	21.9	24	18.8	Fisher's exact*, p=0.19, n.s.
High School diploma, or GED	29	22.7	14	10.9	15	11.7	
Some University or College	8	6.3	5	3.9	3	2.3	
University degree or College Diploma	16	12.5	5	3.9	11	8.6	

*This data, when compared to gender, yielded 25% of χ^2 test cells less than 5 count, therefore used Fisher's exact test.

Table 5. Analysis of Education by Age at Time of Survey			
	Age at Survey		Test Statistic
Education	**MEAN**	**SD**	
Grade 8 or less	41.5	14.5	ANOVA, F=1.67, n.s.
High School, not enrolled	40.5	12.5	
High School, still enrolled	44.3	9.2	
High School diploma, or GED	40.1	9.9	
Some University or College	50.3	7.6	
University degree or College Diploma	44.4	9.5	

Table 6. Analysis of Education by Age at Time of Diagnosis			
	Age at Diagnosis		Test Statistic
Education	MEAN	SD	
Grade 8 or less	29.5	17.3	Kruskal Wallis*, p=0.09, n.s.
High School, not enrolled	31.3	10.5	
High School, still enrolled	32.4	10.5	
High School diploma, or GED	30.3	8.6	
Some University or College	37.4	12.9	
University degree or College Diploma	37.3	10.1	

*Age at time of diagnosis data distribution skewed left, non-parametric analysis used.

Table 7. Analysis of Education by Time Since Diagnosis			
	Time Since Diagnosis		Test Statistic
Education	MEAN	SD	
Grade 8 or less	10.4	3.9	
High School, not enrolled	9.2	6.1	
High School, still enrolled	12.1	6.5	ANOVA, F=1.62, n.s.
High School diploma, or GED	9.8	7.5	
Some University or College	12.9	10.2	
University degree or College Diploma	7.2	6.2	

4.1.3 Descriptive Examination of Ethnicity and Univariate Examination of Ethnicity by Mental Health Diagnosis, Age at Time of Survey, Age at Time of Diagnosis, and Time Since Diagnosis

The univariate examination of ethnicity reveals 84 participants, 65.1%, self identified as Aboriginal (Table 8). The next most chosen ethnicity category was Caucasian at 24.8% (n=32) (Table 8). The other ethnicity categories, Asian, Black, Latino, Mixed Ethnicity and Other, all totalled approximately 10% of the sample, collectively (Table 8).

There was a significant association between ethnicity and gender, where the Fisher's exact p value was less than 0.05 (Table 8). Those who identified as Caucasian were more likely to have also self identified a Male, 19.4% (n=25), as opposed to female 5.4% (n=7) (Table 8). A higher proportion of both male and female participants identified as Aboriginal, 34.1% (n=44) and 31.0% (n=40) respectively.

Table 8. Analysis of Ethnicity (Descriptive) and Ethnicity by Gender (Univariate)

	Total (131)		Male (81)		Female (50)		Test statistic
Ethnicity	N	%	N	%	N	%	
Aboriginal	84	65.1	44	34.1	40	31.0	
Asian	2	1.6	2	1.6	0	0	
Black	3	2.3	1	0.8	2	1.6	
Caucasian	32	24.8	25	19.4	7	5.4	Fisher's exact* $p<0.05$
Latino	1	0.8	1	0.8	0	0	
Mixed ethnicity	4	3.1	3	2.3	1	0.8	
Other	3	2.3	3	2.3	0	0	

*This data, when compared to gender, yielded 25% of χ^2 test cells less than 5 count, therefore Fisher's exact test was utilized.

Table 9 shows the association between ever having a mental health diagnosis and self identified ethnicity. This effect was significant ($p<0.05$) for the fisher's exact test used (Table 9). Table 9 reveals this association, showing that those who reported ever having received a mental health diagnosis were more likely to identify as Aboriginal (30.2%) or Caucasian (18.6%).

Table 9. Analysis of Ethnicity by Mental Health Diagnosis (ever)

	No Mental Health Diagnosis (Ever)		Mental Health Diagnosis (Ever)		Test Statistic
Ethnicity	**N (59)**	**%**	**N (69)**	**%**	
Aboriginal	45	34.9	39	30.2	Fisher's exact*, $p<0.05$
Asian	0	0	2	1.6	
Black	2	1.6	1	0.8	
Caucasian	8	6.2	24	18.6	
Latino	0	0	1	0.8	
Mixed ethnicity	3	2.3	1	0.8	
Other	1	0.8	2	1.6	

*This data, when compared to gender, yielded 25% of χ^2 test cells less than 5 count, therefore Fisher's exact test was utilized.

Ethnicity and age at time of survey were shown to have a significant association in an ANOVA statistical analysis where F=2.67>critical F value, and $p<0.05$ (Table 10). Upon closer inspection, using a Tukey's test for comparison of the mean age of each ethnic category, only one paring was shown to be significant: Caucasian participants were significantly older than Aboriginal participants ($p<0.05$) (Table 10). Age at time of diagnosis, and time since diagnosis were shown to have no association with ethnicity in their respective analyses (Table 10).

Table 10. Analysis of Self Identified Ethnicity by Age and Time Measurements

	Age at Time of Study (Years)		Age at Time of Diagnosis (Years)		Time since Diagnosis (Years)	
Self Identified Ethnicity	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Aboriginal	40.8	9.6	30.7	9.9	10.0	6.2
Asian	56.0	15.6	44.0	31.1	12.0	15.6
Black	41.3	15.1	29.0	11.0	12.3	6.5
Caucasian	48.0	10.1	36.6	12.1	11.6	8.2
Latino	48.0	0	39.0	0	9.0	0
Mixed ethnicity	41.5	14.1	30.7	16.1	8.3	9.1
Other	43.0	2.0	30.5	0.7	11.5	0.7
Test Statistic	ANOVA F=2.67>critical, p<0.05		Kruskal Wallis* p=0.31, n.s.		ANOVA F=0.32<critical, p=0.93, n.s.	

*Age at time of diagnosis data distribution skewed left, non-parametric analysis used.

4.1.4 Descriptive Examination of Mental Health and Univariate Examination of Mental Health by Age at Time of Survey, Age at Time of Diagnosis, and Time Since Diagnosis

Within the PPS sample, 54.2% (n=71) reported ever having a mental health diagnosis (Table 11). There was no difference between male and female participants with regard to ever having received a mental health diagnosis (Table 11). Similarly, there was no association between age at time of survey, age at time of diagnosis, or time since diagnosis with ever having received a mental health diagnosis (Table 12).

Table 11. Analysis of Mental Health Diagnosis (ever) by Self Defined Gender							
	Total (131)		Male (81)		Female (50)		Test statistic
Mental Health Status	N	%	N	%	N	%	
diagnosis with a mental health concern, ever	71	54.2	45	34.4	26	19.9	$\chi^2 = 0.69$, n.s.

Table 12. Analysis of Mental Health Diagnosis (ever) by Age and Time Measurements						
	Age at Time of Study (Years)		**Age at Time of Diagnosis (Years)**		**Time since Diagnosis (Years)**	
Mental Health	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
No Mental Health Diagnosis (Ever)	42.4	8.8	30.9	9.7	11.7	6.6
Mental Health Diagnosis (Ever)	43.9	11.7	34.2	12.3	9.5	6.9
Test Statistic	t=0.40, n.s.		Wilcoxon Mann Whitney* p=0.19, n.s.		t=0.08, n.s.	

*Age at time of diagnosis data distribution skewed left, non-parametric analysis used.

4.1.5 Descriptive Examination of Time Since Diagnosis by Age at Time of Survey and Age at Time of Diagnosis, and Univariate Examination of Age at Time of Survey and Age at Time of Diagnosis

Time since diagnosis was positively correlated with age at time of survey (correlation coefficient of 0.22, $p<0.05$) (Table 13). This means those who were older at the time of taking the PPS survey had been living with HIV/AIDS longer, as compared to younger participants. Time since diagnosis was negatively associated with age at time of diagnosis (Spearmans rho (two-tailed) = -0.37) (Table 13). Those participants who had reported older ages at time of diagnosis had been living with HIV/AIDS for a shorter amount of time. Not surprisingly, age at time of survey was also found to be positively correlated with age at time of diagnosis

(Spearmans rho (two tailed) = 0.77, p<0.0001) (Table 14). This reveals that older participants had reported older ages of diagnosis.

Table 13. Analysis of Time Since Diagnosis by Age at Time of Survey, and Age at time of Diagnosis

	Age at Time of Study (Years)	**Age at Time of Diagnosis (Years)**
	Correlation Coefficient	**Correlation Coefficient**
Time since diagnosis (Years)	0.22, p<0.05	Spearman*, rho=-0.37, p<0.0001

*Age at time of diagnosis data distribution skewed left, non-parametric analysis used.

Table 14. Analysis of Age at Time of Survey by Age at Time of Diagnosis

	Age at Time of Diagnosis (Years)
	Correlation Coefficient
Age at Time of Study (Years)	Spearman*, rho=0.77, p<0.0001

*Age at time of diagnosis data distribution skewed left, non-parametric analysis used.

4.2 Research Objective 2

4.2.1 Descriptive Examination of Helpful and Harmful Social Support Reported by Study Participants

The Descriptive examinations of the social support variables under study are presented in Table 15. The majority of participants reported having any positively perceived social support, from various sources, in their lives. High numbers of participants reported any positively perceived social support from family, partners, friends, and staff at service/health care providers. Fewer, however, reported any positively perceived social support from religious/spiritual sources (38.8%, n=38) (Table 15). The numbers of those reporting any negatively perceived social

support from these sources was much lower compared to positively perceived social support. The most reported categories of negatively perceived social support are friends (49.2%, n=30) and family (37.3%, n=22).

Natural social support was defined, in the current study, as having reported any social support from family members, partners, or friends. In this context, 78.0% (n=103) reported having any positively perceived natural social support and 66.1% (n=41) reported having any negatively perceived social support, that is, people who make life more difficult for participants (Table 15).

Formal social support was defined as having reported any social support from staff at service providers/health care providers or from religious/spiritual leaders. In this context, 72.0% (n=95) reported having any positively perceived formal social support and 8.3% (n=11) reported having any negatively perceived formal social support (Table 15).

The number of positively and negatively perceived people in respondents' lives was then examined. 79.6% (n=105) of participants report having at least one person in their life who is perceived as positive social support, 59.9% (n=79) reported at least 3, and 39.4% (n=52) reported more than 5 (Table 15). 43.2% (n=57) reported having at least one person perceived as making life more difficult, 18.9% (n=25) reported at least 3, and 39.4% (n=15) reported more than 5 (Table 15).

The number of participants reporting no positively or negatively perceived social support at the time of the PPS survey was also examined. 20.5% (n=27) of participants reported no positively perceived social support and 56.8% (n=75) of participants reported no negatively perceived social support.

Table 15. Descriptive Analysis of Detailed Sources of Social Support

	Positively perceived		Negatively Perceived	
Those Reporting ANY of the Following Sources of Social Support	**N**	**%**	**N**	**%**
Family	81	77.1	22	37.3
Partner(s)	75	74.3	12	20.0
Friend(s)	74	69.8	30	49.2
Staff at Providers	94	90.4	10	15.9
Religious/Spiritual Leader	38	38.8	3	5.3
Natural (Family, Partner(s), Friend(s))	103	78.0	41	66.1
Formal (Staff at Providers, Religious/Spiritual)	95	72.0	11	8.3
At Least 1 People	105	79.6	57	43.2
At Least 3 People	79	59.9	25	18.9
5+ People	52	39.4	15	11.4
None	27	20.5	75	56.8

Positive and negative social support scores were also examined. Table 16 reveals how participants responded to this question on the PPS survey. The most common categories chosen were more than five people positively perceived (44.8%, n=52) and no negatively perceived social support (51.7%, n=61) (Table 16).

Table 16. Descriptive Analysis of Social Support Score

	Positively Perceived		Negatively Perceived	
Those Reporting the Following Numbers of people in their social support network	**N**	**%**	**N**	**%**
0	11	9.5	61	51.7
1-2	26	22.4	32	27.1
3-5	27	23.3	10	8.5
5+	52	44.8	15	12.7

4.3 Research Objective 3

4.3.1 Univariate Analysis Social Support Variables of Interest with Demographic Variables under Study

Reporting of any positively and negatively perceived family and partner sources of social support were not found to be associated with any of the demographic factors included in this analysis. When examining friend based social support however, it was revealed that educational attainment was associated with reporting positive friend based social support ($p<0.05$) (Table 17). Those with higher educational attainment were found to be more likely to report positively perceived social support from a friend(s).

Table 17. Univariate Analysis of Positively Perceived and Negatively Perceived Friend Based Social Support by Demographics

	Positively Perceived		**Negatively Perceived**	
Variable of Interest		Test Statistic		Test Statistic
Age at time of survey	p=0.59, n.s.	Logist	p=0.14, n.s.	Logist
Age at time of diagnosis	p=0.90, n.s.	Logist	p=0.65, n.s.	Logist
Time since diagnosis	p=.43, n.s.	Logist	p=0.14, n.s.	Logist
Education	p<0.05	Fisher's Exact	p=0.98, n.s.	Fisher's Exact
Ethnicity	p=0.61, n.s.	Fisher's exact	p=0.47, n.s.	Fisher's Exact
Mental Health Diagnosis (Ever)	χ^2=0.30, p=0.58, n.s.	χ^2	χ^2=0.01, p=0.91, n.s.	χ^2
Gender	χ^2=0.09, p=0.76, n.s.	χ^2	χ^2=0.45, p=0.50, n.s.	χ^2

Table 18 shows the results of the analyses of social support from staff at service providers or health care centres, both positively perceived and negatively perceived. Older age at time of survey was associated with reporting negatively perceived social support from a staff based source (Table 18).

Table 19 shows the results of the analyses of social support from religious/spiritual leaders, both positively and negatively perceived. Lower educational attainment was associated with reporting positively perceived religious/spiritually based social support (Table 19).

Table 18. Univariate Analysis of Positively Perceived and Negatively Perceived Staff Based Social Support by Demographics				
	Positively Perceived		**Negatively Perceived**	
Variable of Interest		Test Statistic		Test Statistic
Age at time of survey	p=0.50, n.s.	Logist	p<0.05	Logist
Age at time of diagnosis	p=0.65, n.s.	Logist	p=0.17, n.s.	Logist
Time since diagnosis	p=.09, n.s.	Logist	p=0.32, n.s.	Logist
Education	p=0.80, n.s.	Fisher's Exact	p=0.91, n.s.	Fisher's Exact
Ethnicity	p=0.62, n.s.	Fisher's Exact	p=0.50, n.s.	Fisher's Exact
Mental Health Diagnosis (Ever)	χ^2=0.44, p=0.51, n.s.	χ^2	p=0.49, n.s.	Fisher's Exact
Gender	p=0.52, n.s.	Fisher's Exact	p=1, n.s.	Fisher's Exact

Table 19. Univariate Analysis of Positively Perceived and Negatively Perceived Religious/Spiritual Leader Based Social Support by Demographics				
	Helpful		**Harmful**	
Variable of Interest		Test Statistic		Test Statistic
Age at time of survey	p=0.29, n.s.	Logist	p=0.47, n.s.	Logist
Age at time of diagnosis	p=0.81, n.s.	Logist	p=0.85, n.s.	Logist
Time since diagnosis	p=.24, n.s.	Logist	p=0.17, n.s.	Logist
Education	p<0.05	Fisher's Exact	p=0.30, n.s.	Fisher's Exact
Ethnicity	p=0.10, n.s.	Fisher's Exact	p=0.17, n.s.	Fisher's Exact
Mental Health Diagnosis (Ever)	χ^2=0.009, p=0.93, n.s.	χ^2	p=0.25, n.s.	Fisher's Exact
Gender	χ^2=0.10, p=0.75, n.s.	χ^2	p=1, n.s.	Fisher's Exact

Age at time of survey was associated with reporting any negatively perceived sources of formal social support ($p<0.05$) (Table 20). With each year of age (increasing) the odds of reporting any negatively perceived sources of social support increased (point estimate 1.07). None of the other demographic variables were found to have a significant relationship with reporting any negatively perceived formal sources of social support.

Table 20. Univariate Analysis of Those Reporting Any Negatively Perceived Formal Source of Social Support by Demographic Variables

Variable of Interest		Test Statistic
Age at time of survey	$p<0.05$	Logist
Age at time of diagnosis	$p=0.28$, n.s.	Logist
Time since diagnosis	$p=0.31$, n.s.	Logist
Education	$p=0.77$, n.s.	Fisher's Exact
Ethnicity	$p=0.67$, n.s.	Fisher's Exact
Mental Health Diagnosis (Ever)	$\chi^2=0.02$, $p=0.90$, n.s.	χ^2
Gender	$\chi^2=1.66$, $p=0.20$, n.s.	χ^2

The demographic variables of interest were not found to have any effect on any of the other social support categories including: those reporting any natural social support (positively or negatively perceived), any positively perceived formal social support, those reporting any number of positively perceived or negatively perceived people in their lives (social support score), those reporting at least 1 positively or negatively perceived source of social support, those reporting at least 3 positively or negatively perceived people in their lives, those reporting 5 or more positively or negatively perceived people in their lives, those reporting no positively

perceived sources of social support, or those reporting no negatively perceived sources of social support.

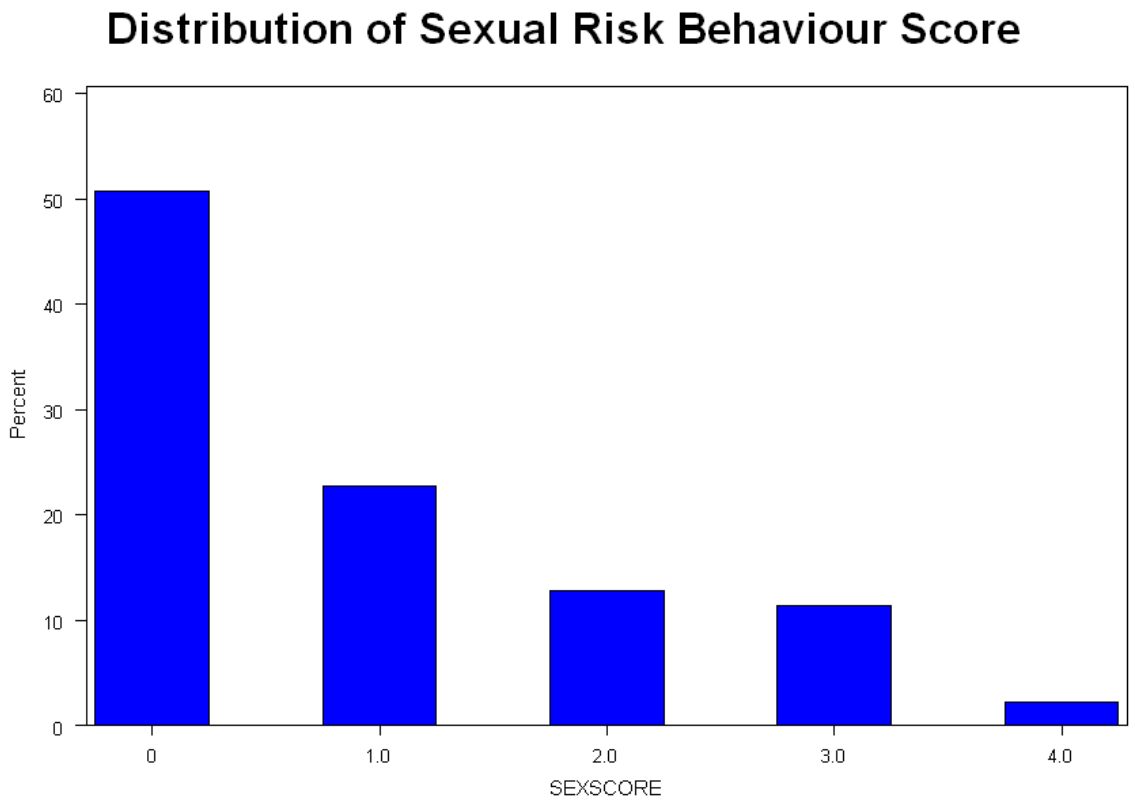
4.4 Research Objective 4

4.4.1 Descriptive Analyses of Sexual Risk Behaviour Measures Under Study

The sexual transmission risk behaviour variables measured five separate sexual risk behaviours and an overall score of how many of those risk categories each participant exhibited since the time of their diagnosis with HIV. Overall, 49.2% (n=65) of participants reported any of the sexual risk behaviours under investigation. The most reported categories of sexual risk were unprotected oral sex (32.6%, n=43) and unprotected vaginal sex (28.8%, n=38). When considering the sexual risk score variable roughly half of the participants reported engaging in at least one type of sexual risk behaviour since the time of their HIV diagnosis (Table 21). Further, 22.7% (n=30) reported one type, 12.8% (n=17) reported two types, 11.4% (n=15) reported three types, and 2.3% (n=3) reported four types of sexual risk behaviour (Table 21).

Table 21. Descriptive Analysis of Sexual Risk Behaviour Variables Under Study (by Gender)						
Those Reporting the following unprotected sex risk behaviours (ever, since diagnosis)						
	Total		**Male (81)**		**Female (50)**	
	N	**%**	**N**	**%**	**N**	%
Unprotected Oral Sex	43	32.6	30	38.0	13	16.5
Unprotected Receptive Anal Sex	16	12.1	11	28.2	5	12.8
Unprotected Insertive Anal Sex	17	12.9	13	37.1	4	11.4
Unprotected Vaginal Sex	38	28.8	25	30.1	13	15.7
Unprotected Sex with Multiple Partners	7	5.3	5	26.3	2	10.5
Ever Any Sexual Risk (reported ANY type of sexual transmission risk behaviour, since HIV diagnosis)	65	49.2	44	33.6	21	16.0
Sexual Risk Score (the number of types of risk behaviours exhibited, since HIV diagnosis)						
0	67	50.8	37	28.2	29	22.1
1	30	22.7	20	15.3	10	7.6
2	17	12.8	11	8.4	6	4.6
3	15	11.4	10	7.6	5	3.8
4	3	2.3	3	2.3	0	0

Figure 5.



4.4.2 Descriptive Analyses of Alcohol Use Related Risk Behaviours Under Study

Five different alcohol related sexual risk variables were investigated along with a score of the number of types of risks exhibited by each participant in the last three months before the survey. All alcohol-related risk categories were reported except for sex with multiple partners with no condom changes between partners. Overall 23.5% (n=31) of participants reported any alcohol related sexual risk behaviours (Table 22). The most common alcohol-related risk behaviours reported amongst participants were unprotected oral sex (15.9%, n=21) and unprotected vaginal sex (12.1%, n=16) (Table 22). The alcohol-related sexual risk behaviour score showed the majority of participants (76.5%, n=101) did not report exhibiting any of these

risk behaviours (Table 22). Further, 13.6% (n=18) reported one type, 6.8% (n=9) reported two types, and 3.0% (n=4) reported three types of alcohol related sexual risk behaviours (Table 22). None of the participants reported exhibiting four or five types of alcohol-related sexual risk behaviours (Table 22).

Table 22. Descriptive Analysis of Alcohol Related Risk Behaviour Variables Under Study (by Gender)

Those reporting the following risk behaviours (in the last three month before the PPS survey) after using alcohol:						
	Total		**Male**		**Female**	
	N	**%**	**N**	**%**	**N**	%
Unprotected Oral Sex	21	15.9	14	10.7	7	5.3
Unprotected Anal Sex	10	7.6	9	6.9	1	0.8
Unprotected Vaginal Sex	16	12.1	9	6.9	7	5.3
Unprotected Sex with Multiple Partners (no condom change between partner change)	0	0	0	0	0	0
Unprotected Sex with Multiple Partners (no condom at all)	1	0.8	0	0	1	0.8
Ever Any Sexual Risk (reported ANY type of sexual transmission risk behaviour, in the 3 months before the PPS survey)	31	23.5	18	13.7	13	9.9
Sexual Risk Score (the number of types of risk behaviours exhibited, in the 3 months before the PPS survey)						
0	101	76.5	63	48.1	37	28.2
1	18	13.6	7	5.3	11	8.4
2	9	6.8	8	6.1	1	0.8
3	4	3.0	3	2.3	1	0.8

4.4.3 Univariate Analyses of Non-Injection Drug Related Risk Behaviour Measures Under Study

The non-injection drug risk behaviour section of the analysis includes five sexual risk behaviours and one risk relating to the sharing of non-injection drug paraphernalia. This section also includes an overall risk score including all six risk variables. All variables relate to the time period of the last three months before the completion of the PPS survey. Overall 28.0% (n=37) of respondents reported any non-injection drug related risk behaviours in the last three months before the completion of the survey (Table 23). Only one risk category was not reported, that being unprotected sex with multiple partners (no condom at all) (Table 23). Of the individual non-injection drug related sexual risk behaviours the most reported of them were unprotected oral sex (11.4%, n=15) and unprotected vaginal sex (8.3%, n=11) (Table 23). The non-injection drug use related risk behaviours (sharing non-injection drug paraphernalia) was reported by 17.4% (n=25) of participants. The overall non-injection drug risk score results showed 72.0% (n=95) of participants reported none of the risk behaviours (Table 23). Further, 17.4% (n=23) reported one type, 4.6% (n=2) reported two types, and 6.1% (n=6) reported three types of non-injection drug related risk behaviors (Table 23). None of the participants reported four, five, or six types of non-injection drug related risk behaviours in the last 3 months prior to completing the survey.

Table 23. Descriptive Analysis of Non-Injection Drug Related Risk Behaviour Variables Under Study		
Those reporting the following risk behaviours (in the last three month before the PPS survey) after using non-injection drugs:		
	N	**%**
Unprotected Oral Sex	15	11.4
Unprotected Anal Sex	6	4.6
Unprotected Vaginal Sex	11	8.3
Unprotected Sex with Multiple Partners (no condom change between partner change)	2	1.5
Unprotected Sex with Multiple Partners (no condom at all)	0	0
Ever Any Sexual Risk (reported ANY type of sexual transmission risk behaviour, in the 3 months before the PPS survey)	37	28.0
Sexual Risk Score (the number of types of risk behaviours exhibited, in the 3 months before the PPS survey)		
0	95	72.0
1	23	17.4
2	2	4.6
3	6	6.1
Those who have shared non-injection drug paraphernalia	25	17.4

4.4.4 Descriptive Analyses of Injection Drug Use Risk Behaviour Measures Under Study

This section of the analysis is concerned with five different injection drug related sexual risk behaviours, one injection drug use risk behaviour relating to sharing injection equipment, and an overall injection risk behaviour score. These variables relate to the time period of the three months prior to completion of the PPS survey. Overall, 6.1% (n=8) of participants reported

ever exhibiting any injection drug risk behaviours. All risk categories were reported, albeit by very few participants. The highest reported risk behaviour was unprotected vaginal sex (1.5%, n=2). The injection drug use risk behaviour (sharing injection equipment) was reported by 6.1%, n=8 participants. The overall injection drug risk score results showed 93.9% (n=124) reported not engaging in any injection drug risk behaviour. Further, 3.8% (n=5) reported one type, and 2.3% (n=3) reported three types of injection drug risk behaviour. None of the participants reported two, four, five, or six injection drug related risk behaviours in the three months previous to the completion of the PPS survey.

Table 24. Descriptive Analysis of Injection Drug Related Risk Behaviour Variables Under Study		
Those reporting the following risk behaviours (in the last three month before the PPS survey) after using injection drugs:		
	N	**%**
Unprotected Oral Sex	1	0.8
Unprotected Anal Sex	1	0.8
Unprotected Vaginal Sex	2	1.5
Unprotected Sex with Multiple Partners (no condom change between partner change)	1	0.8
Unprotected Sex with Multiple Partners (no condom at all)	1	0.8
Ever Any Sexual Risk (reported ANY type of sexual transmission risk behaviour, in the 3 months before the PPS survey)	8	6.1
Sexual Risk Score (the number of types of risk behaviours exhibited, in the 3 months before the PPS survey)		
0	124	93.9
1	5	3.8
2	0	0
3	3	2.3
Those who have shared injection drug paraphernalia	8	6.1

4.4.5 Descriptive Analysis of Overall Substance Use related Risk Behaviour Score

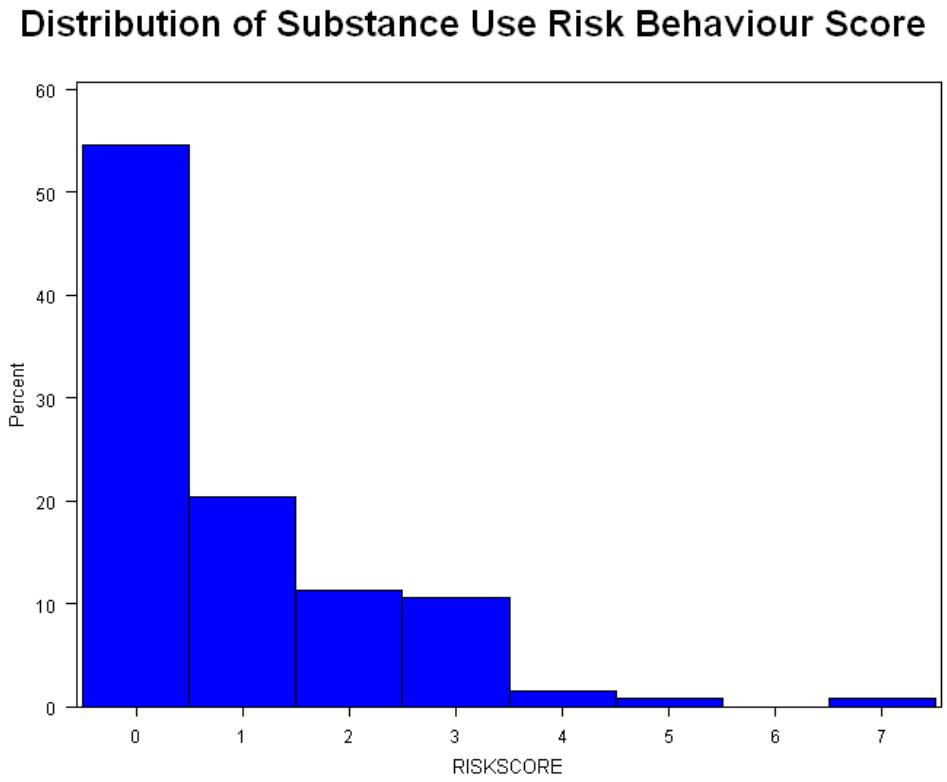
The overall substance use transmission risk behaviour score was a measure which included the alcohol, non-injection drug, and injection drug risk behaviours, relating to both sexual risks and sharing of drug use equipment. Because this variable is based upon the original substance use risk categories, it follows that this measure also relates to a time period of the last

three months before the PPS survey was taken. Overall, 45.4% of participants reported exhibiting at least one substance use related risk behaviour in the 3 months before the survey (Table 25). Further, 20.5% (n=27) reported one type, 11.4% (n=15) reported two types, 10.6% (n=14) reported three types, 1.5% (n=2) reported four types, and 0.8% (n=1) reported 5 and 7 types of substance related transmission risk behaviours (Table 25). No participants reported 6 types (Table 25).

Table 25. Descriptive Analysis of Overall Substance Use Related Risk Behaviour Score (alcohol, non-injection drug, injection drug)

Those reporting the following numbers of substance related risk behaviours after using alcohol, or non-injection drugs, or injection drugs (in the last three month before the PPS survey):		
	N	**%**
Number of Substance-Related Risk Behaviours		
0	72	54.6
1	27	20.5
2	15	11.4
3	14	10.6
4	2	1.5
5	1	0.8
6	0	0
7	1	0.8

Figure 6.



4.4.6 Univariate Analyses of Sexual Risk Behaviour Variables Under Study by Demographics and Social Support

The next section reports the univariate examination of the sexual risk behaviour score using both the demographic and social support variables of interest. Age at time of survey and age at time of diagnosis were found to have significant effect upon sexual risk score in simple linear regression (Table 26). For every unit (year) increase in age at time of survey ($p<0.05$) there is a corresponding 0.02 unit increase in sexual risk score (Table 26). For every unit (year) increase in age at time of diagnosis ($p<0.05$) there is a corresponding 0.02 unit increase in sexual risk score (Table 26). None of the other demographic variables had any effect upon sexual risk

behaviour score. As well, none of the social support variables of interest were found to have any effect upon sexual risk score (Table 27).

Table 26. Univariate Analysis of Sexual Risk Score by Demographic Variables Under Study

Variable of Interest			**Test statistic**
Age at time of survey	F=5.20	p<0.05	Linear regression (parameter est 0.02)
Age at time of diagnosis	F=4.78	p<0.05	Linear regression (parameter est 0.02)
Time since diagnosis	F=0.09	p=0.76, n.s.	Linear regression
Education	χ^2=15.36	p=0.76, n.s.	χ^2
Ethnicity	χ^2=17.31	p=0.84, n.s.	χ^2
Mental Health Diagnosis (Ever)	χ^2=3.35	p=0.50, n.s.	χ^2
Gender		p=0.61, n.s.	Fisher's exact

Table 27. Univariate Analysis of Sexual Risk Score by Social Support Variables Under Study		
Social Support Variable of Interest	**χ^2**	**Pr> χ^2**
Any Natural Negatively Perceived	0.41	0.98, n.s.
Any Formal Negatively Perceived	1.20	0.88, n.s.
No Positively Perceived People	3.56	0.47, n.s.
No Negatively Perceived People	8.48	0.08, n.s.
At least 1 person negatively perceived	8.48	0.08, n.s.
At least 3 person negatively perceived	7.42	0.12, n.s.
More than 5 negatively perceived	1.61	0.81, n.s.
At least 1 Positively Perceived	3.56	0.47, n.s.
At least 3 Positively Perceived	4.97	0.29, n.s.
More than 5 Positively Perceived	2.63	0.62, n.s.
Natural Positively Perceived	3.87	0.42, n.s.
Formal Positively Perceived	5.59	0.23, n.s.
Number of Positively Perceived People (Score)	12.41	0.41, n.s.
Number of Negatively Perceived People (Score)	20.60	0.06, n.s.

4.4.7 Univariate Analyses of Alcohol Risk Behaviour Variables Under Study by Demographic and Social Support

The next section reports the univariate examination of the alcohol risk behaviour score using both the demographic and social support variables of interest. Poisson analysis was used as

the alcohol risk score is a count of the types of alcohol related risk behaviours exhibited in a fixed time frame (in the last three months before the PPS survey was completed) by participants.

Age at time of survey, age at time of diagnosis, and time since diagnosis, mental health diagnosis (ever), and gender were not associated with alcohol risk behaviour score. Education however, did show a relationship (Table 28). The different educational categories were used as reference categories in Poisson regression and two pairings were found to be significant. Those who had not completed high school but were still enrolled and those who had finished a university degree/college diploma had greater odds of being in a higher alcohol risk score category compared to those who had completed high school or GED equivalent (Table 28). Ethnicity also showed an association with number of alcohol risk behaviour types. Those self identifying as Aboriginal, Black, or Caucasian had significantly ($0<0.0001$) greater odds of being in a higher alcohol use risk score category compared to those who identified as Asian, Latino, or Other (Table 28).

There were no significant associations revealed between univariate analyses of alcohol risk score with the social support variables under study (Table 29).

Table 28. Univariate Analysis of Alcohol Risk Score by Demographic Variables Under Study			
Variable of Interest	**Goodness of fit (F)**	**Wald χ^2**	**Pr> χ^2**
Age at time of survey	1.53	0.06	0.81, n.s.
Age at time of diagnosis	1.51	0.28	0.60, n.s.
Time since diagnosis	1.53	1.41	0.23, n.s.
Education (reference category)	**Goodness of fit (F)**	**Significant relationships, parameter est +/-**	**Pr> χ^2**
Grade 8 or less	1.43	None	.
High school, not still enrolled		None	.
High school, still enrolled		High school, GED -	<0.05
High school, GED		High school still enrolled +, completed university/college +	<0.05 <0.05
Some University/College		None	.
University degree/College diploma		High school, GED -	<0.05
Ethnicity (reference category)	**Goodness of fit (F)**	**Significant relationships, parameter est +/-**	**Pr> χ^2**
Aboriginal	1.44	None	.
Asian		Aboriginal + Black+ Caucasian+	<0.0001 <0.0001 <0.0001
Black		None	.
Caucasian		None	.
Latino		Aboriginal + Black+ Caucasian+	<0.0001 <0.0001 <0.0001
Mixed background		None	.
Other		Aboriginal + Black+ Caucasian+	<0.0001 <0.0001 <0.0001
	Goodness of fit (F)	**Wald χ^2**	**Pr> χ^2**
Mental Health Diagnosis (Ever)	1.47	2.97	0.08, n.s.
Gender (male)	1.50	0.47	0.49, n.s.

Table 29. Univariate Analysis of Alcohol Risk Score by Social Support Variables Under Study			
Social Support Variables of Interest	**Goodness of fit**	**Wald χ^2**	**Pr> χ^2**
Natural Harmful	1.56	0	0.96, n.s.
Formal Harmful	1.53	0.27	0.60, n.s.
No Helpful People	1.48	1.81	0.78, n.s.
No Harmful People	1.54	0.04	0.83, n.s.
At least 1 person harmful	1.54	0.04	0.83, n.s.
At least 3 person harmful	1.51	0.49	0.48, n.s.
More than 5 harmful	1.52	0.43	0.51, n.s.
At least 1 helpful	1.48	1.81	0.18, n.s.
At least 3 helpful	1.49	1.56	0.21, n.s.
More than 5 helpful	1.54	0.07	0.79, n.s.
Natural Helpful	1.49	0.78	0.38, n.s.
Formal Helpful	1.54	0.03	0.86, n.s.
Number of Helpful People (Score)	**Goodness of fit**	**Significant differences, parameter estimate +/-**	**Pr> χ^2**
0	1.55	None	.
1		None	.
2		None	.
3		None	.
Number of Harmful People (Score)	**Goodness of fit**	**Significant differences, parameter estimate +/-**	**Pr> χ^2**
0	1.48	None	.
1		None	.
2		None	.
3		None	.

4.4.8 Univariate Analyses of Non-Injection Drug Risk Behaviour Variables Under Study by Demographic and Social Support

The next section reports the univariate examination of the non-injection drug risk behaviour score using both the demographic and social support variables of interest. Poisson analysis was used as the alcohol risk score is a count of the types of non-injection drug related risk behaviours exhibited in a fixed time frame (in the last three months before the PPS survey was completed) by participants.

Age at time of survey, age at time of diagnosis, and time since diagnosis, mental health diagnosis (ever), and education were not associated with non-injection drug risk behaviour score. Ethnicity showed some significant differences between categories in Poisson regression analyses. Those who identified as Latino had a significantly greater odds of being in a higher non-injection drug risk category compared to those who identified as Aboriginal, Black, or Mixed background (Table 30). Also, those who identified as Aboriginal, Asian, Caucasian, had significantly higher odds of being in a higher non-injection drug risk category compared to those who identified as Black or Mixed Ethnicity (Table 30). Gender also showed a significant relationship ($p<0.05$) (Table 30). Those who identified as male had a greater odds of being in a higher non-injection risk score category versus those who identify as females (Table 30).

There were no significant associations revealed between univariate analyses of non-injection drug risk score with the social support variables under study (Table 31).

Table 30. Univariate Analysis of Non-Injection Drug Risk Behaviour Score by Demographic Variables Under Study			
Variable of Interest	**Goodness of fit**	**Wald χ^2**	**Pr> χ^2**
Age at time of survey	1.51	1.16	0.28, n.s.
Age at time of diagnosis	1.51	0.49	0.49, n.s.
Time since diagnosis	1.51	0	0.97, n.s.
Education (reference category)	**Goodness of fit**	**Significant relationships, parameter est +/-**	**Pr> χ^2**
Grade 8 or less	1.50	None	.
High school, not still enrolled		None	.
High school, still enrolled		None	.
High school, GED		None	.
Some University/College		None	.
University degree or College diploma		None	.
Ethnicity (reference category)	**Goodness of fit**	**Significant relationships, parameter est +/-**	**Pr> χ^2**
Aboriginal	1.38	Latino+	<0.05
Asian		None	.
Black		Aboriginal+ Asian+ Caucasian+ Latino+	<0.0001 <0.0001 <0.0001 <0.0001
Caucasian		None	
Latino		Aboriginal-	<0.05
Mixed background		Aboriginal+ Asian+ Caucasian+ Latino+	<0.0001 <0.0001 <0.0001 <0.0001
Other		None	.
Mental Health Diagnosis (Ever)	1.50	2.54	0.11, n.s.
Gender	1.44	5.45	<0.05

Table 31. Univariate Analysis of Non-Injection Drug Risk Behaviour Score by Social Support Variables Under Study			
Social Support Variables of Interest	**Goodness of fit**	**Wald χ^2**	**Pr> χ^2**
Natural Harmful	1.60	0.69	0.41, n.s.
Formal Harmful	1.46	1.62	0.20, n.s.
No Helpful People	1.51	0.05	0.83, n.s.
No Harmful People	1.50	0.82	0.37, n.s.
At least 1 person harmful	1.50	0.82	0.37, n.s
At least 3 person harmful	1.50	0	0.94, n.s.
More than 5 harmful	1.48	0.40	0.53, n.s.
At least 1 helpful	1.51	0.05	0.83, n.s.
At least 3 helpful	1.51	0.06	0.81, n.s.
More than 5 helpful	1.47	1.44	0.23, n.s.
Natural Helpful	1.52	0.24	0.63, n.s.
Formal Helpful	1.50	0	0.99, n.s.
Number of Helpful People (Score)	**Goodness of fit**	**Significant differences, parameter estimate +/-**	**Pr> χ^2**
0	1.45	None	.
1		None	.
2		None	.
3		None	.
Number of Harmful People (Score)	**Goodness of fit**	**Significant differences, parameter estimate +/-**	**Pr> χ^2**
0	1.57	None	.
1		None	.
2		None	.
3		None	.

4.4.9 Univariate Analyses of Injection Drug Risk Behaviour Variables Under Study by Demographic and Social Support

This section of the report describes the results of the univariate examination of the injection drug risk behaviour score using both the demographic and social support variables of interest. Poisson analysis was used as the injection drug risk score is a count of the types of injection drug related risk behaviours exhibited in a fixed time frame (in the last three months before the PPS survey was completed) by participants.

Age at time of survey, age at time of diagnosis, and time since diagnosis, and mental health diagnosis (ever) were not associated with injection drug related risk behaviour score. Education, ethnicity, and gender however, did show a relationship (Table 32). The educational attainment of participants had an effect on the number of types of injection risk scores participants reported. Those who had indicated having grade 8 or less, being in high school (still enrolled), or completing high school/GED equivalent had a greater odds of being in a higher injection drug risk scores category compared to those who had indicated being not currently enrolled in high school or those who indicated completing a university degree/college diploma (Table 32). Also, those who had indicated having completed some university or college had significantly greater odds of being in a higher injection drug risk scores than those who indicated grade 8 or less, still being enrolled in high school, or those who had completed high school/GED (Table 32). Ethnicity showed an association with injection drug use risk score as well. The Poisson regression analyses were conducted, again using each of the ethnicity categories as a reference category. The results of these pairings can be viewed in Table 32. Those who self identified as Black had statistically greater odds of being in a higher injection drug risk category compared to all other ethnicity categories (Table 32). As well, those who identified as

Aboriginal had greater odds of being in a higher injection drug risk score category compared to all other categories except those who identified as Black, or Caucasian (Table 32).

The only social support variables that had a significant effect upon injection drug use score was the number of positively perceived people (score) and number of negatively perceived people (score) in a social support landscape (Table 33). Those who reported no positively perceived people in their social support landscape had a greater odds of being in a higher injection drug risk scores category than those who reported over five positively perceived people in their social support landscape ($p<0.05$) (Table 33). Compared to those who reported 3-5 negatively perceived people in their social support landscape, those who reported 0 or 1-2 negatively perceived people in their sphere had significantly greater odds of being in a higher injection drug risk score category (Table 33).

Table 32. Univariate Analysis of Injection Drug Risk Behaviour Score by Demographic Variables Under Study			
Variable of Interest	**Goodness of fit**	**Wald χ^2**	**Pr> χ^2**
Age at time of survey	2.26	0.28	0.60, n.s.
Age at time of diagnosis	2.32	0.01	0.92, n.s.
Time since diagnosis	2.40	0.19	0.66, n.s.
Education (reference category)	**Goodness of fit**	**Significant differences, parameter estimate +/-**	**Pr> χ^2**
Grade 8 or less	1.30	Some university/college+	<0.05
High school, not still enrolled		Grade 8 or less+ High school, still enrolled + High school/GED+	<0.0001 <0.0001 <0.0001
High school, still enrolled		Some university/college+	<0.001
High school, GED		Some university/college+	<0.001
Some University/College		Grade 8 or less- High school, still enrolled - High school/GED-	<0.05 <0.001 <0.001
University degree or College diploma		Grade 8 or less+ High school, still enrolled + High school/GED+	<0.0001 <0.0001 <0.0001
Ethnicity (reference category)	**Goodness of fit**	**Significant differences, parameter estimate +/-**	**Pr> χ^2**
Aboriginal	1.91	Black +	<0.001
Asian		Aboriginal + Black +	<0.0001 <0.0001
Black		Aboriginal - Caucasian -	<0.001 <0.05
Caucasian		Black +	<0.05
Latino		Aboriginal + Black +	<0.0001 <0.0001
Mixed Background		Aboriginal + Black +	<0.0001 <0.0001
Other		Aboriginal + Black +	<0.0001 <0.0001
	Goodness of fit	**Wald χ^2**	**Pr> χ^2**
Mental Health Diagnosis (ever)	2.16	0.71	0.40, n.s.
Gender (Male)	1.78	4.03	<0.05

Table 33. Univariate Analysis of Injection Drug Risk Behaviour Score by Social Support Variables Under Study			
Social Support Variables of Interest	**Goodness of fit**	**Wald χ^2**	**Pr> χ^2**
Any Natural Harmful	1.75	0.74	0.39, n.s.
Any Formal Harmful	2.20	0.03	0.87, n.s.
No Helpful People	2.19	0.56	0.46, n.s.
No Harmful People	2.21	0	0.98, n.s.
At least 1 person harmful	2.21	0	0.98, n.s.
At least 3 person harmful	2.19	0.06	0.81, n.s.
More than 5 harmful	2.12	1.34	0.25, n.s.
At least 1 helpful	2.19	0.56	0.46, n.s.
At least 3 helpful	2.12	1.62	0.20, n.s.
More than 5 helpful	1.91	1.78	0.18, n.s.
Natural Helpful	2.19	0.35	0.55, n.s.
Formal Helpful	2.12	3.11	0.08, n.s.
Number of Helpful People (Score)	**Goodness of fit**	**Significant differences, parameter estimate +/-**	**Pr> χ^2**
0	1.89	More than 5 -	<0.05
1-2		None	.
3-5		None	.
5+		No helpful people +	<0.05
Number of Harmful People (Score)	**Goodness of fit**	**Significant differences, parameter estimate +/-**	**Pr> χ^2**
0	1.89	None	.
1-2		None	.
3-5		No harmful+ 1-2 harmful +	<0.0001 <0.0001
5+		None	.

4.4.10 Univariate Analyses of Overall Substance Use Risk Behaviour by Demographic and Social Support Variables Under Study

This section reports the results of the univariate analyses used to examine any relationships between overall substance use risk score by both the demographic and social support variables of interest. This score is based upon the alcohol, non-injection drug, and injection drug use variables, and is therefore based upon the time frame relating to the last three months before the PPS survey was completed. Poisson regression was again utilized in order to explore this count data.

Age at time of survey, age at time of diagnosis, time since diagnosis, ethnicity, and ever having had a mental health diagnosis were not found to affect overall substance use risk score. Education was found to have an effect upon overall substance use risk score. Those who indicated having completed some university/college had a greater odds of being in a higher substance risk score category than the following: grade 8 or less, high school not enrolled, high school still enrolled, high school/GED completed (Table 34). As well, those indicating still being enrolled in high school had significantly greater odds of being in a higher substance related risk score category compared to those not being enrolled (Table 34). Finally, those indicating having completed a university degree or a college diploma had greater odds of being in a higher substance risk score category as compared to those not currently enrolled in high school (Table 34). Gender was also found to have an effect upon overall substance use risk score. Males had greater odds of being in a higher substance use risk scores category compared to females ($p<0.05$) (Table 34).

There was one social support variable that showed an effect upon overall substance use risk score. Having reported 3-5 positively perceived people in a social support landscape meant greater odds of being in a higher substance use risk score category compared to reporting 5 or more positively perceived people (Table 35). None of the other social support variables significantly affected overall substance use risk score.

Table 34. Univariate Analysis of Overall Substance Use Risk Score by Demographic Variables Under Study			
Variable of Interest	**Goodness of fit**	**Wald χ^2**	**Pr> χ^2**
Age at time of survey	1.72	0.51	0.47, n.s.
Age at time of diagnosis	1.75	0.03	0.86, n.s.
Time since diagnosis	1.80	0.43	0.51, n.s.
Education (reference category)	**Goodness of fit**	**Significant differences, parameter estimate +/-**	**Pr> χ^2**
Grade 8 or less	1.61	Some university/college+	<0.05
High school, not still enrolled		High school, still enrolled + Some university/college + University/college+	<0.05 <0.05 <0.05
High school, still enrolled		High school not still enrolled - Some university/college+	<0.05 <0.05
High school, GED		Some university/college+	<0.001
Some University/College		Grade 8 or less – High school not enrolled – High school still enrolled	<0.05 <0.05 <0.05
University degree or College diploma		High school not enrolled -	<0.05
Ethnicity (reference category)	**Goodness of fit**	**Significant differences, parameter estimate +/-**	**Pr> χ^2**
Aboriginal	1.83	None	.
Asian		None	.
Black		None	.
Caucasian		None	.
Latino		None	.
Mixed background		None	.
Other		None	.
	Goodness of fit	**Wald χ^2**	**Pr> χ^2**
Mental Health Diagnosis (Ever)	1.79	0.08	0.78, n.s.
Gender (male)	1.63	8.21	<0.05

Table 35. Univariate Analysis of Overall Substance Use Risk Score by Social Support Variables Under Study			
Social Support Variable of Interest	**Goodness of fit**	**Wald χ^2**	**Pr> χ^2**
Natural Harmful	1.73	0.85	0.36, n.s.
Formal Harmful	1.79	1.65	0.20, n.s.
No Helpful People	1.81	0.57	0.45, n.s.
No Harmful People	1.81	0.23	0.63, n.s.
At least 1 person harmful	1.81	0.23	0.63, n.s.
At least 3 person harmful	1.81	0.33	0.56, n.s.
More than 5 harmful	1.81	0.18	0.67, n.s.
At least 1 helpful	1.81	0.57	0.45, n.s.
At least 3 helpful	1.80	0.27	0.60, n.s.
More than 5 helpful	1.77	2.17	0.14, n.s.
Natural Helpful	1.81	0.48	0.49, n.s.
Formal Helpful	1.80	0.55	0.46, n.s.
Number of Helpful People (Score)	**Goodness of fit**	**Significant differences, parameter estimate +/-**	**Pr> χ^2**
0	1.70	None	.
1-2		None	.
3-5		More than 5 -	<0.05
5+		Three to five +	<0.05
Number of Harmful People (Score)	**Goodness of fit**	**Significant differences, parameter estimate +/-**	**Pr> χ^2**
0	1.84	None	.
1-2		None	.
3-5		None	.
5+		None	.

4.4.11 Multivariate Analysis of Sex Risk Behaviour Category

In order to investigate sexual transmission risk score further, an ordinal logistic regression model was created to examine the effects of key social support and demographic variables on sexual risk behaviour score. After controlling for interactions and attempting several different iterations of the available data the final model was decided upon using an analysis of maximum likelihood estimates (Table 37). The final model included the variables listed in Table 36. Three variables were found to be significant including; gender (male), ever having a mental health diagnosis, and reporting no negatively perceived social support. The resulting equations are:

1. $\ln(pi/(1-pi))(sexscore_0) = 12.9422 - (1.6845 \times \text{gender (male)}) + (0.0247 \times \text{age*tsd}) - (2.2304 \times \text{mental health diagnosis ever}) - (2.3281 \times \text{no formal negatively perceived social support})$
2. $\ln(pi/(1-pi))(sexscore_1) = 14.4083 - (1.6845 \times \text{gender (male)}) + (0.0247 \times \text{age*tsd}) - (2.2304 \times \text{mental health diagnosis ever}) - (2.3281 \times \text{no formal negatively perceived social support})$
3. $\ln(pi/(1-pi))(sexscore_2) = 15.4421 - (1.6845 \times \text{gender (male)}) + (0.0247 \times \text{age*tsd}) - (2.2304 \times \text{mental health diagnosis ever}) - (2.3281 \times \text{no formal negatively perceived social support})$
4. $\ln(pi/(1-pi))(sexscore_3) = 17.8579 - (1.6845 \times \text{gender (male)}) + (0.0247 \times \text{age*tsd}) - (2.2304 \times \text{mental health diagnosis ever}) - (2.3281 \times \text{no formal negatively perceived social support})$

The results of this endeavour reveal that being male, ever having a mental health diagnosis, and reporting no negatively perceived formal social support all contributed to lower odds of having a higher sexual risk score. The specific odds ratios for these variables are as follows:

1. Being male meant 0.186 times lower odds of having a higher sexual risk behaviour score compared to being female.
2. Ever having a mental health diagnosis meant 0.107 times lower odds of having a higher sexual risk behaviour score.
3. Reporting no negatively perceived social support meant 0.097 times lower odds of having a higher sexual risk behaviour score compared to reporting any negatively perceived social support at all.

Being male, not having any negatively perceived social support, and interestingly, having ever had a mental health diagnosis were protective of a higher sexual risk behaviour score.

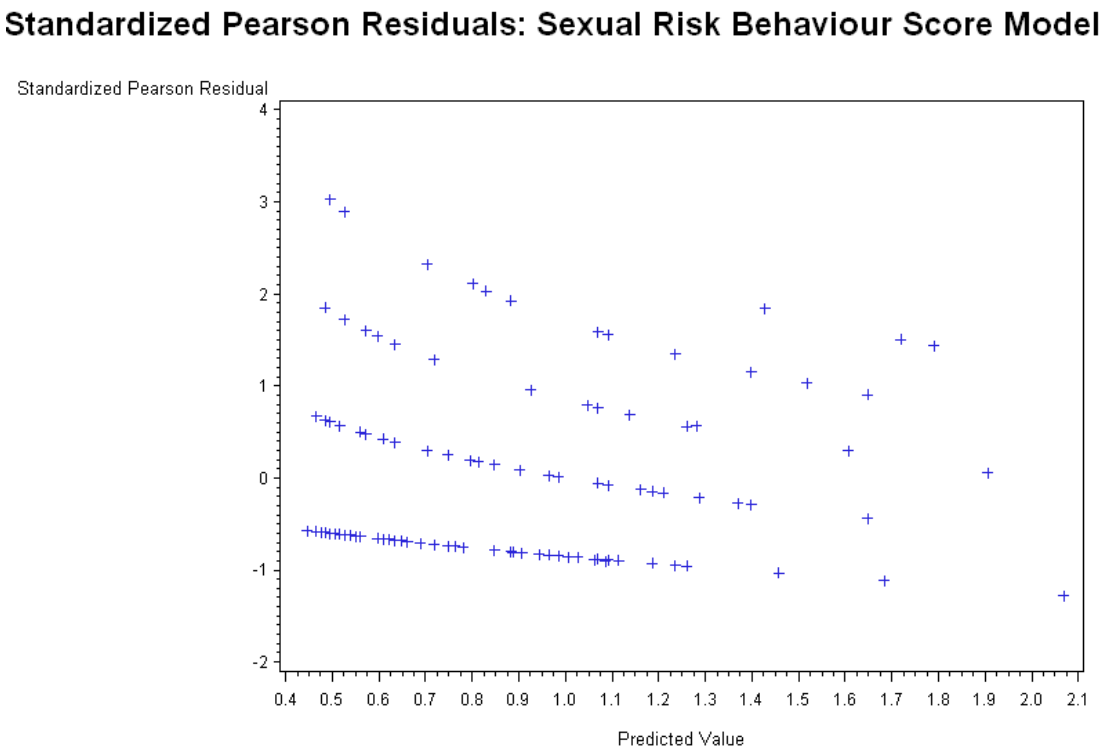
Table 36. Ordinal Logistic Regression Model: Outcome=Sexual risk behaviour score (types of sexual risk behaviours exhibited since diagnosis with HIV)

Variable of Interest	DF	Estimate	SE	Wald χ^2	Pr> χ^2
Gender (male)	1	-1.6845	0.7527	5.0077	<0.05
Mental Health Diagnosis (ever)	1	-2.2304	0.7386	9.1189	<0.001
Negatively perceived formal social support (none reported)	1	-2.381	1.0930	4.5373	<0.05
Positively perceived natural source of social support (none reported)	1	-5.2018	2.6098	3.9727	0.05, n.s.
Age at time of survey	1	-0.3287	0.3375	0.9484	0.33, n.s.
Age at time of diagnosis	1	0	0	.	.
Time since diagnosis	1	-0.5419	0.3381	2.5681	0.11, n.s.
Age*diagnostic age	1	0.00248	0.00381	0.4235	0.52, n.s.
Diagnostic age*time since diagnosis	1	-0.0170	0.0103	2.7106	0.10, n.s.
Time since diagnosis*age	1	0.0247	0.0109	5.1613	<0.05
Education (Grade 8 or less)	1	-1.1967	1.6454	0.5290	0.47, n.s.
High school not enrolled	1	-2.6138	1.5378	2.8890	0.09, n.s.
High school still enrolled	1	-0.1347	1.2272	0.0120	0.91, n.s.
High school or GED completed	1	-0.6535	1.3566	0.2321	0.63, n.s.
Some university or college	1	-0.9690	1.9199	0.2547	0.61, n.s.
Positively perceived formal social support (none reported)	1	-1.8320	1.2608	2.1114	0.15, n.s.
Negatively perceived natural social support (none reported)	1	0.1342	0.6942	0.0374	0.85, n.s.
Number of positively perceived people					
0	1	5.1423	3.4179	2.2635	0.13, n.s.
1-2	1	-0.6792	0.9295	0.5339	0.47, n.s.
3-5	1	-0.7597	0.8670	0.7678	0.38, n.s.

Table 37. Analysis of Maximum Likelihood Estimate for Final Sexual Risk Score Model

DF	-2LogL	Subtraction term	New DF	χ^2(0.05)	critical value < calculated value	Wald χ^2	Pr> χ^2
19	116.338	36.4451	18	28.87	Yes, significant	23.7387	<0.01

Figure 7.



4.4.12 Multivariate Analysis of Substance Use Risk Behaviour, and Substance Use Leading Directly to Sexual Risk Behaviour Category

A Poisson regression model was utilised to examine the effects of key social support and demographic variables on substance use related risk behaviour score. After controlling for interactions and attempting several different iterations of the available data the final model was decided upon using a goodness of fit χ^2 test, while ensuring the Scaled Pearson χ^2 value/degrees of freedom stayed as close to one as possible (in order to control for dispersion) (Table 39). The final model included the variables listed in Table 38. Six variables were found to be significant including; High school (still enrolled), some university/college, Self identified as Aboriginal,

Self identified as Black, reporting no positively perceived natural social support, and reporting no positively perceived social support at all. The resulting equation is:

Log(riskscore) = 11.4342 + (2.9551 x edu3) + (6.0344 x edu5) – (5.1312 x eth1) – (6.1498 x eth3) – (5.6439 x nathelp0) – (6.7980 x nonehelp0)

The model revealed several interesting significant results. Being currently enrolled in high school (compared to having completed university/college), having completed some university college (compared to having completed university/college), self-identifying as Aboriginal or Black (compared to self identifying Other), reporting no positive natural sources of social support (versus reporting any), and reporting no positive social support at all (versus reporting any) all had significant associations with overall substance use related risk behaviour score. The specific odds ratios for these variables are:

1. Being in currently enrolled in high school meant 19.20 times higher odds of having a higher overall substance use related risk behaviour score compared to having completed university/college.
2. Having completed some university college meant 417.5 times higher odds of having a higher overall substance use related risk behaviour score compared to having completed university/college.
3. Identifying as Aboriginal meant 5.91^{-03} times lower odds of having a higher overall substance use related risk behaviour score compared to identifying as Other.
4. Identifying as Black meant 5.91^{-03} times lower odds of having a higher overall substance use related risk behaviour score compared to identifying as Other.

5. Reporting no positive natural sources of social support meant 3.539^{-03} times lower odds of having a higher overall substance use related risk behaviour score versus reporting any.
6. Reporting no positive social support at all meant 1.116^{-03} times lower odds of having a higher overall substance use related risk behaviour score versus reporting any.

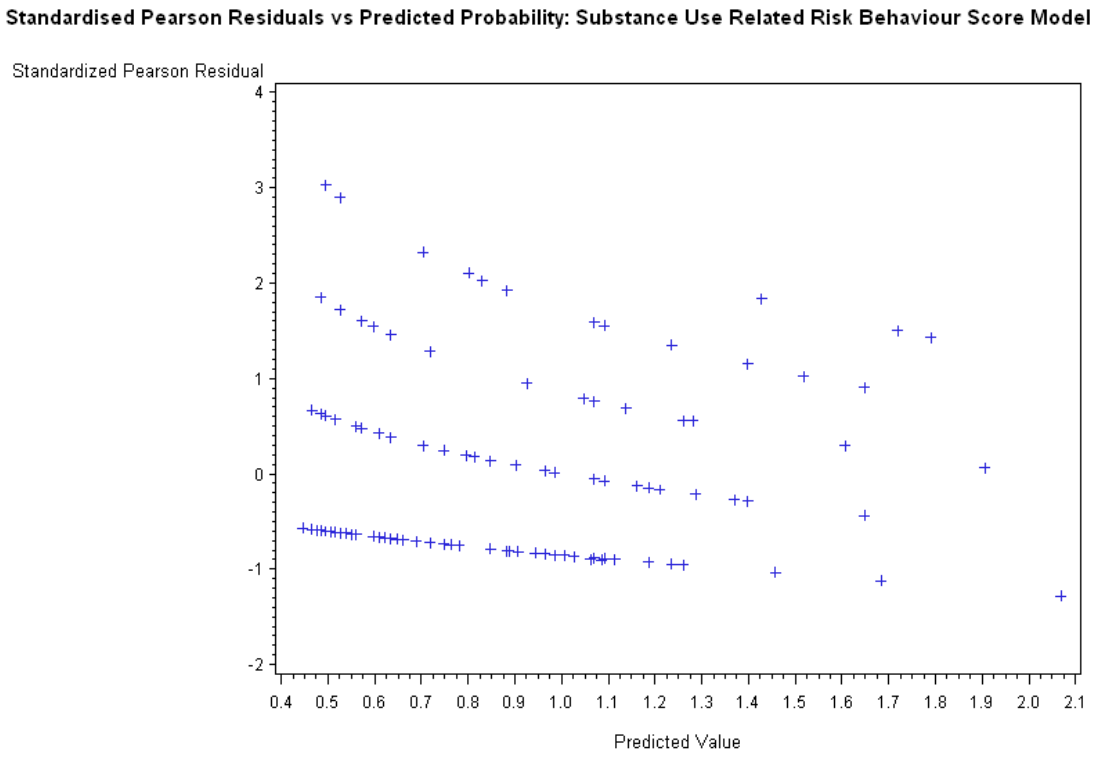
Table 38. Poisson Regression Model: Outcome=Overall Substance Use Risk Behaviour Score (Types of substance use risk behaviours exhibited in the last three months before the PS survey)

Variable	DF	Estimate	SE	Wald 95% CI		Wald χ^2	Pr> χ^2
Age	1	1.2459	1.17488	-1.058	3.5504	1.12	0.29
Age*Age at time of diagnosis	1	-0.0027	0.0074	-0.0171	0.0118	0.13	0.72
Time since diagnosis	0	0.0000	0.0000	0.0000	0.0000	.	.
Age*Time since diagnosis	1	-0.0337	0.0221	-0.0770	0.0095	2.34	0.13
Age*Age at time of diagnosis*Time since diagnosis	1	0.0012	0.0007	-0.0001	0.0025	3.10	0.08
Age at time of diagnosis*Time since diagnosis	1	-0.0478	0.0323	-0.1112	0.0156	2.19	0.14
Negatively Perceived Social Support Score: none	1	-0.4930	1.1209	-2.6900	1.7039	0.19	0.66
Negatively Perceived Social Support Score: 1-2	1	-0.0564	0.5070	-1.0501	0.9374	0.01	0.91
Negatively Perceived Social Support Score: 3-5	1	0.8235	0.6363	-0.4236	2.0706	1.68	0.20
No positively perceived *formal* social support	1	-0.3779	0.7593	-1.8662	1.1104	0.25	0.62
Grade 8 education or less	1	-0.0202	1.3573	-2.6806	2.6401	0.00	0.99
Some High School (not still enrolled)	1	0.8094	1.5276	-2.1846	3.8034	0.28	0.60
Some High School (Still enrolled)	1	2.9551	1.1695	0.6629	5.2473	6.38	<0.05
High School/GED completed	1	1.6855	1.2032	-0.6728	4.0438	1.96	0.16
Some university/college	1	6.0344	1.7604	2.5840	9.4847	11.75	<0.05
Self identified as Aboriginal	1	-5.1312	1.6399	-8.3453	-1.9170	9.79	<0.05
Self identified as Black	1	-6.1498	2.7439	-11.528	-0.7719	5.02	<0.05
Self identified as Caucasian	1	-2.6311	1.3273	-5.2325	-0.0297	3.93	0.05
No Negatively Perceived *Natural* Sources of Social Support	1	-0.5040	0.4761	-1.4371	0.4290	1.12	0.29
No Negatively Perceived *Formal* Sources of social Support	1	-0.2300	0.7300	-1.6609	1.2008	0.10	0.75
No Positively Perceived *Natural* Sources of Social Support	1	-5.6439	1.9694	-9.5039	-1.7839	8.21	<0.05

Table 38. (CONTINUED) Poisson Regression Model: Outcome=Overall Substance Use Risk Behaviour Score (Types of substance use risk behaviours exhibited in the last three months before the PS survey)							
Variable	**DF**	**Estimate**	**SE**	**Wald 95% CI**		**Wald χ^2**	**Pr> χ^2**
No positively perceived social support at all	1	-6.7980	2.8642	-12.412	-1.1842	5.63	<0.05
Gender (male)	1	-0.7604	0.5130	-1.7659	0.2451	2.20	0.14
Mental health diagnosis (never)	1	0.7507	0.5806	-0.3874	1.8887	1.67	0.20
Age at time of diagnosis	1	-1.1915	0.6706	-2.5059	0.1230	3.16	0.08

Table 39. Goodness of Fit Test Results for Final Overall Substance Use Risk Score Model				
Deviance DF	**Deviance χ^2**	**Scaled Pearson Value χ^2/DF**	**P value**	**Model goodness of fit χ^2 test**
27	40.0589	1.80	0.0506	p value not statistically significant, reasonable fit

Figure 8.



CHAPTER 5: SUMMARY AND DISCUSSION

The purpose of the current research was to examine the social support landscape of Manitobans living with HIV/AIDS, based upon several determinants of health, and to pinpoint how social support may influence continuing transmission risk behaviours (sexual, alcohol, non-injection drug, and injection drug related). The demographic variables considered for this examination included self defined gender and ethnicity, age at time of survey, age at time of diagnosis, time since diagnosis, ever having had a mental health diagnosis, and educational attainment. The social support categories under investigation included: number of positively and negatively perceived people in the social support landscape, and number of natural and formal sources of social support.

The current study is comprised of a secondary analysis of the PPS survey which was conducted in 2009. The PPS was designed to ask PLWHA in Manitoba about their secondary transmission risk behaviours, what their social support networks looked like, and what they did to stay healthy. 132 people completed the PPS survey, ranging in ages from 24 to 78 years, and with a mean age of 43.2 years (Table 1).

Several social support measures were created based upon the data collected in the PPS survey. These measures included: any positively perceived natural and formal social support, any negatively perceived natural and formal social support, no positively and no negatively perceived social support, reporting at least 1, at least 3, or more than 5 positively perceived people, reporting at least 1, at least 3, or more than 5 negatively perceived people, score of number of positively perceived people, and a score of number of negatively perceived people. As well, risk behaviour scores were created for the number of types of sexual risk behaviours (since time of diagnosis), alcohol use related risk behaviour, non-injection drug use behaviours, and injection

drug use related risk behaviours (relating to the time period of three months before the PPS survey was completed). Finally, an overall substance use related risk score was created by combining the alcohol, non-injection drug, and injection drug scores.

Univariate analyses were utilized for each social support and transmission risk outcome variable. Multivariate models were created for the sexual risk behaviours score (Ordinal Logistic regression model) and overall substance use related risk score (Poisson regression model).

5.1 Summary of Results for Research Objective 1: Describe key demographic characteristics of PPS participants:

Descriptive and univariate analyses of the demographic variables of interest revealed a snapshot of the population of PLWHA in Manitoba. Approximately 2/3 of PPS participants self identified as male (61.4% (n=81)) and approximately 1/3 (37.9%, n=50) identified as female (Table 1). The mean age of the participants was 43 years, slightly older than in the general population, and male participants were significantly older (45.7 years) than those who identified as female (39.2%) (Table 1) (Manitoba Health, Public Health Planning, Primary Health Care Division, 2010). Mean age at time of diagnosis was 32.6 years and those who identified as male were more likely to have had an HIV diagnosis at an older age than those who identified as female (Table 1). The study population had been living with HIV/AIDS for a mean of 10.5 years (SD=6.83) (Table 1). This finding is particularly exciting as most behavioural studies tend to focus mostly on those who had received their diagnosis recently. Having the perspectives of those who had been living with HIV/AIDS for a longer period of time is important to studying long term behavioural and social support landscape change. Older participants had significantly

higher times since diagnosis and were older at time of diagnosis (Table 13). As well, those who were older at time of diagnosis had significantly shorter times since diagnosis (Table 13).

Overall educational attainment was much lower than expected. With an older population taking part in the study it was expected that the majority would have completed their high school or GED equivalent, when in fact this was not the case. The majority of participants reported having completed less than high school or GED equivalent (Table 2). Those who identified as male were found to have significantly higher educational attainment than those who identified as female (Table 2).

This analysis shows that the majority of participants identified themselves as Aboriginal (65.1%, n=84) (Table 8). Further, 24.8% (n=32) of the participants identified as Caucasian and all other categories of ethnicity (Asian, Black, Latino, Mixed background, Other) made up approximately 10% cumulatively (Table 8). Generally, this distribution mirrors what was found in the general population in Manitoba, where the majority of cases identify as Aboriginal, Caucasian, and Black (in that order) (Manitoba Health, Public Health Planning, Primary Health Care Division, 2010). Those who identified as Caucasian were significantly more likely to identify as male (Table 8). Those who reported ever receiving a mental health diagnosis were significantly more likely to identify as Aboriginal (30.2%) or Caucasian (18.6%). As well, those who identified as Caucasian were significantly older than those who identified as Aboriginal.

5.2 Summary of Results for Research Objective 2: Describe the social support landscapes of the PPS participants:

Participants of the PPS reported high levels of positively perceived social support. The analysis of the detailed sources of social support reveals that approximately three quarters of

participants reported at least one positively perceived person in their social support landscape that was a natural source of support (family member, partner, or friend) (Table 15). Nearly all (94%) participants reported at least one positively perceived staff member at their service/health care providers. Fewer PPS respondents, approximately 38%, reported positively perceived social support from a religious or spiritual source (Table 15).

Lower levels of negatively perceived social support were reported in the detailed sources of social support inquiry however, this category is still informative. Nearly half (49%) of participants reported at least one friend who was negatively perceived and 37% reported at least one family member who was negatively perceived (Table 15). Very few participants reported any negatively perceived social support from staff sources (1.6%) or religious/spiritual (5.2%) sources (Table 15).

Over ¾ of participants reported any natural positively perceived social support, at all, and nearly ¾ reported any formal positively perceived sources of social support. Fewer participants reported any negatively perceived naturally sourced social support (66%) and even fewer still reported any negatively perceived formally sourced social support (8%) (Table 15).

Most participants reported having at least one person whom they perceived as being a positive source of social support (79%) (Table 15). Comparatively, 43% of participants reported having at least one person whom they viewed as a negative source of social support (Table15).

Finally, 20% of participants reported no people in their lives who were positive sources of social support (Table 15). Comparatively, 56% of participants reported no people in their lives whom they would consider a negative source of social support (Table 15).

5.3 Summary of Results for Research Objective 3: Examine if certain demographic characteristics are indicative of positive or negative social support landscapes:

Upon univariate examination of the social support variables, with the demographic variables of interest, few significant relationships were discovered. Education and positively perceived friend based social support were found to be associated. Those who reported lower educational attainment were more likely to report positively perceived friend based social support and any positively perceived religious/spiritual sources of social support.

An association was also discovered between participants who reported negatively perceived staff based social support and age. As described by the logistic model, as age increases, so do the odds of reporting any negatively perceived social support. An association was also found between age and negatively perceived staff based social support. The logistic model utilized showed that as age increased so did the odds of reporting negatively perceived staff based social support.

5.4 Summary of Results for Research Objective 4: Examine the associations between social support and several key HIV-related risk behaviours:

Descriptive analysis of the risk behaviours under investigation showed a fairly high level of transmission risk behaviours amongst participants. The most reported category of transmission risk behaviour was sexual (49.2%). The most frequently reported types of sexual risk behaviours, for every risk category, except injection drug use related risk behaviours, were unprotected oral sex, unprotected vaginal sex, unprotected anal sex, and unprotected sex with multiple partners.

49.2% of participants reported at least one type of sexual transmission risk behaviour since the time of diagnosis, the highest of any of the risk categories investigated. In descending

order of frequency the sexual risk behaviour categories were: unprotected oral sex (32.6%), unprotected vaginal sex (28.8%), unprotected insertive anal sex (12.9%), unprotected receptive anal sex (12.1%), and finally unprotected sex with multiple partners (5.3%).

Almost a quarter of participants reported exhibiting alcohol use related risk behaviour in the three months before they completed the PPS survey (23.5%). In descending order of frequency the alcohol use related risk behaviour categories were: unprotected oral sex (15.9%), unprotected vaginal sex (12.1%), unprotected anal sex (7.6%), unprotected sex with multiple partners and not changing condoms between partners (0.8%), and finally unprotected sex with multiple partners without any condoms at all (0%).

Similarly, little over a quarter of participants reported exhibiting non-injection drug use related risk behaviour in the three months before they completed the PPS survey (28.0%). In descending order of frequency the non-injection drug use related risk behaviour categories were: unprotected oral sex (11.4%), unprotected vaginal sex (8.3%), unprotected anal sex (4.6%), unprotected sex with multiple partners and not changing condoms between partners (1.5%), and finally unprotected sex with multiple partners without any condoms at all (0%). An additional category was utilized in the non-injection drug risk category, asking those who used non-injection drugs if they had shared any of their drug use equipment with others. 17.4% of respondents indicated they indeed had.

6.1% of participants reported exhibiting injection drug use related risk behaviour in the three months before they completed the PPS survey. In descending order of frequency the non-injection drug use related risk behaviour categories were: unprotected vaginal sex (1.5%), unprotected anal sex (0.8%), unprotected sex with multiple partners and not changing condoms

between partners (0.8%), and finally unprotected sex with multiple partners without any condoms at all (0.8%), unprotected oral sex (0.8%). An additional category was utilized in the injection drug risk category, asking those who used injection drugs if they had shared any of their drug use equipment with others, and 6.1% of respondents indicated they had.

Finally, an overall substance use related risk category was analyzed. This variable combined all of the substance use categories into one count variable for each participant, pertaining to behaviours exhibited in the last 3 months before they had completed the PPS survey. Overall, 54.6% of participants reported no substance related transmission risk behaviours (Table 25). Further, 20.5% (n=27) reported one type, 11.4% (n=15) reported two types, 10.6% (n=14) reported three types, 1.5% (n=2) reported four types, and 0.8% (n=1) reported 5 and 7 types of substance related transmission risk behaviours (Table 25). No participants reported 6 types (Table 25).

The next stage of this analysis examined the transmission risk scores in univariate analyses with both the demographic and social support variables under study. Univariate analysis of sexual transmission risk behaviours revealed associations with age at time of survey and age at time of diagnosis. Older participants were more likely to report more types of sexual risk behaviours (Table 26). Similarly, participants that were older at time of diagnosis were more likely to report more types of sexual risk behaviours (Table 26).

Univariate analysis of alcohol risk behaviour score revealed associations with self-identified ethnicity and education. Those currently enrolled in high school and those who had completed university/college had significantly greater odds of having a higher alcohol risk behaviour score than those who had completed high school/GED equivalent. Those who self

identified as Aboriginal, Black, or Caucasian had greater odds of a higher alcohol use risk score compared to those who self identified as Asian, Latino, or Other.

Univariate Analysis of those non-injection drug use related risk score with social support and demographic variables of interest revealed associations with self identified ethnicity and gender. Those who self identified as Latino had greater odds of reporting more types of non-injection drug behaviours than those who self identified as Aboriginal, Black, or Mixed Background. As well, the odds of higher non-injection drug use scores were greater for those who self identified as Aboriginal, Asian, Caucasian, and Latino as compared to those who self identified as Black. In addition to this, those who self identified as male had a greater odds of higher non-injection drug risk score than those who identified as female.

Univariate analysis of injection drug use related risk score with social support and demographic variables of interest revealed that ethnicity, education, reporting no positively perceived social support, and reporting no negatively perceived social support were associated with greater odds of being in a higher injection drug risk score category. With regards to education, those reporting grade 8 or less, being currently enrolled in high school, and having completed university or college related to greater odds of higher injection drug risk score compared to those reporting not being enrolled in high school and having completed university or college. At the same time, having completed some university or college led to greater odds of injection drug risk scores compared to those reporting grade 8 or less, being currently enrolled in high school, and having completed high school or GED equivalent. Respondents reporting no positively perceived social support, at all, had higher odds of higher injection drug risk scores compared to those reporting over five positively perceived people in their lives. Finally, those reporting no or 1-2 negatively perceived people in their lives were more likely, than those

reporting 3-5 negatively perceived people, to greater odds of being in a higher injection drug risk score category.

Examination of the overall substance use related risk score showed several significant findings. Education, gender, and number of positively perceived people in a social support landscape were found to have associations with this risk score. Those who identified as male had greater odds of having a higher overall substance use risk score. Surprisingly, having higher educational attainment also seemed to result in greater odds of overall substance use risk scores. Finally, those participants reporting three to five positively perceived people in their social support landscape had greater odds of having a higher substance use score as compared to those reporting over five positively perceived.

An ordinal logistic model was created for further inquiry of the sexual risk score. Being male meant 0.186 times lower odds of having a higher sexual risk behaviour score compared to being female. Ever having a mental health diagnosis meant 0.107 times lower odds of having a higher sexual risk behaviour score. Reporting no negatively perceived social support meant 0.097 times lower odds of having a higher sexual risk behaviour score compared to reporting any negatively perceived social support at all.

Poisson regression model for overall substance use related risk score. Being currently enrolled in high school meant 19.20 times higher odds of having a higher overall substance use related risk behaviour score compared to having completed university/college. Having completed some university college meant 417.5 times greater odds of having a higher overall substance use related risk behaviour score compared to having completed university/college. Identifying as Aboriginal meant 5.91^{-03} times lower odds of having a higher overall substance use related risk

behaviour score compared to identifying as Other. Identifying as Black meant 5.91^{-03} times lower odds of having a higher overall substance use related risk behaviour score compared to identifying as Other. Reporting no positive natural sources of social support meant 3.539^{-03} times lower odds of having a higher overall substance use related risk behaviour score versus reporting any. Reporting no positive social support at all meant 1.116^{-03} times lower odds of having a higher overall substance use related risk behaviour score versus reporting any.

5.5 Discussion

In order to decrease continued HIV transmission risk behaviours among PLWHA, programming should be targeted toward those who are most at risk of exhibiting HIV transmission risk behaviours. The base of epidemiologic information presented in the current research can assist in the successful direction of these efforts. This study endeavoured to describe the social support landscapes and HIV transmission risk behaviours of PLWHA in Manitoba. The details of how demographic and social support factors are associated with the risk behaviours of interest, in this research, can be used to support evidence based public health programming that is striving to reduce HIV transmission in Manitoba.

In the results of this research one important consideration is actually related to something which was found to be not significant. It was assumed that time since diagnosis would have an association with both social support and risk behaviours. It was postulated that as time since diagnosis increased social support landscapes would become compromised and risk behaviours had the potential to resurface. The reality in this study was, that time since diagnosis was not found to be significant with either social support or risk behaviour outcomes. The PPS data show a large proportion of respondents reporting engaging in HIV transmission risk behaviours in the

three months prior to the PPS survey, no matter what their time since diagnosis was. That is, even with the prevention programming available via the Manitoba HIV Program, adults at various times since diagnosis, were continuing to exhibit high risk behaviours that have the potential to convey the HIV virus. Clearly something in the current HIV prevention messaging system is missing. It could be that more people than suspected were not in care and therefore not receiving the messaging available. It could be that current messaging is not being well received. It could also be that messaging is being overlooked due to time/budget constraints, or that health care providers may no longer believe that the simple messaging at clinic time is important or useful (Crepaz et al., 2014a; Medley et al., 2015). However, previous research has shown that brief counselling messages delivered by health care providers at routine visits do significantly reduce HIV transmission among those living with HIV/AIDS (Crepaz et al., 2014; Medley et al., 2015). The complicated part of this recommended course of action is knowing where to focus resources. The results of the current research help to identify risk factors associated with higher risk behaviours in order to better direct HIV prevention efforts.

In univariate analysis, factors that were predictive of higher sexual risk score (of more types of sexual risk behaviours since time of HIV diagnosis), included age at time of survey and age at time of diagnosis. Those who were older at time of the PPS survey and those who reported older age at diagnosis were more likely to report more types of sexual risk score. As suggested by Hillman (2011) there are often false assumptions about low level of sexual activity among older adults where prevention efforts are more often targeting the uninfected (Hillman, 2011). Clearly there is room for targeting older PLWHA with safe sexual practice information.

An opportunity exists in this plan to address the fact that being of older age was also predictive of reporting higher negatively perceived formal (either staff at service providers/health

centres, or religious/spiritual leaders) social support. More specifically, older participants were more likely to report higher numbers of negatively perceived staff based social support. This was surprising due to the fact that so many of the participants (94%) actually reported positive staff based social support. This would have several consequences for directing programming, such as, how to create positive relationships with older PLWHA so that they feel comfortable in the health care setting and therefore are receptive to prevention knowledge. Previous research has shown older adults living with HIV/AIDS find it difficult to express sexual information, even to physicians, especially if it is considered inappropriate by their health care provider, culture, or social support landscape (Illa et al., 2010).

In multivariate analysis higher sexual risk behaviour score was seen in those who identified as female, those reporting negative social support of any kind (natural or formal), and oddly, those never having had a mental health diagnosis (ever). Targeting prevention towards those who identify as female, and promoting opportunity for the creation/nurturing of positive social support in a meaningful way among all PLWHA, could help reduce sexual transmission risk behaviours (Afzali, Shahhosseini, & Hamzeghardeshi, 2015). The link between mental health and sexual risk behaviour warrants further study.

Higher alcohol and injection drug use related risk scores were associated through a complex relationship with educational attainment. Higher educational attainment has been established as a protective factor for health and well being (Leganger & Kraft, 2003). However, in the case of this study the opposite was also found to be true. In alignment with previous research some lower levels of educational attainment were associated with higher risk scores, as in the case of not having completed high school (still enrolled) versus having completed high school or GED equivalent. However, those reporting having completed a university

degree/college diploma also had a greater odds of reporting higher alcohol risk scores. Previous research has reported that the positive benefits of educational attainment for health are highly dependent on social context (Browning & Cagney, 2002). For example, Browning and Cagney (2002) found that the benefits of educational attainment can be masked by living in areas lacking in collective efficacy. Therefore, there may be further contextual factors which somehow mask the benefit of education in the case of the PPS participants. Further study of the social determinants of health data collected by the PPS could reveal the intricacies of this complex association.

Alcohol, non-injection drug, and injection drug use related risk behaviour scores all held complex relationships with ethnicity. With all three outcome categories there were some ethnicities that were more likely to report more types of risk behaviours. In every instance of outcome category under study however, in univariate analyses, self identifying as Aboriginal led to a greater risk of reporting higher risk scores. Ethnicity is clearly something that should be considered when planning prevention efforts when it comes to substance use related risk behaviours. Prevention programs should be built around a central model of cultural appropriateness, which includes involving advocates and cultural representatives from the time of program inception through to implementation (Medley, 2015). Previous research supports this, where it has been discovered that seeing more peer educators led to more self efficacious health behaviours (Sarafian, 2012; Wagner et al., 2010).

Univariate examination of non-injection drug use and gender revealed that males had greater odds of being in a higher non-injection drug use related risk category. Again, self identified gender shows association with transmission risk behaviours, strengthening the argument for including it as an important consideration in the development of program content.

Injection drug use related risk behaviours and social support have been shown to have a complex relationship in previous research where, depending upon contextual factors, social support could have negative and/or positive associations with ongoing injection drug use risk behaviors (Avants et al., 2001; Unger et al., 2006). In this study associations with higher injection drug risk scores were found with participants reporting lower numbers of both positively perceived and negatively perceived social support. Reporting no positive social support versus reporting 5+ positively perceived people was associated with higher injection drug risk score amongst PPS participants. Less positive social interaction was associated with higher injection drug use risk behaviour. However, those reporting none or 1-2 negatively perceived people in their social support landscape were also more likely to report higher injection risk scores versus those who reported 5+ negatively perceived people. Having less negatively perceived people in a social support landscape was also associated with having more types of injection drug use risk behaviours. These results fall in line with previous research that showed unusual social support-risk behaviour dynamics that actually lead to ongoing transmission risk behaviours (Unger et al., 2006). Based upon these findings, further study of the social determinants of health data collected by the PPS could reveal what other contextual factors were responsible for this complex association.

In univariate analysis of overall substance use related risk behaviour identifying as male, and reporting less positively perceived people in a social support landscape, were both predictive of higher risk score. Educational attainment showed a very complex relationship with this outcome variable. Overall, higher educational attainment led to a greater odds of being in a higher risk score category. This suggests prevention efforts focusing on those with lower educational attainment could be actually ineffective in reducing risk behaviours because they are

excluding a large portion of people who are actually at higher risk of transmission risk behaviour.

In multivariate analysis, overall substance use related risk behaviour score was higher in those enrolled in high school compared to having completed university/college, and it was also higher in those having some university/college versus having completed them. Therefore lower educational attainment was associated with higher substance use risk scores. As well, identifying as Aboriginal or Black was predictive of lower overall substance use risk score. Reporting no positively or negatively perceived social support was also indicative of lower overall substance use related risk score. This result is consistent with some previous research which shows that larger social support networks, both positively and negatively perceived, can contribute to increased sexual risk behaviours (Neblett, Davey-Rothwell, Chander, & Latkin, 2011; Siegel, Palamara Mesagno, Chen, & Christ, 1989)

5.6 Limitations

The positive prevention study included those who had been living with HIV/AIDS for any number of years (over 6 months), in some cases even decades. This leads to the potential of a very pronounced recall bias from the respondents in some cases. For example the sex related risk behaviour questions asked about unprotected sexual risk activity since the time of diagnosis.

Another form of recall bias stems from the fact that a good portion of the questions were related to behaviours exhibited while under the influence of alcohol or drugs. The tendency here would be a lower level of recalling exhibited risk behaviour simply because participants do not remember having done them.

The design of the substance use related questions in the PPS survey also make it difficult to peel apart a case where someone could have used more than one substance. This would have been reported twice in the question bank. As a result it is statistically impossible to pick apart if the risk behaviour was the result of the one particular substance.

A strong confounder included in this study, as mentioned previously in the section discussing literature gaps, is individuals' varying levels of HIV transmission prevention knowledge upon entry into the study. Previous knowledge would obviously influence respondents' prevention behaviours.

The sexual risk behaviour questions used a different recall timeframe (since time of diagnosis) than the substance use risk behaviour questions (in the last 3 months before the PPS survey). As well, the specific risk behaviour categories asked about in the sexual risk behaviour question bank were different from the risk behaviour categories used in the substance use related risk behaviour questions. The sexual risk question bank made a distinction between unprotected receptive and insertive anal sex, whereas the substance use related risk questions did not. In addition to this, the substance use related questions made a distinction between different types of unprotected sex with multiple partners, where the sex risk behaviour questions did not. This made it impossible to combine the sex risk behaviour questions and the substance use related risk questions into an overall risk score, or to make any meaningful statistical comparison between them.

The study found a high level of ongoing risk behaviour among the PPS participants, however, that number was likely compressed due to the presence of social desirability bias. Due to the stigma which is still associated with HIV/AIDS, and transmission risk behaviours, social

desirability bias can lead to the over reporting of socially desirable behaviours (for example, barrier use) and under reporting of socially undesirable behaviours (for example, multiple partners) (Hanck et al., 2008). This effect was present in the data as the author was physically in the room, at a service provider (Nine Circles Community Health Centre), reading the interview materials to all of the PPS participants. It is therefore suspected that respondents have greatly under reported all risk behaviours and possibly several of the social support questions. This is especially the case in respondents' answering more favourably to the positively perceived staff questions on the PPS survey. This skewing of the scores used in the study means that the accuracy of measurement may not be as strong as it could have been if another data collection design was used which accounted for social desirability bias. For example, Lowndes et al (2012) compared HIV-related sexual risk behaviour data collected in two ways: face to face interviews (as used in the PPS), and anonymous polling booths. The study team discovered that much higher rates of risk behaviours were reported using anonymous polling booths as opposed to face to face interviews, due to social desirability bias (Lowndes, C.M., et. al., 2012).

There are also limitations to the cross sectional survey design used in the PPS, and consequently this study. Cross sectional studies cannot reveal any information about causality, only association between having a health outcome and a particular risk factor (Young, 2005). This is an effect of the inability of the cross sectional design to distinguish any definitive temporal sequence between a health outcome and a risk factor (Young, 2005). In the case of this study it cannot be stated whether transmission risk behaviours are a consequence of certain social support characteristics, or vice versa, only that they are associated.

In addition to this, the very nature of cross sectional designs, where they collect information at one point in time, has a consequence to how a population can be sampled. Young

discusses the fact that only "survivors" can be sampled, meaning there are those who are legitimate candidates for the study who potentially are not caught by the sampling strategy and therefore left out of analyses. This was the case in the PPS, where sampling did not end up being representative of the Manitoba population of PLWHA. Most of the participants brought into the study were in care of some kind, mostly at Nine Circles Community Health Centre where many sources of support are available, covering a wide range of social determinants of health. This was evident by the fact that over 90% of PPS participants reported positively perceived social support from staff at such organizations. With the addition of the unintentional snowballing effect that occurred within this sample, it means that the PPS mostly drew in participants that were in a care centre and therefore most likely at risk. The resulting population based sampling means that the results gathered pertain to the sample well (those Manitobans living with HIV/AIDS, in some sort of care, and most likely at risk), but is not representative of the entire Manitoba population of PLWHA.

Another limitation is the scope of the variables collected by the PPS, and more importantly used by this study in particular. While many of the social determinants of health were asked about in the PPS survey, an exhaustive list was not utilized. For example, socioeconomic status was not inquired about in the PPS questionnaire. The scope of this study was even smaller, looking at fewer demographic, social, behavioural, and health related variables. It is important to remember that the results of this study are a piece of a much larger story. Examination of more of the variables collected in the PPS may reveal a clearer picture of the associations between the variables of interest.

There are limitations to the statistical analyses used for modelling sexual risk score and substance use risk score. Poisson regression analysis, which was used for the overall substance

use risk score analysis, is appropriate for a dependent variable which is count data, with a fixed timeframe, either individual or aggregate, that is highly skewed (the overall substance use risk score data were aggregate, pertained to a fixed timeframe (the three months before the survey), and highly skewed left). The problem with Poisson regression analysis is that it is susceptible to overdispersion, where the variance of the distribution of the number of events is greater than the conditional mean, which can lead to underestimates of standard errors and overestimates of test statistics (Allison, 1999; Weaver et al., 2015).

Risk behaviours and social support landscapes may change over time as individuals travel through the life stages with their HIV diagnosis (Hudson, 2001). This study does not distinguish this important fact as it is a cross sectional snapshot in the lives of the PPS participants. Although this study does examine potential associations between age and time since diagnosis and risk behaviour, it does not do so in a longitudinal way, which could lead to better understanding of what types of supports are helpful at different stages of life.

CHAPTER 6: CONCLUSION AND FUTURE RESEARCH DIRECTIONS

6.1 Future Directions

6.1.1 Recommended Knowledge Transfer Activities

The next step for the current work is to communicate with the Manitoba HIV Program and the Community Advisory Board at NCCHC about knowledge transfer. This is an important consideration because the study participants overwhelmingly self identified as Aboriginal the Community Advisory Board seats representatives from the Aboriginal community. This research belongs to all of those who participated and it therefore requires all of their voices be respectfully

represented. It is the hope of the author that these two groups can decide how best to share this information.

Recommendations will be made to the two representative groups at Nine Circles Community Health Centre. To the Manitoba HIV Program it will be suggested that results be disseminated to practicing health care providers. It should be made clear that there are a large number of different types of risk behaviours continuing to be exhibited among PLWHA, regardless of time since diagnosis. The importance of brief talks in health care settings should be reiterated as the vast majority of participants reported positively perceived staff based social support at health care providers (Crepaz et al., 2014). Provisions should be made for physicians to have the time and resources available to continue risk prevention discussions with their patients in perpetuation. As well, peer/advocate based prevention programs, focused upon the at risk groups identified in this study, will also be recommended. It is hoped that the evidence presented here will help add to the growing base of information in support of Nine Circles Community Health Centre functioning as an important source of social support, and preventative programming, to the community of PLWHA in Manitoba.

6.1.2 Future Research Questions

Future research can use this study to serve as a platform on which to build further, more detailed, knowledge in social support and risk behaviour in PLWHA in Manitoba. For example, it may be beneficial to look at the possible existence of a minimum of social support contact needed for an positive effect on morbidity/mortality. Consequently, there may also be a maximum social support level that when exceeded pushes social support into a more deleterious factor in risk behaviour reduction.

There were a myriad of other variables in the PPS database that could have lent to useful analyses, however due to time constraints these were not pursued. It is hoped further analysis of the data collected will occur, and contribute to a larger picture of the experience of those living with HIV/AIDS in Manitoba.

It was decided to avoid looking at the HIV diagnosis disclosure data based upon the theoretical model chosen. Relational regulation theory explains that support is helpful even when discussion/activities do not centre upon life with HIV, meaning that it does not matter whether or not a source is aware of an individual's HIV status. Disclosure information is however an important part of life with HIV and the data present in the PPS database may lend important nuisances to the overall narrative.

The Relational Regulation Theory suggests that looking at the influence of individual relationships upon the morbidity and risk behaviours of PLWHA may be a meaningful direction for future social support research to head in.

Evaluation studies are also a logical next step in this line of inquiry. Evaluation studies are needed to assess the outcomes of current interventions which include social support. Another benefit to evaluation studies is they can examine the effect of social support as an important social or contextual factor in mediating the impacts of other types of intervention, and not just those which are based entirely upon social support, upon HIV related transmission risk behaviours (Qiao et al., 2014).

Future research and intervention should target specific needs of different at risk populations in Manitoba, including those at different stages of their lives.

6.2 Conclusion

There is a lack of research specifically targeting the social support landscapes and their influence upon the transmission risk behaviours of PLWHA in Manitoba. Although these types of studies have been done in other large North American centres, it is difficult to say how transferable those results are to the Manitoba population. This type of study is important to the reduction of new HIV cases and an end to the continuing HIV pandemic. With the advent of modern pharmaceuticals, PLWHA are enjoying longer and healthier lives, which in turn, translates into longer times in which they may convey the infection further. Understanding not just the individual level factors, but also the sociocultural and psychosocial, will help to create more appropriate and effective HIV prevention programs.

The findings of the current research support a reinvestigation and bolstering of HIV transmission risk behaviours prevention programming, both peer/advocate based and that which is based within the health care setting. Gaps in the coverage of the existing programs have been identified in these results as demographic and social support based factors which contributed to more types of transmission risk behaviours being exhibited. Ongoing high levels of transmission risk behaviours were detected. However, most participants reported at least some level of positively perceived social support. Overwhelmingly, the majority of participants reported positively perceived social support from their health care providers. This lends itself well to using this source as a basis for strengthening prevention efforts.

References

Abrefa-Gyan, T., Cornelius, L., & Okundaye, J. (2015). Gender and children as the moderators of the relationship between social support and quality of life: An empirical study of people living with HIV/AIDS in Ghana. *Social Work in Public Health, 30*(7), 550-558. doi:10.1080/19371918.2015.1071611 [doi]

Afzali, M., Shahhosseini, Z., & Hamzeghardeshi, Z. (2015). Social capital role in managing high risk behavior: A narrative review. *Materia Socio-Medica, 27*(4), 280-285. doi:10.5455/msm.2015.27.280-285 [doi]

Allison, P.D. (1999). Logistic Regression using SAS: theory and application. *SAS Institute Incorporated and Wiley, Cary, NC, USA.*

Antonucci, T. C., & Akiyama, H. (1987). Social networks in adult life and a preliminary examination of the convoy model. *Journals of Gerontology, 42*(5), 519-527.

Arasteh, K., Des Jarlais, D. C., & Perlis, T. E. (2008). Alcohol and HIV sexual risk behaviors among injection drug users. *Drug and Alcohol Dependence, 95*(1-2), 54-61. doi:10.1016/j.drugalcdep.2007.12.008 [doi]

Avants, S. K., Warburton, L. A., & Margolin, A. (2001). How injection drug users coped with testing HIV-seropositive: Implications for subsequent health-related behaviors. *AIDS Education and Prevention : Official Publication of the International Society for AIDS Education, 13*(3), 207-218.

Barroso, J. (1997). Social support and long-term survivors of AIDS. *Western Journal of Nursing Research, 19*(5), 554-582.

Barta, W. D., Portnoy, D. B., Kiene, S. M., Tennen, H., Abu-Hasaballah, K. S., & Ferrer, R. (2008). A daily process investigation of alcohol-involved sexual risk behavior among economically disadvantaged problem drinkers living with HIV/AIDS. *AIDS and Behavior, 12*(5), 729-740. doi:10.1007/s10461-007-9342-4 [doi]

Baum, A., & Grunberg, N. E. (1991). Gender, stress, and health. *Health Psychology, 10*(2), 80-85. doi:10.1037//0278-6133.10.2.80

Beaudoin, C. M. (2004). Results from phase II of the enhanced surveillance of sexually transmitted diseases among Winnipeg street-involved youth study.

Beaudoin, C.M., Sloane, M., Wood, M., Larsen, T., Wylie, J.L., Dawood, M., Van Caeseele, P. (2009). The epidemiology of sexually transmitted infections and blood borne pathogens in a random sample of inmates in Manitoba correctional centres. Winnipeg, Manitoba: Completed for Manitoba corrections, department of justice, Manitoba government. available through Dr. Carole Beaudoin, 1015 Arlington Street, Winnipeg, Manitoba, R3E 3R2.

Booth, R. E., Kwiatkowski, C. F., & Chitwood, D. D. (2000). Sex related HIV risk behaviors: Differential risks among injection drug users, crack smokers, and injection drug users who smoke crack. *Drug and Alcohol Dependence, 58*(3), 219-226. doi:S0376-8716(99)00094-0 [pii]

Browning, C.R., & Cagney, K.A. (2002), Neighborhood structural disadvantage, collective efficacy and self-rated health in a physical setting. *Journal of Health and Social Behavior, 43*:383-99.

Bryant, K. J. (2006). Expanding research on the role of alcohol consumption and related risks in the prevention and treatment of HIV/AIDS. *Substance use & Misuse, 41*(10-12), 1465-1507. doi:R007R8T7722349V8 [pii]

Burgoyne, R. W., & Saunders, D. S. (2000). Perceived support in newly registered HIV/AIDS clinic outpatients. *AIDS Care - Psychological and Socio-Medical Aspects of AIDS/HIV, 12*(5), 643-650.

Chidwick, A., & Borrill, J. (1996). Dealing with a life-threatening diagnosis: The experience of people with the human immunodeficiency virus. *AIDS Care - Psychological and Socio-Medical Aspects of AIDS/HIV, 8*(3), 271-284. doi:10.1080/09540129650125704

Cockerham, W. C. (2007). *Social causes of health and disease*. Cambridge, UK: Polity Press.

Cohen, L., Chavez, V. & Chehimi, S. (2007). *Prevention is primary: Strategies for community well-being*. USA: Jossey Bass Publishing.

Cohen, S., & Wills, T. A. (1985). Stress, social support, and the buffering hypothesis. *Psychological Bulletin, 98*(2), 310-357. doi:10.1037/0033-2909.98.2.310

Colfax, G. N., Buchbinder, S. P., Cornelisse, P. G. A., Vittinghoff, E., Mayer, K., & Celum, C. (2002). Sexual risk behaviors and implications for secondary HIV transmission during and

after HIV seroconversion. *Aids, 16*(11), 1529-1535. doi:10.1097/00002030-200207260-00010

Collins, R. L., Kanouse, D. E., Gifford, A. L., Senterfitt, J. W., Schuster, M. A., McCaffrey, D. F., . . . Wengere, N. S. (2001). Changes in health-promoting behavior following diagnosis with HIV: Prevalence and correlates in a national probability sample. *Health Psychology, 20*(5), 351-360. doi:10.1037/0278-6133.20.5.351

Crepaz, N., Tungol-Ashmon, M. V., Higa, D. H., Vosburgh, W., Mullins, M. M., Barham, T., . . . Lyles, C. M. (2014). A systematic review of interventions for reducing HIV risk behaviors among people living with HIV in the united states, 1988-2012. *Aids, 28*(5), 633-656. doi:10.1097/QAD.0000000000000108

Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches* (3rd Edition ed.). Thousand Oaks, California, U.S.A.: SAGE Publicatons, Inc.

Cutrona, C. E. (1986). Objective determinants of perceived social support. *Journal of Personality and Social Psychology, 50*(2), 349-355. doi:10.1037/0022-3514.50.2.349

Darbes, L. A., Chakravarty, D., Beougher, S. C., Neilands, T. B., & Hoff, C. C. (2011). Partner-provided social support influences choice of risk reduction strategies in gay male couples. *AIDS and Behavior, ,* 1-9. doi:10.1007/s10461-010-9868-8

Elford, J., Ibrahim, F., Bukutu, C., & Anderson, J. (2008). Over fifty and living with HIV in london. *Sexually Transmitted Infections, 84*(6), 468-472. doi:10.1136/sti.2008.031187

Elliott, L., Blanchard, J., & Dinner, K.I. (1999). The Winnipeg injection drug epidemiology (WIDE) study. *Canadian Journal of Infectious Diseases, 10*

Ewart, C. K. (1991). Social action theory for a public health psychology. *The American Psychologist, 46*(9), 931-946.

Fisher, J. D. (1988). Possible effects of reference group-based social influence on AIDS-risk behavior and AIDS prevention. *American Psychologist, 43*(11), 914-920. doi:10.1037/0003-066X.43.11.914

Fisher, J. D., & Smith, L. (2009). Secondary prevention of HIV infection: The current state of prevention for positives. *Current Opinion in HIV and AIDS, 4*(4), 279-287. doi:10.1097/COH.0b013e32832c7ce5

Fox, J., White, P. J., Macdonald, N., Weber, J., McClure, M., Fidler, S., & Ward, H. (2009). Reductions in HIV transmission risk behaviour following diagnosis of primary HIV infection: A cohort of high-risk men who have sex with men. *HIV Medicine, 10*(7), 432-438. doi:10.1111/j.1468-1293.2009.00708.x

Friedland, J., Renwick, R., & McColl, M. (1996). Coping and social support as determinants of quality of life in HIV/AIDS. *AIDS Care - Psychological and Socio-Medical Aspects of AIDS/HIV, 8*(1), 15-31. doi:10.1080/09540129650125966

Friedman, S. R., Cooper, H. L., & Osborne, A. H. (2009). Structural and social contexts of HIV risk among African Americans. *American Journal of Public Health, 99*(6), 1002-1008. doi:10.2105/AJPH.2008.140327 [doi]

Gielen, A. C., McDonnell, K. A., Wu, A. W., O'Campo, P., & Faden, R. (2001). Quality of life among women living with HIV: The importance violence, social support, and self care behaviors. *Social Science & Medicine (1982), 52*(2), 315-322. doi:S0277953600001350 [pii]

Golden, M. R., Wood, R. W., Buskin, S. E., Fleming, M., & Harrington, R. D. (2007). Ongoing risk behavior among persons with HIV in medical care. *AIDS and Behavior, 11*(5), 726-735. doi:10.1007/s10461-007-9244-5

Gore-Felton, C., & Koopman, C. (2008). Behavioral mediation of the relationship between psychosocial factors and HIV disease progression. *Psychosomatic Medicine, 70*(5), 569-574. doi:10.1097/PSY.0b013e318177353e [doi]

Gore-Felton, C., Koopman, C., Turner-Cobb, J. M., Duran, R., Israelski, D., & Spiegel, D. (2002). The influence of social support, coping and mood on sexual risk behavior among HIV-positive men and women. *Journal of Health Psychology, 7*(6), 713-722. doi:10.1177/1359105302007006874 [doi]

Hanck, S.E., Blankenship, K.M., Irwin, K.S., West, B.S., Kershaw, T. (2008). Assessment of self-reported sexual behavior and condom use among female sex workers in India using a polling booth approach: a preliminary report. *Sex Transm Dis. 35*: 489-94.

Hays, R. B., Magee, R. H., & Chauncey, S. (1994). Identifying helpful and unhelpful behaviours of loved ones: The PWA's perspective. *AIDS Care - Psychological and Socio-Medical Aspects of AIDS/HIV, 6*(4), 379-392.

Healthy Living Project Team. (2007). Effects of a behavioral intervention to reduce risk of transmission among people living with HIV: The healthy living project randomized controlled study. *Journal of Acquired Immune Deficiency Syndromes (1999), 44*(2), 213-221. doi:10.1097/QAI.0b013e31802c0cae

Heckman, T. G., Somlai, A. M., Peters, J., Walker, J., Otto-Salaj, L., Galdabini, C. A., & Kelly, J. A. (1998). Barriers to care among persons living with HIV/AIDS in urban and rural areas. *AIDS Care, 10*(3), 365-375. doi:10.1080/713612410

Hillman, J. (2011). A call for an integrated biopsychosocial model to address fundamental disconnects in an emergent field: An introduction to the special issue on "sexuality and aging". *Ageing International, 36*(3), 303-312. doi:10.1007/s12126-011-9122-3

Hogan, B. E., Linden, W., & Najarian, B. (2002). Social support interventions: Do they work? *Clinical Psychology Review, 22*(3), 381-440. doi:http://dx.doi.org/10.1016/S0272-7358(01)00102-7

Hough, E. S., Magnan, M. A., Templin, T., & Gadelrab, H. F. (2005). Social network structure and social support in HIV-positive inner city mothers. *Journal of the Association of Nurses in AIDS Care, 16*(4), 14-24. doi:10.1016/j.jana.2005.05.002

Hudson, A. L., Lee, K. A., Miramontes, H., & Portillo, C. J. (2001). Social interactions, perceived support, and level of distress in HIV-positive women. *The Journal of the Association of Nurses in AIDS Care : JANAC, 12*(4), 68-76. doi:S1055-3290(06)60218-5 [pii]

Hulley, S.B., Cummings, S.R., Brower, W.S., Grady D.G., Newman T.B. (2007). *Designing clinical research* (Third ed.). PA, USA: Lippincott Williams & Wilkins.

Illa, L., Brickman, A., Saint-Jean, G., Echenique, M., Metsch, L., Eisdorfer, C., . . . Sanchez-Martinez, M. (2008). Sexual risk behaviors in late middle age and older HIV seropositive adults. *AIDS and Behavior, 12*(6), 935-942. doi:10.1007/s10461-008-9370-8 [doi]

Illa, L., Echenique, M., Saint Jean, G., Bustamante-Avellaneda, V., Metsch, L., Mendez-Mulet, L., . . . Sanchez-Martinez, M. (2010). Project roadmap: Reeducating older adults in maintaining aids prevention: A secondary intervention for older HIV-positive adults. *AIDS Education and Prevention, 22*(2), 138-147. doi:10.1521/aeap.2010.22.2.138

Jaworsky, D., Benoit, A., Raboud, J., O'Brien-Teengs, D., Blitz, S., Rourke, S. B., . . . OHTN Cohort Study Research Team. (2015). Comparison of coping strategies and supports between aboriginal and non-aboriginal people living with HIV in Ontario. *AIDS Care*, , 1-7. doi:10.1080/09540121.2015.1061634 [doi]

Johnson, B. T., Redding, C. A., DiClemente, R. J., Mustanski, B. S., Dodge, B., Sheeran, P., . . . Fishbein, M. (2010). A network-individual-resource model for HIV prevention. *AIDS and Behavior, 14*(Suppl 2), 204-221. doi:10.1007/s10461-010-9803-z [doi]

Kalichman, S. C., DiMarco, M., Austin, J., Luke, W., & DiFonzo, K. (2003). Stress, social support, and HIV-status disclosure to family and friends among HIV-positive men and women. *Journal of Behavioral Medicine, 26*(4), 315-332. doi:10.1023/A:1024252926930

Kelly, J. A., Murphy, D. A., Bahr, G. R., Koob, J. J., Morgan, M. G., Kalichman, S. C., . . . St Lawrence, J. S. (1993). Factors associated with severity of depression and high-risk sexual behavior among persons diagnosed with human immunodeficiency virus (HIV) infection. *Health Psychology : Official Journal of the Division of Health Psychology, American Psychological Association, 12*(3), 215-219.

Kimberly, J. A., & Serovich, J. M. (1999). The role of family and friend social support in reducing risk behaviors among HIV-positive gay men. *AIDS Education and Prevention : Official Publication of the International Society for AIDS Education, 11*(6), 465-475.

Kingston-Riechers, J. (2011). *The economic cost of HIV/AIDS in canada.* ().Canadian AIDS Society.

Kyle, R. D., & Sachs, L. G. (1994). Perceptions of control and social support in relation to psychosocial adjustment to HIV/AIDS. *AIDS Patient Care, 8*(6), 322-327.

Lakey, B., & Orehek, E. (2011). Relational regulation theory: A new approach to explain the link between perceived social support and mental health. *Psychological Review, 118*(3), 482-495. doi:10.1037/a0023477

Latkin, C. A., & Knowlton, A. R. (2005). Micro-social structural approaches to HIV prevention: A social ecological perspective. *AIDS Care, 17 Suppl 1*, S102-13. doi:G24761842K68N796 [pii]

Leganger, A., & Kraft, P. (2003), Control Constrcts: Do they mediate the relationship between educational attainment and health behavior? *Journal of Health Psychology, 8*(3): 361-72.

Leserman, J., Jackson, E. D., Petitto, J. M., Golden, R. N., Silva, S. G., Perkins, D. O., . . . Evans, D. L. (1999). Progression to AIDS: The effects of stress, depressive symptoms, and social support. *Psychosomatic Medicine, 61*(3), 397-406.

Leserman, J., Perkins, D. O., & Evans, D. L. (1992). Coping with the threat of AIDS: The role of social support. *The American Journal of Psychiatry, 149*(11), 1514-1520. doi:10.1176/ajp.149.11.1514 [doi]

Lowndes, C.M., Jayachandran, A.A., Banandur, P., Ramesh, B.M., Sangameshwar, B.M., Moses, S., Blanchard, J., Alary, M.. (2012) Polling booth surveys: a novel approach for reducing social desirability bias in HIV-related behavioral surveys in resource poor settings. *AIDS Behavior, 16*(4): 1054-62.

Manitoba Health, Public Health Planning, Primary Health Care Division. (2010). *Statistical update: HIV and AIDS report to December 31, 2009.* (). Winnipeg, Manitoba: Manitoba Health.

Manitoba Health, Public Health Planning, Primary Health Care Division. (2011). *Statistical update: HIV and AIDS report to December 31, 2010.* ().Manitoba Health.

McMahon J.M., and Tortu S. (2003), *A potential hidden source of hepatitis C infection among noninjecting drug users.* Journal of Psychoactive Drugs 2003; 35: pp. 455-460

Medley, A., Bachanas, P., Grillo, M., Hasen, N., & Amanyeiwe, U. (2015). Integrating prevention interventions for people living with HIV into care and treatment programs: A

systematic review of the evidence. *Journal of Acquired Immune Deficiency Syndromes, 68*, S286-S296. doi:10.1097/QAI.0000000000000520

Metsch, L. R., Pereyra, M., Messinger, S., Del Rio, C., Strathdee, S. A., Anderson-Mahoney, P., . . . Antiretroviral Treatment and Access Study (ARTAS) Study Group. (2008). HIV transmission risk behaviors among HIV-infected persons who are successfully linked to care. *Clinical Infectious Diseases : An Official Publication of the Infectious Diseases Society of America, 47*(4), 577-584. doi:10.1086/590153 [doi]

Nanni, M. G., Caruso, R., Mitchell, A. J., Meggiolaro, E., & Grassi, L. (2015). Depression in HIV infected patients: A review. *Current Psychiatry Reports, 17*(1), 1-11. doi:10.1007/s11920-014-0530-4

Neaigus, A., Friedman, S. R., Curtis, R., Des Jarlais, D. C., Furst, R. T., Jose, B., . . . Ward, T. (1994). The relevance of drug injectors' social and risk networks for understanding and preventing HIV infection. *Social Science & Medicine (1982), 38*(1), 67-78.

Neblett, R. C., Davey-Rothwell, M., Chander, G., & Latkin, C. A. (2011). Social network characteristics and HIV sexual risk behavior among urban African American women. *Journal of Urban Health : Bulletin of the New York Academy of Medicine, 88*(1), 54-65. doi:10.1007/s11524-010-9513-x [doi]

Norbeck, J. S., Lindsey, A. M., & Carrieri, V. L. (1981). The development of an instrument to measure social support. *Nursing Research, 30*(5), 264-269.

Porter J., Bonilla L., & Drucker E.(1997), *Methods of smoking crack as a potential risk factor for HIV infection: Crack smokers' perceptions and behavior. Contemporary Drug Problems 1997*; 24: pp. 319-347

Public Health Agency of Canada. (2009). *HIV and AIDS in Canada: Surveillance report to December 31, 2008.* (No. No. HP37-2/2008-1-2E-PDF).

Public Health Agency of Canada. (2010). *HIV/AIDS epi updates, July 2010, surveillance and risk assessment division, centre for communicable diseases and infection control.* ().PHAC.

Public Health Agency of Canada. (2014). *HIV/AIDS epi updates: October 2014: Chapter 1: National HIV prevalence and incidence estimates for 2011.* (No. 140254).PHAC.

Purcell, D. W., Mizuno, Y., Metsch, L. R., Garfein, R., Tobin, K., Knight, K., & Latka, M. H. (2006). Unprotected sexual behavior among heterosexual HIV-positive injection drug using men: Associations by partner type and partner serostatus. *Journal of Urban Health : Bulletin of the New York Academy of Medicine, 83*(4), 656-668. doi:10.1007/s11524-006-9066-1 [doi]

Qiao, S., Li, X., & Stanton, B. (2014). Social support and HIV-related risk behaviors: A systematic review of the global literature. *AIDS and Behavior, 18*(2), 419-441. doi:10.1007/s10461-013-0561-6 [doi]

Reilly, T., & Woo, G. (2004). Social support and maintenance of safer sex practices among people living with HIV/AIDS. *Health and Social Work, 29*(2), 97-105.

Reynolds, E. K., Magidson, J. F., Bornovalova, M. A., Gwadz, M., Ewart, C. K., Daughters, S. B., & Lejuez, C. W. (2010). Application of the social action theory to understand factors associated with risky sexual behavior among individuals in residential substance abuse treatment. *Psychology of Addictive Behaviors : Journal of the Society of Psychologists in Addictive Behaviors, 24*(2), 311-321. doi:10.1037/a0018929 [doi]

Rodgers, A. Y. (1995). The relationship between changes in sexual support and adjustment to AIDS in gay males. *Social Work in Health Care, 20*(3), 37-49. doi:10.1300/J010v20n03_03

Roger, K. S., Mignone, J., & Kirkland, S. (2013). Social aspects of HIV/AIDS and aging: A thematic review. *Canadian Journal on Aging, 32*(3), 298-306. doi:10.1017/S0714980813000330

Rosario, M., Schrimshaw, E. W., & Hunter, J. (2006). A model of sexual risk behaviors among young gay and bisexual men: Longitudinal associations of mental health, substance abuse, sexual abuse, and the coming-out process. *AIDS Education and Prevention : Official Publication of the International Society for AIDS Education, 18*(5), 444-460. doi:10.1521/aeap.2006.18.5.444 [doi]

Rzeszutek, M., Oniszczenkow, O., Zebbrowska, M., & Firtaq-Burkacka, E. (2015), HIV infection duration, social support and the level of trauma symptoms in a sample of HIV positive Polish individuals. *AIDS Care, 27*(3): 363-9.

Sarafian, I. (2012). Process assessment of a peer education programme for HIV prevention among sex workers in Dhaka, Bangladesh : A social support framework. *Social Science & Medicine (1982), 75*(4), 668-675. doi:10.1016/j.socscimed.2011.09.003 [doi]

Saxon, A. J., & Calsyn, D. A. (1992). Alcohol use and high-risk behavior by intravenous drug users in an AIDS education paradigm. *Journal of Studies on Alcohol, 53*(6), 611-618.

Serovich, J. M., Kimberly, J. A., Mosack, K. E., & Lewis, T. L. (2001). The role of family and friend social support in reducing emotional distress among HIV-positive women. *AIDS Care - Psychological and Socio-Medical Aspects of AIDS/HIV, 13*(3), 335-341. doi:10.1080/09540120120043982

Siegel, K., Palamara Mesagno, F., Chen, J. -., & Christ, G. (1989). Factors distinguishing homosexual males practicing risky and safer sex. *Social Science and Medicine, 28*(6), 561-569. doi:10.1016/0277-9536(89)90250-5

Stein, M., Herman, D. S., Trisvan, E., Pirraglia, P., Engler, P., & Anderson, B. J. (2005). Alcohol use and sexual risk behavior among human immunodeficiency virus-positive persons. *Alcoholism, Clinical and Experimental Research, 29*(5), 837-843. doi:00000374-200505000-00018 [pii]

Strathdee, S. A., Galai, N., Safaiean, M., Celentano, D. D., Vlahov, D., Johnson, L., & Nelson, K. E. (2001). Sex differences in risk factors for HIV seroconversion among injection drug users: A 10-year perspective. *Archives of Internal Medicine, 161*(10), 1281-1288. doi:ioi00801 [pii]

Traube, D. E., Holloway, I. W., & Smith, L. (2011). Theory development for HIV behavioral health: Empirical validation of behavior health models specific to HIV risk. *AIDS Care, 23*(6), 663-670. doi:10.1080/09540121.2010.532532 [doi]

Triandis, H. C. (1989). The self and social behavior in differing cultural contexts. *Psychological Review, 96*(3), 506-520.

Turner, H. A., Hays, R. B., & Coates, T. J. (1993). Determinants of social support among gay men: The context of AIDS. *Journal of Health and Social Behavior, 34*(1), 37-53.

Turner, H. A., Pearlin, L. I., & Mullan, J. T. (1998). Sources and determinants of social support for caregivers of persons with AIDS. *Journal of Health and Social Behavior, 39*(2), 137-151.

UNAIDS. (2013). *Global report: UNAIDS report on the global AIDS epidemic.* (No. JC2502/1/E). Geneva, Switzerland: UNAIDS.

Unger, J. B., Kipke, M. D., De Rosa, C. J., Hyde, J., Ritt-Olson, A., & Montgomery, S. (2006). Needle-sharing among young IV drug users and their social network members: The influence of the injection partner's characteristics on HIV risk behavior. *Addictive Behaviors, 31*(9), 1607-1618. doi:S0306-4603(05)00299-6 [pii]

Wagner, G. J., Holloway, I., Ghosh-Dastidar, B., Ryan, G., Kityo, C., & Mugyenyi, P. (2010). Factors associated with condom use among HIV clients in stable relationships with partners at varying risk for HIV in Uganda. *AIDS and Behavior, 14*(5), 1055-1065. doi:10.1007/s10461-010-9673-4 [doi]

Weaver, C.G.,Ravani, P., Oliver M.J.., Austin P.C., Quinn R.R. (2015). Analyzing hospitalization data: potential limitations of Poisson regression. *Nephrol. dial. Transplant. 30*(8): 1244-1249.

White, L., & Cant, B. (2003). Social networks, social support, health and HIV-positive gay men. *Health & Social Care in the Community, 11*(4), 329-334. doi:431 [pii]

Young, T.K. (2005). Population health: concepts and methods. *Oxford University Press, 2005.*

APPENDIX A

INFORMED CONSENT FORM

UNIVERSITY OF MANITOBA

Faculty of Medicine
Department of
Community Health Sciences
750 Bannatyne Avenue
Winnipeg, Manitoba
Canada R3E 0W3
Telephone: (204) 789-3473
Fax: (204) 789-3905

The HIV Positive Behaviour Study

Questionnaire Information and Verbal Consent Form

We are currently doing a study on HIV positive people in Manitoba. The purpose of this study is to look at what HIV positive people do to stay healthy, and what factors help them to protect others from HIV. Understanding these factors will help us to prevent further HIV infections and to provide better health and social services to people with HIV in Manitoba. We would appreciate your participation in this study.

Your participation in this study is completely **voluntary**. You may drop out at any time, and your decision to participate or not participate will **not** influence your access to any services. If you agree to participate, you will be asked by the study interviewer to answer questions about yourself, your sexual behaviour, and other behaviours like drug and alcohol use. Some of the questions are very personal, and you may refuse to answer any questions at any time. The study interviewer can discuss any issues of concern at this time, during the interview, or later on during the course of the study.

Your participation is expected to last about 1 hour. After the interview a $10.00 honorarium will be paid to you in cash. The honorarium receipt will not have any information on it about this study.

You will not be asked to provide your name on the questionnaire; it will be coded with an anonymous study code only. All of the information you provide will remain strictly confidential. NO identifying information (e.g., name, address, phone number) will be on the questionnaires. All information you provide will be entered into this study using a code, such as “person231”. All information will be stored in a secure and confidential environment, and will only be reviewed by authorized study personnel. The University of Manitoba Health Research Ethics Board may review study-related records for quality assurance purposes.

Do you have any questions about this study? Yes ( ) No ( )

_____

Do you agree to take part in the interview? Yes ( ) No ( )

Initials or alias of the person interviewed_____

If you have questions or concerns about the study once the interview is over, you may contact Alina Cameron (the study assistant) at 204-298-5526 or inkiboska@shawmail.com

Name of interviewer_____

Signature of Interviewer_____

Time of interview (e.g.13:45) _____

Date of interview (dd/mm/yy) _____/_____/_____

APPENDIX B

POSITIVE PREVENTION STUDY PARTICIPANT ADVERTISEMENT

THE POSITIVE PREVENTION STUDY

THE UNIVERSITY OF MANITOBA

RESEARCH STUDY ON THE

EXPERIENCES OF PEOPLE LIVING WITH HIV/AIDS IN MANITOBA

We are interested in talking to People Living with HIV/AIDS in Manitoba about their experiences. We would like to know about:

- Changes that you have made since testing HIV positive.
- The people in your life that support you.
- Any experiences you have had because of your HIV status.

All interviews will take place at Nine Circles Community Health Centre, 705 Broadway, Winnipeg.

- Interviews will occur at a time that is best for you.
- The survey will take about 45 minutes to complete.
- You will be offered $10 to thank you for your time and reimburse your travel.
- Participation is completely voluntary.
- Everything you tell us is **private** and **anonymous**. Your name will **not** be in the study.

This is a University study. Your participation will not affect any care or services that you are receiving.

If you are:

- 18 years of age or older,
- Tested positive for HIV a**t least 6 months ago,** and
- Are interested in participating or would like more information please phone:

The Study Coordinator at XXX-XXXX.

APPENDIX C

UNIVERSITY OF MANITOBA | BANNATYNE CAMPUS Research Ethics Board

P126 - 770 Bannatyne Avenue
Winnipeg, Manitoba
Canada R3E 0W3
Telephone 204-789-3255
Fax 204-789-3414

Received Oct 26th, 2015

HEALTH RESEARCH ETHICS BOARD (HREB)

CERTIFICATE OF ANNUAL APPROVAL

PRINCIPAL INVESTIGATOR:	INSTITUTION/DEPARTMENT:	ETHICS #:
Alina Cameron	U of M/Medicine/Community Health Sciences	HS11513 (H2009:264)
HREB MEETING DATE (If applicable):	**APPROVAL DATE:** October 6, 2015	**EXPIRY DATE:** March 2, 2016
STUDENT PRINCIPAL INVESTIGATOR SUPERVISOR (If applicable): Dr. C. Beaudoin		

PROTOCOL NUMBER:	PROJECT OR PROTOCOL TITLE:
NA	Positive Prevention study: Manitoba HIV+ Client Survey
SPONSORING AGENCIES AND/OR COORDINATING GROUPS: NA	

Submission Date of Investigator Documents:	HREB Receipt Date of Documents:
September 29, 2015	October 6, 2015

REVIEW CATEGORY OF ANNUAL REVIEW: **Full Board Review** ☐ **Delegated Review** ☒

THE FOLLOWING AMENDMENT(S) and DOCUMENTS ARE APPROVED FOR USE:

Document Name(if applicable)	Version(if applicable)	Date

Annual approval

*Annual approval implies that the most recent **HREB approved** versions of the protocol, Investigator Brochures, advertisements, letters of initial contact or questionnaires, and recruitment methods, etc. are approved.*

Consent and Assent Form(s):

CERTIFICATION

The University of Manitoba (UM) Health Research Board (HREB) has reviewed the annual study status report for the research study/project named on this ***Certificate of Annual Approval*** as per the category of review listed above and was found to be acceptable on ethical grounds for research involving human participants. Annual approval was granted by the Chair or Acting Chair, UM HREB, per the response to the conditions of approval outlined during the initial review (full board or delegated) of the annual study status report.

HREB ATTESTATION

The University of Manitoba (UM) Health Research Board (HREB) is organized and operates according to Health Canada/ICH Good Clinical Practices, Tri-Council Policy Statement 2, and the applicable laws and regulations of Manitoba. In respect to clinical trials, the HREB complies with the membership requirements for Research Ethics Boards defined in Division 5 of the Food and Drug Regulations of Canada and carries out its functions in a manner consistent with Good Clinical Practices.

QUALITY ASSURANCE

The University of Manitoba Research Quality Management Office may request to review research documentation from this research study/project to demonstrate compliance with this approved protocol and the University of Manitoba Policy on the Ethics of Research Involving Humans.

CONDITIONS OF APPROVAL:

1. The study is acceptable on scientific and ethical grounds for the ethics of human use only. ***For logistics of performing the study, approval must be sought from the relevant institution(s).***
2. This research study/project is to be conducted by the local principal investigator listed on this certificate of approval.
3. The principal investigator has the responsibility for any other administrative or regulatory approvals that may pertain to the research study/project, and for ensuring that the authorized research is carried out according to governing law.
4. **This approval is valid until the expiry date noted on this certificate of annual approval. A Bannatyne Campus Annual Study Status Report** must be submitted to the REB within 15-30 days of this expiry date.
5. Any changes of the protocol (including recruitment procedures, etc.), informed consent form(s) or documents must be reported to the HREB for consideration in advance of implementation of such changes on the **Bannatyne Campus Research Amendment Form.**
6. Adverse events and unanticipated problems must be reported to the REB as per Bannatyne Campus Research Boards Standard Operating procedures.
7. The UM HREB must be notified regarding discontinuation or study/project closure on the **Bannatyne Campus Final Study Status Report**.

Sincerely,

John Arnett, PhD., C. Pysch.
Chair, Health Research Ethics Board
Bannatyne Campus

APPENDIX D

UNIVERSITY OF MANITOBA | Research Ethics - Bannatyne
Office of the Vice-President (Research and International)

P126-770 Bannatyne Avenue
Winnipeg, Manitoba
Canada, R3E 0W3
Telephone : 204-789-3255
Fax: 204-789-3414

HEALTH RESEARCH ETHICS BOARD (HREB)
CERTIFICATE OF FINAL APPROVAL FOR NEW STUDIES
Delegated Review

PRINCIPAL INVESTIGATOR:	INSTITUTION/DEPARTMENT:	ETHICS #:
Ms. Alina Cameron	U of M/Health Sciences	HS19043 (H2015:403)
APPROVAL DATE: November 19, 2015	**EXPIRY DATE:** November 19, 2016	
STUDENT PRINCIPAL INVESTIGATOR SUPERVISOR (If applicable): Dr. M. Becker		

PROTOCOL NUMBER:	PROJECT OR PROTOCOL TITLE;
NA	The Influence of Social Support in the Lives of People Living with HIV/ADIS in Winnipeg Manitoba, Canada (Linked to H2009:264)
SPONSORING AGENCIES AND/OR COORDINATING GROUPS: NA	

Submission Date of Investigator Documents:	HREB Receipt Date of Documents:
September 29 and November 2, 2015	October 6 and November 4, 2015

THE FOLLOWING ARE APPROVED FOR USE:

Document Name	Version(if applicable)	Date
Protocol: Protocol		June 8, 2012
Revised REB Submission Form submitted November 2, 2015		
Consent and Assent Form(s):		
Other:		

CERTIFICATION
The above named research study/project has been reviewed in a ***delegated manner*** by the University of Manitoba (UM) Health Research Board (HREB) and was found to be acceptable on ethical grounds for research involving human participants. The study/project and documents listed above was granted final approval by the Chair or Acting Chair, UM HREB.

HREB ATTESTATION
The University of Manitoba (UM) Research Board (HREB) is organized and operates according to Health Canada/ICH Good Clinical Practices, Tri-Council Policy Statement 2, and the applicable laws and regulations of Manitoba. In respect to clinical trials, the HREB complies with the membership requirements for Research Ethics Boards defined in Division 5

of the Food and Drug Regulations of Canada and carries out its functions in a manner consistent with Good Clinical Practices.

QUALITY ASSURANCE
The University of Manitoba Research Quality Management Office may request to review research documentation from this research study/project to demonstrate compliance with this approved protocol and the University of Manitoba Policy on the Ethics of Research Involving Humans.

CONDITIONS OF APPROVAL:

1. The study is acceptable on scientific and ethical grounds for the ethics of human use only. ***For logistics of performing the study, approval must be sought from the relevant institution(s).***
2. This research study/project is to be conducted by the local principal investigator listed on this certificate of approval.
3. The principal investigator has the responsibility for any other administrative or regulatory approvals that may pertain to the research study/project, and for ensuring that the authorized research is carried out according to governing law.
4. **This approval is valid until the expiry date noted on this certificate of approval. A Bannatyne Campus Annual Study Status Report** must be submitted to the HREB within 15-30 days of this expiry date.
5. Any changes of the protocol (including recruitment procedures, etc.), informed consent form(s) or documents must be reported to the HREB for consideration in advance of implementation of such changes on the **Bannatyne Campus Research Amendment Form.**
6. Adverse events and unanticipated problems must be reported to the HREB as per Bannatyne Campus Research Boards Standard Operating procedures.
7. The UM HREB must be notified regarding discontinuation or study/project closure on the **Bannatyne Campus Final Study Status Report**.

Sincerely,

John Arnett, PhD. C. Psych.
Chair, Health Research Ethics Board
Bannatyne Campus

Please quote the above Human Ethics Number on all correspondence.
Inquiries should be directed to the REB Secretary **Telephone:** (204) 789-3255/ **Fax:** (204) 789-3414

APPENDIX E

THE POSITIVE PREVENTION STUDY SURVEY/INTERVIEW:
The Experiences of People Living with HIV/AIDS in Manitoba

Please complete prior to interview.

Study ID Number _____

Date of Interview _____ (mm/dd/yyyy)

Time of Interview _____ a.m. or p.m.

Time of Interview Complete _____ a.m. or p.m.

Interview Not Completed (1) Changed mind
(2) Unable to Complete _____(explain)

Place of Interview (1) NCCHC
(2) Other _____(where)

Informed Consent Received _____ (interviewer's initial)

THE POSITIVE PREVENTION STUDY:
The Experiences of People Living with HIV/AIDS in Manitoba

Demographic Information

1. **What is your gender?**
   (1) Male (2) Female (3) Trans M-F (4) Trans F-M
   (88) Not sure/haven't decided/questioning (99) Refused

2. **I would describe myself as:**
   (1) Queer/Homosexual/ Gay/ Lesbian (2) Heterosexual/ Straight (3) Bisexual
   (4) Two-spirit (88) Not sure; haven't decided (99) Refused

3. **How old are you?**
   _____ years (88) Don't Know (99) Refused

4. **How old were you when were you first diagnosed with HIV?**
   I was _____years old when I was first diagnosed OR
   I was first diagnosed in _____ (month & year) (88) Can't remember (99) Refused

5. **To what racial background do you belong?**
   (1) Aboriginal (4) Caucasian/White (88) Don't Know
   (2) Asian (5) Latino (99) Refused
   (3) Black (6) Other: _____

If NOT ABORIGINAL, skip to question 6…

5a. If Aboriginal, do you consider yourself:
(1) First Nations Status (2) First Nations Non-Status (3) Inuit (4) Métis
(5) Mixed background (6) Other_____ (88) Don't Know (99) Refused

6. **Where were you born?**
   (1) Canada (2) Outside of Canada (specify country) _____
   (88) Don't Know (99) Refused

If NOT BORN IN CANADA, skip to question 8…

7. **If you were born in Canada, where did you mainly live/grow up as a child?**
   (1) City (2) Rural/Town (3) On Reserve
   (4) Other _____ (88) Don't Know (99) Refused

8. **Where do you live or mostly live right now? (see provided maps)**
   (1) Assiniboine (7) Brandon
   (2) Burntwood (8) Central
   (3) Churchill (9) Interlake
   (4) Norman (10) North Eastman
   (5) Parkland (11) South Eastman
   (6) Winnipeg (12) Out of province (specify) _____
   (13) Other_____ (88) Don't Know
   (99) Refused

9. **Where were you living when you were first diagnosed with HIV?**
   (1) Canada (2) Outside of Canada (specify country) _____
   (88) Don't Know (99) Refused

If OUTSIDE OF CANADA, skip to question 11…

10. If you were diagnosed in Canada, where were you living when you were first diagnosed?

(1) B.C. (6) Quebec (11) Yukon
(2) Alberta (7) P.E.I (12) Nunavut
(3) Saskatchewan (8) Nova Scotia (13) Northwest Territories
(4) Manitoba (9) Newfoundland and Labrador (88) Don't Know
(5) Ontario (10) New Brunswick (99) Refused

11. Where did you receive your HIV positive diagnosis?

(1) My regular doctor's office (2) Community health centre (3) Walk-in clinic (4) Hospital
(5) Immigration centre (6) Other_____ (88) Don't know (99) Refused

12. What is the main reason you were tested? Please check only one.

(1) I was pregnant
(2) I had symptoms that worried me (for example: high fever, night sweats, pneumonia)
(3) My doctor recommended it
(4) I had sex with somebody who I thought, or I knew, was HIV positive
(5) I shared needles with somebody who I thought, or I knew, was HIV positive
(6) I have HIV positive friends and I thought I should get tested
(7) Immigration requirement
(8) Insurance requirement
(9) Sexual assault
(10) In a fight
(11) Tattoo, piercing or scarification
(12) Other_____
(88) Don't Know (99) Refused

13. What is the highest level of education that you have completed?

(1) Grade 8 or less
(2) Some high school (gr. 9-12); still enrolled
(3) Some high school (gr. 9-12); not enrolled
(4) High school diploma or GED
(5) Some college or university course work
(6) College or university diploma/degree
(7) Other _____
(88) Don't Know (99) Refused

14. What do you think is the most likely way that you got HIV? Please check only one.

(1) Sex (Any consensual sexual contact with another person of any gender – includes vaginal, anal, or oral sex)
(2) Sexual assault
(3) Injection drugs
(4) Fighting or biting
(5) Tattoos/Piercing/Scarification
(6) Born to HIV positive mother
(7) Can't decide – probably a combination of the above _____ (specify)
(8) Other_____
(88) Don't Know (99) Refused

Housing

15. **Where do you currently live? (please circle all that apply)**
    (1) House or condo that I rent
    (2) Apartment
    (3) Hotel
    (4) Homeless; changes daily
    (5) House or condo that I own
    (6) Staying at a friends / family's place
    (7) Rooming house/ boarding house/ hostel
    (8) Shelter
    (99) Refused

16. **Is your housing situation:**
    (1) Stable – you have been or will be there for a while
    (2) Unstable – you tend to move around a lot, or may not be there for very long
    (99) Refused

17. **Do you have any concerns about your current housing situation?**

	Yes	No	Not sure	Refused
I'm worried I can't afford it				
I'm worried that I may be evicted or thrown out				
It's located in an unsafe neighbourhood; I feel unsafe there				
It's dirty or otherwise an unhealthy place (e.g. bugs)				
I'm homeless; I don't know where I will be day to day				
Other (please explain):				

Mental Illness

18. **Have you ever been diagnosed by a professional (e.g. doctor, counsellor) with any mental health concerns? (e.g., depression, anxiety, schizophrenia, foetal alcohol syndrome).**
    (0) No (1) Yes (88) Don't Know (99) Refused

If NO, skip to question 19…

18a. Which mental health issues are you currently managing? (Check all that apply)
(1) Depression (4) Obsessive-Compulsive Disorder (7) Other_____
(2) Bipolar Disorder (5) Panic Attacks (88) Not Sure
(3) Anxiety (6) Schizophrenia (99) Refused

18b. Were you diagnosed with this mental health concern before or after your HIV diagnosis?
(1) Before (2) After (88) Not Sure (99) Refused

18c. Do you have someone, like a physician, counselor, therapist, or other health worker, that you see regularly to talk about mental health concerns?
(0) No, and I don't want to talk to anyone
(1) No, I don't need to talk to anyone
(2) No, but I would like to have someone to talk to
(3) Yes, but I don't feel that it is helping
(4) Yes, and I feel that it is helping
(88) Not Sure (99) Refused

Sexual Behaviours
(Sex means any consensual (not forced) sexual contact with another person of any gender; it includes vaginal, anal, or oral sex).

19. Have you EVER had sex?
(0) No (1) Yes (88) Not Sure (99) Refused

If NO, skip to question 27…

20. Before you found out that you have HIV, did you have sex with:
(0) I never had sex before I found out I had HIV
(1) Men (2) Women (3) Both (99) Refused

21. Since testing positive for HIV, have you had sex, even once, with:
(0) I haven't had sex since testing HIV positive
(1) Men (2) Women (3) Both (99) Refused

If you haven't had sex at all since testing HIV positive, skip to question 23…

22. Since testing positive for HIV, if you have had sex (oral, anal, or vaginal) – even once - please indicate how often you used condoms or oral barriers:

I use a condom or a dental dam for …	Not applicable	Every time	About half the time	Less than half the time	Almost never	Refused to answer
Oral sex						
Receptive anal sex						
Insertive anal sex						
Vaginal sex						
Sex with multiple partners						

23. Since finding out that you have HIV, have you made any changes to your sexual behaviours?
(0) No, because I didn't think my sexual behaviours needed to change
(1) No, I changed my sexual behaviours before I found out I was HIV positive
(2) I wanted to make some changes, but decided I couldn't
(3) I made some changes to my sexual behaviours after testing positive, but I was not able to keep it up
(4) I made some changes to my sexual behaviours, and I've been able to keep that going
(5) I have more sex since testing positive
(88) Not sure (99) Refused

24. If you've made some lasting changes to your sexual behaviours since finding out that you have HIV, what are those changes?

	Y	N	Not Sure	Refused
I have stopped having sex				
I don't have as many sexual partners as I used to				
I try to use a condom (or dental dam) anytime I have sex				
I don't have anal sex				
I don't have vaginal sex				
I only have sex with people that I know or think are also HIV positive				
I try to always tell new partners that I'm positive, so they will know the risks				
I have told my previous or current partners that I'm positive so they can get tested				
I don't exchange sex for money or drugs (or anything) anymore				
I only have oral sex				

I only have receptive anal sex				
I only have insertive anal sex				

25. Is there anything that makes it hard for you to prevent passing HIV to others through sex?

	Y	N	Not Sure	Refused
I don't have sex since becoming HIV positive, so it's not an issue for me				
I don't really like condoms so I don't use them				
I can't always get condoms when I need them				
I don't really like dental dams so I don't use them				
I don't know how to use a dental dam so I don't use them				
I don't really care if I pass on HIV to others				
I don't like using condoms for oral sex				
I'm afraid that if I told my partners I had HIV they would leave or reject me				
I'm afraid that if I told my partners I had HIV they would hit me (or other violence)				
I'm afraid that if I insisted on using condoms, my partner would know I had HIV				
My partners don't care about getting HIV from me, so we don't use condoms				
If I'm drunk or high, I forget to use a condom or forget to tell my partner I have HIV				
Me or my partner are trying to get pregnant, so we have sex without a condom				
If I'm getting paid for sex, some partners pay more to have sex without a condom				
Sometimes I'm forced to have sex without a condom				
I don't really know how to tell people I'm positive or how to insist on using a condom				
I don't really know how to prevent spreading HIV to others				
Condoms are not acceptable or appropriate in my culture or my community				
My viral load is low, so I don't use condoms				

26. Do you tell your sex partners that you have HIV?

(0) Never (1) Always (2) Sometimes (3) Not when I am high or drunk
(4) I tell some partners but not others (clarify) _____
(77) I haven't had sex since testing positive so it's not an issue (88) Not sure (99) Refused

Alcohol Use

27. Have you <u>EVER</u> had alcohol?

(0) No (1) Yes (88) Not sure (99) Refused

If NO, skip to question 30…

28. In the last 3 months, how often have you had alcohol?

(0) Never (1) Less than once a week (2) A couple of days a week
(3) Everyday (88) Not sure (99) Refused

If NEVER, skip to question 29…

28a. In the last 3 months, have you been on a drinking binge that lasted two or more days?

(0) No (1) Yes (88) Not sure (99) Refused

28b. In the last 3 months, when you have had alcohol, did you EVER have:

	Yes	No	Not Sure	N/A (never had sex)	Refused
Oral sex using a condom					
Oral sex without a condom					
Anal sex with a condom					

Anal sex without a condom					
Vaginal sex with a condom					
Vaginal sex without a condom					
Sex with multiple partners, using a new condom with each partner change					
Sex with multiple partners, not using a new condom with each partner change					
Sex with multiple partners without using condoms					

28c. When you drink alcohol, how much do you usually drink at one time?
(1) One or two drinks (2) Three to five drinks (3) More than 5 drinks
(88) Not sure (99) Refused

29. Since finding out that you have HIV, have you changed your alcohol use? Please choose one.
(0) No, because I didn't think my use of alcohol needed to change
(1) No, I stopped using alcohol before I found out that I was HIV positive
(2) I wanted to make some changes (drink less), but decided I couldn't
(3) I made some changes to my alcohol use after testing HIV positive, but I was not able to keep it going
(4) I did make some changes to my alcohol use, and I've been able to keep that going
(5) I have increased my level of alcohol use since testing HIV positive
(88) Not sure (99) Refused

Non-Injection Drug Use

30. Have you <u>EVER</u> used non-injection street drugs – in other words, drugs that were not prescribed to you? (e.g. smoked marijuana, smoked crack)
(0) No (1) Yes (88) Not Sure (99) Refused

If NO, skip to question 34…

31. In the last 3 months, how often have you used non-injection street drugs?
(0) Never (1) Less than once a week (2) A couple of days a week
(3) Everyday (88) Not sure (99) Refused

If NEVER, skip to question 32…

31a. In the last 3 months, have you been high or stoned on non-injection drugs for one or more days in a row?
(0) No (1) Yes (88) Not sure (99) Refused

31b. In the last 3 months, when you used non-injection drugs, did you EVER have:

	Yes	No	Not Sure	N/A (never had sex)	Refused
Oral sex using a condom					
Oral sex without a condom					
Anal sex with a condom					
Anal sex without a condom					
Vaginal sex with a condom					
Vaginal sex without a condom					
Sex with multiple partners, using a new condom with each partner change					
Sex with multiple partners, not using a new condom with each partner change					
Sex with multiple partners without using condoms					

32. Since finding out that you have HIV, have you changed your non-injection drug use? Please choose one.

(0) No, because I didn't think my use of non-injection drugs needed to change
(1) No, I stopped using non-injection drugs before I found out that I was HIV positive
(2) I wanted to make some changes, but decided I couldn't
(3) I made some changes to my drug use after testing HIV positive, but I was not able to keep it going
(4) I did make some changes to my non-injection drug use, and I've been able to keep that going
(5) I increased my level of non-injection drug use
(88) Not sure (99) Refused

33. If you've made some lasting changes to your non-injection drug use since finding out that you have HIV, what are those changes?

	Yes	No	Not Sure	Refused
I have stopped using all non-injection drugs				
I have stopped using some non-injection drugs				
I have cut down on the amount that I use				
I try to only use new equipment (e.g., crack pipes)				
If I smoke drugs, I don't share any of the equipment with others (e.g. crack pipes)				

Injection Drug Use

34. Have you <u>EVER</u> used injection street drugs? (e.g. morphine, coke)

(0) No (1) Yes (88) Not Sure (99) Refused

If NO, Skip to question 40…

35. In the last 3 months, how often have you used injection street drugs?

(0) Never (1) Less than once a week (2) A couple of days a week
(3) Everyday (88) Not sure (99) Refused

If NEVER, skip to question 36…

35a. In the last 3 months, have you been high or stoned on injection street drugs for one or more days in a row?

(0) No (1) Yes (88) Not sure (99) Refused

35b. In the last 3 months, when you used injection street drugs, did you EVER have:

	Yes	No	Not Sure	N/A (never had sex)	Refused
Oral sex using a condom					
Oral sex without a condom					
Anal sex with a condom					
Anal sex without a condom					
Vaginal sex with a condom					
Vaginal sex without a condom					
Sex with multiple partners, using a new condom with each partner change					
Sex with multiple partners, not using a new condom with each partner change					
Sex with multiple partners without using condoms					

36. Since finding out that you have HIV, have you changed your injection street drug use? Please choose one.

(0) No, because I didn't think my use of injection drugs needed to change
(1) No, I stopped using injection drugs before I found out I was HIV positive
(2) I wanted to make some changes, but decided I couldn't
(3) I made some changes to my injection drug use after testing HIV positive, but I was not able to keep it up
(4) I made some changes to my injection drug use, and I've been able to keep that going
(5) I have increased my injection drug use
(88) Not sure (99) Refused

37. If you've made some lasting changes to your injection street drug use since finding out that you have HIV, what are those changes?

	Yes	No	Not Sure	Refused
I have stopped using all injection drugs				
I have stopped using some injection drugs				
I have cut down on the amount or how often I use				
I try to only use new equipment (e.g., needles/rigs, rinse water, spoon)				
I try to not let anyone use any of my equipment (e.g. needles/rigs, rinse water, spoon)				

38. Since testing positive for HIV, have you ever shared injection drug needles?

(0) Never
(1) Once or twice
(2) Sometimes
(88) Not sure (99) Refused

If NEVER, skip to question 39…

38a. If you've ever shared needles since testing HIV positive, can you describe how?

	Yes	No	Not Sure	Refused
I have shared needles with people who didn't have their own				
I have used someone else's needle if I didn't have my own				
I've always made sure I'm last on the needle				
I've only shared needles with family or friends				
I've only shared needles with other people who I knew or thought were HIV positive				

39. Is there anything that makes it hard for you to prevent passing on HIV to others through injection drugs?

	Yes	No	Not Sure	Refused
I can't always get a new needle when I need one				
I don't really care if I pass on HIV to others				
I'm afraid that if I told my injection partners I had HIV they would leave or reject me				
I'm afraid that if I told my injection partners I had HIV they would hit me (or other violence)				
My injection partners don't care about getting HIV from me, so we don't worry about sharing needles				
If I'm drunk or high, I forget to use a new needle or to tell my injection partners that I				

have HIV				
I don't really know how to tell people I'm positive or how to insist on not sharing needles				
If the police find clean needles on me, I'm afraid I will get hassled or arrested				
I don't really know how to prevent spreading HIV to others				

Treatment Issues/Social Support

40. Are you currently receiving any medical care for your HIV? Please indicate how often you see these health care workers:

	No	Yes	Number of visits this year	Not sure	Refused
I am not getting any medical care for my HIV					
HIV or infection diseases specialist					
My family doctor					
The nurses or health providers in my community					
Emergency room doctors and nurses					

41. Is there anything that makes it hard for you to stay healthy or makes it hard for you to follow your doctor's advice on treatment for HIV?

	Yes	No	Not Applicable	Not sure	Refused
There is nothing that interferes with my health or the treatment for my HIV					
The side effects of the HIV medications make it hard to stay on them					
The location of my doctor's office makes it hard to access services					
I have some addictions issues that interfere with my treatment plan					
Medical appointments are in time slots that are inconvenient for me					
It's hard to find daycare for my kids while I'm at the doctor's					
My housing situation is unstable and that makes keeping up with treatment hard					
I don't like my doctor or the staff where I get care, so I don't like to go					
I'm worried that when I go to the doctor's, other people will know that I have HIV					
I don't understand much of what the doctor or nurses say to me or tell me to do					
I don't know where to go to access some of the services / help that I need					
I can't meet the nutritional requirements needed to stay on my meds					
I am on medications for other things and they mess up my HIV meds					
I feel discriminated against because of my HIV					
Too many pills					
Other:					

42. Are there people around you that are aware of your HIV status? Please indicate how many:
(0) None (1) One or two people (2) Three to five people (3) More than five people

(88) Not sure (99) Refused

If NONE, skip to question 43…

42a. How many of the above people are:

	None	Less than half	About half	More than half	All of them	Not sure	Refused
Family							
Partners							
Friends							
Staff/Volunteers at service provider/health centre/clinic							
Spiritual or Religious Leaders/Advisors or Elders							

43. If you have made and sustained any positive changes since finding out you have HIV, are there people who have supported you in this? Please indicate how many:
(0) None (1) One or two people (2) Three to five people (3) More than five people

(77) Not applicable – I haven't made any changes

(88) Not sure (99) Refused

If NONE, skip to question 44…

43a. How many of the above people are:

	None	Less than half	About half	More than half	All of them	Not sure	Refused
Family							
Partners							
Friends							
Staff/Volunteers at service provider/health centre/clinic							
Spiritual or Religious Leaders/Advisors or Elders							

44. Are there people who have made it more difficult to stay healthy? Please indicate how many:
(0) None (1) One or two people (2) Three to five people (3) More than five people

(88) Not sure (99) Refused

If NONE, skip to question 45…

44a. How many of these people are:

	None	Less than half	About half	More than half	All of them	Not sure	Refused
Family							
Partners							
Friends							
Staff/Volunteers at service provider/health centre/clinic							
Spiritual or Religious Leaders/Advisors or Elders							

45. Would the following help you to prevent HIV transmission?

	Yes, that would help	No, I don't need that	Not sure/ Don't know	Refused
Needle distribution in my community				
Free or easier access to condoms				
Free or easier access to lube				
Someone to help me tell others that I have HIV				
Access to safer crack use kits				
Stable housing				
Money so that I don't have to work in the sex trade				
A partner who won't reject me because I have HIV				
Easier access to medical services				
An outreach worker in my community				
More education on ways to prevent the spread of HIV				
Other supports: _____				

46. Would the following supports help you manage your HIV?

	Yes, that would help	No, I don't need that	Not sure/ Don't know	Refused
An addictions treatment programme				
Help finding a doctor				
Someone to help me understand what the doctors are saying				
Help me find or keep housing				

More information on how to stay healthy				
Nutrition classes				
HIV support group				
Counselling				
Job training				
Peer/ buddy support				
Help getting nutritious food				
Help with daycare / childcare				
Pregnancy or breastfeeding counselling				
More awareness to reduce stigma				
Other supports: _____				

END

Do you have any questions for me?

Do you have any general comments about the survey/interview that you would like to make?