

Understanding the Psychosocial Determinants of STD Risk
Among Winnipeg Street-Involved Youth

by

Carole M. Beaudoin, B.A., M.Sc.

A thesis

submitted to the Faculty of Graduate Studies

in partial fulfilment of the requirements for the degree of

Doctorate of Philosophy

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Department of Psychology

University of Manitoba

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**A Thesis/Practicum submitted to the Faculty of Graduate Studies of The University of
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Abstract

The elimination of gonorrhoea and a significant reduction in chlamydia are proposed as national goals that Canada should achieve by the year 2010 (Health Canada, 1997). Already the national incidence of gonorrhoea has declined by 27% and chlamydia by 66% since 1991 (Health Canada, 1998a). However, the overall rates are influenced by very high rates in certain vulnerable segments of the population, such as youth living away from their parents/guardians (Health Canada, 1998b). Because of their high STD rates, these street-involved youth are a priority for STD prevention programmes. Understanding more about the determinants of STD risk within this group is a necessary step in reducing sexual risk-taking activities and, consequently, STD rates. In an attempt to provide information on the sexual health and sexual behaviours of Canadian street youth, the Laboratory Centre for Disease Control (LCDC, Health Canada; now the Centre for Infectious Disease Prevention and Control (CIDPC; circa 2001)) developed the Enhanced STD Surveillance in Canadian Street Youth project. This national, multi-centre, cross-cultural surveillance system represents the first time that a Canadian national body has examined the prevalence of STD and the determinants of sexual risk behaviours among Canadian street-involved youth. The current study used structural equation modelling to test the explanatory power of a tri-partite model incorporating the constructs of personal attributes, behavioural repertoire, and interpersonal environment on STD risk. It was found that a model including self-esteem, perception of risk, abuse history, relationship with parents, current alcohol use, and current illicit drug use explained a significant portion of the variance in STD risk, as defined by (a) current frequency of condom use, (b) number of recent sexual partners, (c) past and current incidence of chlamydia, gonorrhoea, and/or hepatitis B, and (d) use of used injection drug use equipment. These results suggest that STD risk among street-involved youth is a complex social problem that requires a comprehensive prevention framework regarding determinants of health.

Acknowledgements

As is the case with any piece of research, completing this thesis required substantial time, energy, and dedication (not to mention sweat and tears), certainly by me, but also by several key individuals. I would like to take this opportunity to offer my sincere appreciation for all of the work contributed by others. To begin, I would like to thank my thesis committee for all of their thoughtful input, advice, and immeasurable patience. The area of sexually transmitted diseases is of considerable public health importance, and it was very satisfying to me that my committee, some of whom had not worked in the area, took a keen interest in my research and expended considerable energy to ensure that I produce a quality product that could be used to enhance public health policy in "the real world". My internal committee members, Drs. Gerry Sande and Michael Thomas, provided incredibly valuable feedback and advice during the proposal and defence processes. Their interest and input has certainly enhanced the final dissertation and, I must say, it has been a pleasure working with both of them over the last couple of years. My external member, Dr. Stephen Moses, has been invaluable to this project. Stephen was the principal investigator for the project, and his lifetime devotion to STDs is absolutely inspiring. Stephen is a brilliant scientist and an even better friend, and I very much look forward to continue working with him on future STD/HIV/AIDS projects. Being involved in a project area that he was not acutely familiar with and with a student that he was not at all familiar with, Dr. Bruce Tefft graciously agreed to be my advisor. Over the years, Bruce has exemplified incredible patience, interest, and devotion. I simply cannot thank him enough for his time and energy.

Outside of the scholastic world, there exists a too-small group of people who have devoted their careers to public health in general, and to STD/HIV/AIDS in particular, and it is these individuals to whom I owe a debt of gratitude. The staff of the Communicable Diseases Control Unit of Manitoba Health have offered their never-ending support and interest for this project, not to

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Lastly, I wish to deeply thank my family for their continued support and persistence. Most significantly, I would like to thank my "boys" – my husband, Scott Antoski, and our son, Justin. Scott suspended his educational goals so that I could continue in the PhD programme, and I simply could not have succeeded in this effort without his love, support, guidance, and patience. While much of the work involved in this research has completely gone unnoticed by Justin, certainly the last few months of uncontrolled panic have not. Justin has mustarded up all of the understanding and support that an 8-year old can, and then some. Finally, we can all breathe!

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Understanding the Psychosocial Determinants of STD Risk
Among Winnipeg Street-Involved Youth

INTRODUCTION

National surveys from the United States indicate that approximately 25% of females and 33% of males have had sex by age 15. By age 19, the figures are approximately 80% and 86% for females and males, respectively (Miller & Moore, 1990). These figures are cause for concern given that unprotected sexual intercourse, defined as sexual intercourse without the proper use of a latex barrier such as a condom, is reported by over half of all American young adults in the same age group (Centres for Disease Control and Prevention (Atlanta), 1992a). Specific Manitoba statistics for unprotected sexual activity among young adults (ages 15-19 years) are currently unavailable. However, in 1996, approximately 14% of all 18-19 year old women in Manitoba were pregnant and, for almost half of these women, it was not their first pregnancy (Manitoba Health, 1999). As pregnancies that do not result in a hospital-based outcome (e.g., elective abortions performed at private clinics, early trimester miscarriages) are not included in the Manitoba Health hospital claims database, the above percentage of pregnant teens is likely a conservative estimate.

Sexually Transmitted Diseases

Unintended pregnancy is only one possible consequence of unprotected adolescent sexual activity. Proper use of a latex barrier in penetrative sexual intercourse and/or oral sexual activity is considered highly effective in blocking the transmission of sexually transmitted diseases (STD), in particular chlamydia, gonorrhoea, and hepatitis B (Cates & Stone, 1992; Centres for Disease Control and Prevention (Atlanta), 1993).

Chlamydia. Chlamydia is the most frequently reported communicable disease in North American (Centres for Disease Control (Atlanta), 1996; Health Canada, 1996). While symptoms of infection may

include urethral itching, discharge, and painful urination for males and cervical bleeding, pain, and discharge for females, many chlamydial infections – 25% for males and almost 70% for females - are asymptomatic and, as a result, are less likely to be diagnosed and treated (Cates & Wasserheit, 1991; Benenson, 1995). For males, possible sequelae of infection include infertility, Reiter's syndrome (a form of arthritis) and epididymitis (painful infection of the epididymis; may become recurrent and/or chronic) (Benenson, 1995; Berkow & Fletcher, 1992). For females, the health consequences of infection are numerous and considerably more severe than for males. Sequelae include infertility, ectopic pregnancy (implantation of the foetus occurs outside the endometrial cavity; results in death of foetus and, if undiagnosed, death of mother), pelvic inflammatory disease (PID; chronic pelvic pain), and, if infected during pregnancy, pneumonic infection of the newborn (Benenson, 1995). Additionally, chlamydial infections, particularly those with ulcerations, increase one's risk of contracting HIV (ulcers increase the likelihood of direct contact between body fluids, e.g., semen and blood) (Chin, 2000; Dickerson, Johnson, Delea, White, & Andrews, 1996). The financial burden of chlamydial infection and subsequent illnesses in Canada was estimated a decade ago at over \$89,000,000 annually (Goeree & Gully, 1992). Included in this figure are diagnostic screening and testing, physician and other medical costs, and treatment. Not included are the client-absorbed costs such as days away from work or school and travel costs for rural clients.

Gonorrhoea. Gonorrhoea shares many of the same clinical features with chlamydia, most importantly, the sequelae of untreated infections. In males, urethral discharge, the main symptom, generally occurs within 2-7 days after infection. In females, however, as with chlamydia, a large proportion (50%) infected with gonorrhoea are asymptomatic (Benenson, 1995). Untreated infection in males may result in urethritis (chronic discharge), epididymitis, and gonococcal arthritis. Similar to chlamydia, untreated gonococcal infection in females may result in PID, ectopic pregnancy, and infertility (Berkow & Fletcher, 1992). In women and homosexual males, pharyngeal and anorectal infections are also common

disease sequelae (Benenson, 1995). In pregnant women, conjunctivitis of the newborn is common and may cause blindness if not rapidly treated (Benenson, 1995). Similar to chlamydial infection, gonococcal infection also increases one's risk of contracting HIV (Chin, 2000; Dickerson et al., 1996). The financial burden of illness attributed to gonococcal infection and associated sequelae in Canada were estimated a decade ago at over \$54,000,000 annually (Goeree & Gully, 1992). As with chlamydia, this figure does not include client-absorbed costs.

Acute Viral Hepatitis B. Although acute viral hepatitis B (HBV) antigens are found in almost all human secretions and excretions of infected persons, only blood, semen, and vaginal fluids have been shown to be infectious (Benenson, 1995). Because HBV is transmissible through blood (unlike gonorrhoea or chlamydia), sexually active individuals are not the only ones at risk. Injection drug users are also susceptible to infection. Between 50 to 70% of all adults infected with acute HBV are either asymptomatic, or their symptoms mimic a variety of flu-like symptoms (Laboratory Centre for Disease Control, 1998). As HBV attacks the liver, it is associated with a wide spectrum of liver disease (Berkow & Fletcher, 1992). Between 5-10% of acute HBV infections become chronic HBV and are prone to developing liver cancer (Berkow & Fletcher, 1992). HBV is entirely preventable through a highly effective vaccine. Unfortunately vaccination policies are currently influenced by high cost (Berkow & Fletcher, 1992). In Manitoba, however, widespread vaccination of school-aged children (Grade 4, in particular) and high-risk individuals (e.g., injection drug users, street youth) has been underway since 1999 (Manitoba Health, 1999).

Condom Use among Youth. While condom use has increased in Canada, along with a growing perception of condom use as a socially responsible norm (Health Canada, 1994), there are still large pockets or subsets of Canadians reporting inconsistent use of condoms. While sexually transmissible viral infections (e.g., HIV, Hepatitis C) are highest among injection drug users and men who have sex with men, sexually active adolescents present a particular challenge for decreasing or, at the very least, stabilising the rate of sexually transmissible bacterial infections (e.g., gonorrhoea, chlamydia). The Laboratory Centre for

Disease Control (LCDC; now the Centre for Infectious Disease Prevention and Control (circa 2002)) in Ottawa reported that less than 25% of young people aged 15-24 years always used a condom in the past year (Health Canada, 1994).

The research of Maticka-Tyndale (1991) and MacDonald, Wells, Fisher, Warren, King, Doherty, and Bowie (1990) suggests that, among 15-24 year olds, the current normative pattern for sexual relationships is one of serial monogamy, with being in a monogamous relationship identified as an impediment to condom use. "The result is that young men and women move from one monogamous relationship to another, justifying their inconsistent condom use since each new partner is known and trusted" (Health Canada, 1997, p.10). The error in this justification is apparent when considering that the 15-24 year old age group has the highest reported rates of STDs in Canada (Health Canada, 1997). Using HIV as one STD example, 46% of males and 43% of females diagnosed with AIDS in Manitoba are between 30 and 39 years old (Manitoba Health, 2001). Since HIV can lay dormant for 10 years or more before detection, many of those with AIDS may have been infected with HIV during their young adulthood (Centres for Disease Control and Prevention (Atlanta), 1996; Miller, Turner, & Moses, 1990). Indeed, 36% of the males and 53% of the females diagnosed with HIV in Manitoba are between 15 and 29 years (Manitoba Health, 2001). A similar picture emerges for the United States. As of June, 1996, the Centres for Disease Control and Prevention in Atlanta (1996) reported that 13 to 24 year old youths accounted for 18% of HIV infections (in the 26 states that have such surveillance systems). Other American reports suggest that the rates of other sexually transmitted diseases are higher among sexually active teenagers than among adults (Cates, 1990; Irwin, 1993).

The Manitoba Picture

The importance of encouraging adolescents to either abstain from sexual activity or to always use a condom during penetrative sexual activity becomes particularly salient when considering local statistics for pregnancies, gonorrhoea, chlamydia, and hepatitis B.

Pregnancies. Provincially, 5.2% of Manitoba young women, aged 12-19 years, had a pregnancy in 1996 that resulted in a hospital-based outcome. Although some of these pregnancies may have been intended, about 30% resulted in an induced abortion (Manitoba Health, 1999). Among pregnancies that result in a delivery (i.e., live births and stillbirths), being younger than 20 years of age is associated with poorer feto-infant outcomes. Women younger than 20 have the highest rate of stillbirths, the highest rate of pre-term births, and the lowest rate of breastfeeding compared to women 20 years and older (Manitoba Health, 1999).

Chlamydia. Chlamydia is a significant health concern in Manitoba. Comparing Manitoba rates to those for other provinces (Table 1), Manitoba has the second highest chlamydia rate and twice the national rate (Health Canada, 1999). Among 15 to 24 year old females (who are at greatest risk of infection), Manitoba's rate is highest in the country and, again, is twice the national rate (Health Canada, 1999). One should be cautious however when interpreting these national comparisons, as surveillance and reporting methodologies may vary between provinces, with Manitoba having a comparatively well-established reporting mechanism (personal communiqué, Dr. Stephen Moses, medical advisor, Communicable Diseases Control Unit, February 28, 2000). Additionally, demographic differences, specifically age structure and ethnic composition, may vary between provinces and may impact provincial rates.

In Manitoba, although the number of incident (i.e., newly infected) cases of chlamydia dropped by 28% during the time periods of 1991-1992 to 1997-1998, the proportion of cases accounted for by 15-24 year olds remained about the same (75% in 1991-1992, 74% in 1997-1998), and this is true for both sexes (Figure 1; Beaudoin & Blanchard, unpublished data).

Gonorrhoea. Since 1980 there has been a steady decline in the number of reported cases of gonorrhoea in Canada (Health Canada, 1997). Indeed, in 1997 the gonorrhoea rate was 14.9 per 100,000 population, representing a 12-fold reduction from the 1980 rate (Health Canada, 1997). Comparing provincial rates (Table 2), Manitoba has the highest gonorrhoea rate in the country and is more than three

times the national rate (Health Canada, 1999). Again, one is cautioned when comparing provincial STD data due to potential variability in provincial reporting and demographic distribution.

Changes across time in the proportion of gonorrhoea cases accounted for by young people in Manitoba are shown in Figure 2. For the time period 1991 to 1992, 60% (n=1547) of incident gonorrhoea cases were in young people between 15 and 24 years of age. The proportion of new gonorrhoea infections from 1997 to 1998 accounted for by 15-24 year olds increased slightly, to 64%. However the proportion of newly infected 15-24 year old females increased by almost a third, from 30% of all incident cases in 1991-1992 to 38% in 1997-1998 (Figure2; Beaudoin & Blanchard, unpublished data).

Pelvic Inflammatory Disease and Ectopic Pregnancies. Pelvic inflammatory disease and ectopic pregnancies are very serious possible sequelae of untreated gonorrhoea and chlamydia infections. PID describes an infection of one or more of the following: fallopian tubes, ovaries, cervix, or uterus (Berkow & Fletcher, 1992). Onset of symptoms is usually shortly after menses; classic symptoms include vomiting, abdominal pain becoming more severe with time, high fever, irregular bleeding, and vaginal discharge. PID requires immediate and aggressive antibiotic therapy to effectively cure it and prevent further sequelae. If not treated promptly, severe tubal and pelvic scarring and, consequently, infertility are common sequelae (Berkow & Fletcher, 1992). As Manitoba has the second highest chlamydia and highest gonorrhoea rates in the country, it is not surprising that it has the highest rate of pelvic inflammatory disease in the country (refer to Table 3; Jordan, unpublished data).

Table 1

Chlamydia Rates per 100,000 Population by Province, 1997

Province	All Males (cases/100,000)	All Females (cases/100,000)	15-24 year old Females (cases/100,000)	Total (cases/100,000)
Newfoundland	20.3	98.5	477.8	59.4
Prince Edward Island	57.4	144.3	804.1	101.3
Nova Scotia	51.6	183.8	1083.3	118.9
New Brunswick	50.6	162.3	952.4	107.5
Québec	44.0	126.5	731.3	86.0
Ontario	49.8	134.3	761.9	92.6
Manitoba	105.9	343.9	1997.5	225.9
Saskatchewan	140.9	310.6	1686.2	226.4
Alberta	76.9	243.6	1365.3	159.7
British Columbia	51.3	157.1	892.8	104.6
CANADA	58.1	166.2	942.9	112.7

Figure 1

Age and Sex Proportions of Incident Chlamydia Infections

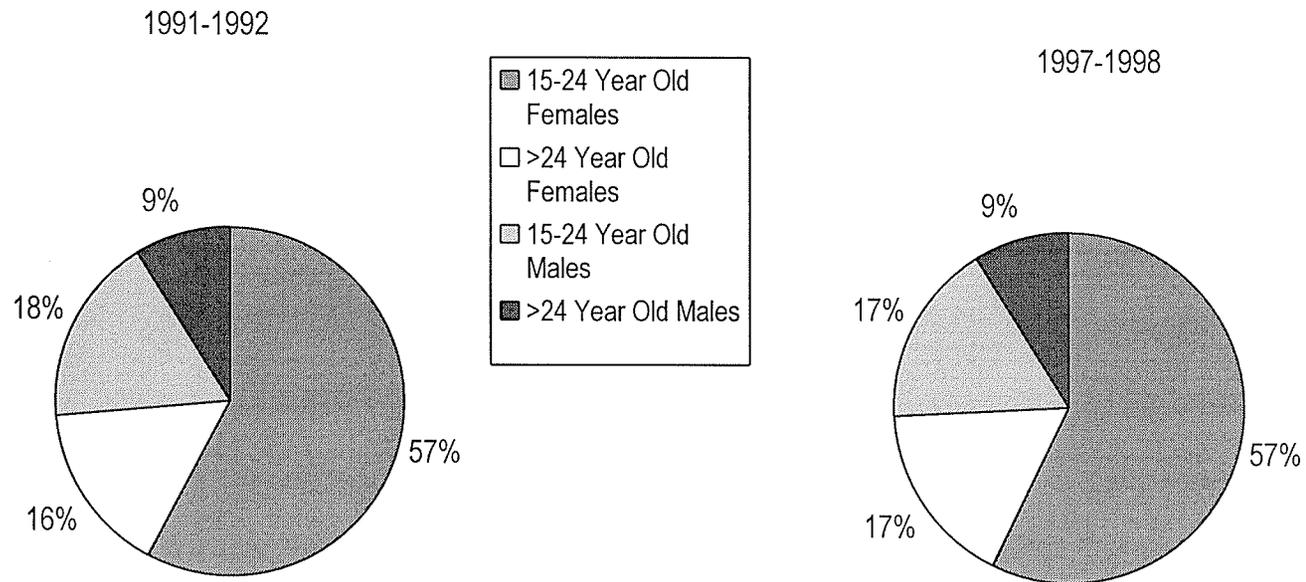


Table 2

Gonorrhoea Rates per 100,000 Population by Province, 1997

Province	Males (cases/100,000)	Females (cases/100,000)	Total (cases/100,000)
Newfoundland	0.7	0.4	0.5
Prince Edward Island	1.5	0.0	0.7
Nova Scotia	7.1	15.6	11.4
New Brunswick	1.1	11.2	6.2
Québec	11.2	3.6	7.4
Ontario	20.3	13.4	16.8
Manitoba	43.9	46.6	45.2
Saskatchewan	34.6	32.2	33.4
Alberta	15.1	13.4	14.3
British Columbia	18.2	6.1	12.1
CANADA	17.7	12.1	14.9

Figure 2

Age and Sex Proportions of Incident Gonorrhoea Infections

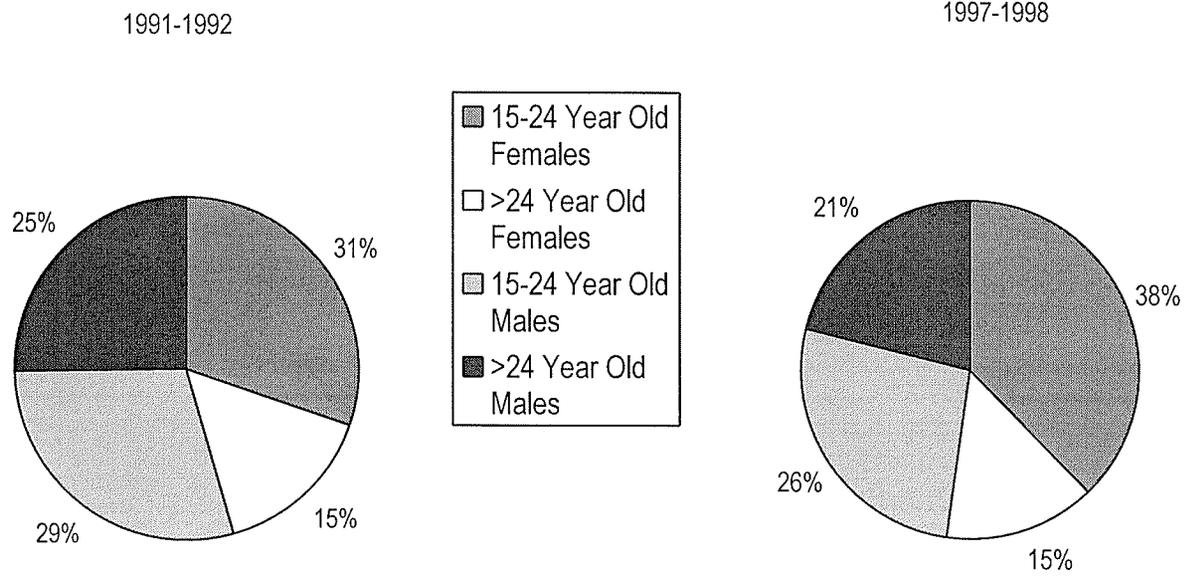


Table 3

Reported Pelvic Inflammatory Disease Rates per 100,000 Females by Province, 1995-1996

Province	PID Rate per 100,000 Females
Newfoundland	60.8
Prince Edward Island	37.9
Nova Scotia	48.8
New Brunswick	50.1
Québec	36.2
Ontario	46.2
Manitoba	94.2
Saskatchewan	92.8
Alberta	64.8
British Columbia	52.1
CANADA	49.9

An ectopic pregnancy results when a fertilised egg implants outside the endometrium and endometrial cavity. The most common site of ectopic implantation is in a uterine tube, where tubal implantation may be caused by a previous tubal infection (e.g., from gonococcal or chlamydial bacteria) (Berkow & Fletcher, 1992). Symptoms of an ectopic pregnancy include lower abdominal pain, haemorrhage, and shock. If an ectopic pregnancy is diagnosed before it ruptures, the only treatment is surgical removal of the foetus and, if necessary, repairs to the uterine tube. If untreated and the uterine tube ruptures, maternal mortality is likely (Berkow & Fletcher, 1992). Table 4 (Jordan, unpublished data) shows the provincial comparisons for ectopic pregnancies. Given Manitoba's considerably higher chlamydia, gonorrhoea, and PID rates, one might expect higher ectopic pregnancy rates compared to the other provinces. As can be seen in Table 4, this is not the case. This discrepancy lends some support to the concern of underreporting of STDs by some provinces. As well, an ectopic pregnancy is more likely if there is considerable scarring of the uterine tube, which may be the result of a PID. Women that have had a PID may be infertile, or may have been advised against becoming pregnant. For this reason, ectopic pregnancies are rare, regardless of a province's STD rates. As well, STDs are not the only cause of ectopic pregnancies and the proportion of ectopic pregnancies attributed to untreated STDs is unclear. Thus, provinces may have similar ectopic pregnancy rates for different aetiologic reasons.

Hepatitis B. Provincial comparisons of HBV rates are harder to interpret than for other STDs, mostly because the numbers vary dramatically from year to year, making conclusions very time-dependent. Also, as HBV is transmissible by blood, some provinces, such as British Columbia, have made screening of injection drug users a public health priority. Lower rates, therefore, may reflect poorer, less aggressive screening measures, rather than true incidence. Given this, the HBV data discussed here is for a five-year period (1994-1998), just for Manitoba.

Table 4

Reported Ectopic Pregnancy Rates per 100,000 Pregnancies by Province, 1995-1996

Province	Ectopic Pregnancy Rate per 100,000 Pregnancies
Newfoundland	11.5
Prince Edward Island	8.5
Nova Scotia	11.5
New Brunswick	11.8
Québec	not available
Ontario	13.7
Manitoba	12.2
Saskatchewan	15.1
Alberta	15.2
British Columbia	16.8
CANADA	14.2

Over 100,000 Canadians are infected with Hepatitis B (Tepper & Gully, 1997). In Manitoba, from 1994 through 1998, there were 231 reported cases of acute HBV (Moses & Beaudoin, unpublished data). Of these cases, more than one-third were contracted sexually (35.5%) and an additional 25.5% were contracted through sharing of injection drug using paraphernalia (e.g., needles, rinse water, spoons). The incident HBV rate for the population is 4.0 per 100,000, although this varies by age and gender. Although males overall have a slightly higher incidence rate (4.6 per 100,000) compared to females (3.4 per 100,000), the rate for females between the ages of 15 to 24 years is more than twice the provincial rate (9.1 per 100,000; Moses & Beaudoin, unpublished data).

Summary

Chlamydia, gonorrhoea, and HBV, and their related sequelae are significant public health concerns for Manitoba, and particularly for Manitoba's youth. As STD rates in the province are driven by this vulnerable population, a better understanding of the psychosocial determinants of STD risk for these street youth should be a priority for public health prevention efforts.

PSYCHOSOCIAL CORRELATES OF STD RISK AMONG YOUTH:

THE PROBLEM BEHAVIOUR THEORY

Research into the factors related to STD risk among youth is very much still in its infancy. As will be discussed more fully in a later section on gaps in the research, many investigations into sexual health practices among youth do not necessarily examine STD risk, per se. Rather, most examine the risk factors involved in deviant behaviour generally, and sexual activity, specifically, often with no differentiation between sexual activity using a condom (which may be defined as low STD risk) and sexual activity without the use of a condom (i.e., high STD risk). It is from this body of literature that the current examination of the potential psychosocial factors involved in STD risk is derived.

Psychosocial risk factors may be conceptualised as factors that encourage risky behaviour; they are the conditions that are associated with a greater likelihood of negative or undesirable outcomes (Jessor, Van Den Bos, Vanderryn, Costa, & Turbin, 1995). Risk factors can increase the likelihood of performing risky acts through:

- (a) direct instigation or encouragement. For example, perceived stress may instigate a coping response such as smoking;
- (b) increased vulnerability to the influence of others. For example, heightened social anxiety may promote alcohol consumption in unfamiliar social settings; and
- (c) opportunities to engage in problem behaviour. For example, membership in a street gang may increase one's opportunity to engage in criminal behaviour. (Jessor et al., 1995).

Jessor (1991; Jessor, Donovan, & Costa, 1991; Jessor et al., 1995) has proposed that risky behaviour among youth is a result of three explanatory systems – the personality system, the environment system, and the behaviour system. While Jessor's tri-partite model provides the framework for the current study, other researchers have proposed similar broad categories of variables that may be associated with risky sexual behaviour. Harvey and Spigner (1995), for example, hypothesised a similar tri-partite paradigm that suggests the influence of sociodemographic characteristics, personality variables, and behavioural activities. Building upon similar pathways, McBride and her colleagues (McBride, Curry, Cheadle, Anderman, Wagner, Diehr, & Psaty, 1995) have proposed a social bonding model for explaining how adolescents come to engage in risky behaviours. The key elements in this theory are attachment to family and friends (which would be part of the perceived environment in Jessor's model), commitment to prosocial goals (part of Jessor's personality system), and involvement in prosocial activities (part of the behaviour system in the problem behaviour theory). Similarly, Benson (1990), through the Search Institute in the United States, developed a scale of potential protective factors, calling them 'developmental assets'. Although Benson (1990) divided the assets into two broad groups, internal and external, the external assets

are really a collection of behaviours (e.g., involvement in creative activities, school engagement) and perceived environment variables (e.g., perceived support from family, neighbourhood, and school officials), while the internal group of assets could be defined as personality variables (e.g., achievement motivation, being empathic, self-esteem).

Personal Attributes

One of the explanatory constructs in most tripartite models of problem behaviour is personality. This construct reflects characteristics of the individual. These personality traits are hypothesised to influence one's level of risk for engaging in problem behaviours, in so far as they predispose one to engage in certain activities.

Personality within a Problem Behaviour Model. Identifying six individual characteristics, Jessor and his colleagues (1995) have studied how low expectations for success, self-esteem, hopelessness, orientation to school, orientation toward health, and intolerance to deviance can influence one's sexual risk behaviours. The first three of these are proposed to place one at risk of engaging in unhealthy behaviours, while the later three may decrease the likelihood of engaging in such behaviours (i.e., protective factors).

Expectations for success assess anticipated life outcomes in school, family life, employment, and so on. Jessor et al. (1995) suggest that low expectations of achieving these goals constitute risk for involvement in problem behaviour because such expectations can serve to pressure an adolescent toward alternate goals. Self-esteem refers to participants' beliefs about their abilities and attributes in various domains. Similarly, a low sense of self-worth and/or low confidence in one's ability to handle challenges is suggested to put one at risk of engaging in problem behaviour as a way of coping with negative feelings (Rosenberg, 1965). The variable that Jessor et al. (1995) call hopelessness is really a measure of depression, anxiety, and social isolation. The authors suggest that disengagement from society in general, and from one's peers in particular, constitutes risk because heightened trait anxiety may lead to maladaptive coping behaviours.

In contrast, having a positive orientation toward school and placing high value on academic achievement is hypothesised to decrease the likelihood of engaging in problematic behaviours because it reflects positive engagement with a conventional social institution and commitment to its goals. Similarly, having a positive orientation toward health acts as a personal control against behaviours that can be damaging to or incompatible with health. Finally, intolerance to deviance reflects a commitment to conventional values and disapproval of norm-violating behaviours and, thus, serves a direct personal control against involvement in questionable activities.

To investigate the relationship between these personality characteristics and risky behaviour (sexual and other), Jessor and his colleagues (1995) followed more than 1500 American students in grades 7, 8, and 9 for four years, interviewing them annually. The researchers assigned each participant a Risk Factor Index (RFI) score, a Protective Factor Index score (PFI), and a Multiple Problem Behaviour Index (MPBI) score. The RFI represents the added values of the dichotomised scores (0 or 1) of six risk factors, of which expectations for success, self-esteem, and hopelessness were three. The other three risk factors included in the RFI were from the environment system and the behavioural system, and will be discussed fully in their respective sections. Similarly, the PFI represents the added values of the dichotomised scores of seven protective factors, of which positive orientation to school, positive orientation toward health, and intolerance to deviance were three. Like the RFI, other protective factors included in the PFI calculated score were from the environment system and the behavioural system. The MPBI score is based on the participants' experiences with alcohol, delinquent-type behaviour (e.g., school fights, theft), marijuana, and sexual intercourse (scored 0 or 1 based on whether they had ever had sexual intercourse). Considering all problem behaviours, their data suggest that the higher the number of risk factors, the greater the involvement in problem behaviours, with the RFI accounting for a significant proportion of the variance in MPBI scores ($R^2 = 0.23$, $p < .001$; unstandardised regression coefficient, $\beta = 7.96$). Conversely, the higher

the number of protective factors, the lower the involvement in problem behaviours ($R^2 = 0.24$, $p < .001$; unstandardised regression coefficient, $\beta = -1.25$).

The authors do not report their findings specific to sexual involvement, so it is difficult to assess whether the risk factors they identified have any explanatory value with regard to sexual activity specifically. Additionally, sexual involvement was defined as ever having had sexual intercourse, with no evaluation of number of partners or condom usage. As well, the specific contribution of the personality characteristics cannot be ascertained, as both the Protective Factor Index and the Risk Factor Index scores represent variables from the environment and problem behaviour systems, as well as from the personality system.

Also studying personality characteristics, Harvey and Spigner (1995) suggested that depressive symptomatology, stress level, life satisfaction, educational aspirations, and one's concern about AIDS may be risk factors for adolescent sexual behaviour. Surveying 1,026 public high school students, the authors found that, compared to sexually inexperienced males, sexually active males (which comprised 60% of their male sample) were older, reported higher levels of depressive symptomatology, higher levels of stress, and lower educational aspirations. Unfortunately, the authors do not report the group means for these measures or the associated statistics. Sexually active female respondents (comprising 41% of their female sample) were also older, reported higher levels of depressive symptomatology, higher levels of stress, and more risk-taking behaviour than sexually inexperienced females.

As previously noted, McBride and her colleagues (1995) have also devised a tri-partite problem behaviour model that, similar to Jessor et al.'s (1995), incorporates personality attributes. Studying the correlates of risky behaviour among 4,622 grade nine and 3,936 grade 12 students, McBride et al. (1995) asked students how much importance they placed on making a contribution to society and on achieving academic success, in order to assess their level of commitment to prosocial goals. Additionally, students completed the Rosenberg (1965) Self-Esteem scale. As with the Jessor et al. (1995) study, the authors created a social bonding score by adding students' scores on all of their test items from the personality,

perceived environment, and problem behaviours systems. Thus, the specific contribution of individual items, or even the unique contribution of the personality system, cannot be assessed. Nonetheless, McBride et al. (1995) found that level of bonding negatively correlated with having had sexual intercourse in the past month for the grade nine students in their sample ($R^2 = -0.08$, $p < .05$), but not for the grade 12 students ($R^2 = -0.02$). Grade nine students' social bonding scores were also negatively correlated with engagement in non-sexual negative behaviours, although to a much stronger degree (smoking: $R^2 = -0.22$, $p < .001$, binge drinking: $R^2 = -0.15$, $p < .001$, and illicit drug use: $R^2 = -0.18$, $p < .001$). This suggests that perhaps the factors identified in the social bonding model may be more protective against smoking, binge drinking, and illicit drug use than they are against engaging in sexual intercourse. The non-significant findings among grade 12 students further suggests that the relationships identified in the model are more useful in explaining risky behaviour among younger adolescents. Interestingly, the authors examined binge drinking, as opposed to just alcohol consumption, suggesting that they recognised the importance of pattern and not simply incidence of consumption. Unfortunately, this was not the case with sexual intercourse, which was examined as a dichotomous variable.

Benson (1990) as well has examined the effect of bonding to school, achievement motivation, being empathic, having high self-esteem, and being optimistic in addition to a number of environmental and behavioural factors. Surveying 100,000 high school students, the report, initiated by the Search Institute in the United States, revealed that of those positively endorsing between 31 and 40 protective factors, 3% were sexually active. In contrast, 33% of those endorsing less than 11 of the protective factors were sexually active.

The main criticism of the three studies reviewed to this point is that they assess a number of variables from the personality system as well as from the perceived environment and the behaviour system. The researchers then add up participants' scores on all of the variables to create a general risk or protection score. This score is then correlated with one or a collection of risky behaviours. Using this

methodology, the specific contribution of individual factors, or even the unique contribution of a particular construct (e.g., personality attributes, behavioural repertoire, perceived environment) cannot be assessed.

Independently Assessed Personality Variables. Some personality theorists have examined the unique contribution of various individual risk factors in the engagement of adolescent sexual behaviour. Two individual differences often examined in relation to sexual behaviour are impulsivity and venturesomeness (Elliott & Morse, 1989; Galavotti & Lovick, 1989). Venturesomeness (also referred to as sensation seeking in some studies) is defined as a rational, considered type of risk-taking, such as bungee jumping or mountain climbing. Impulsivity, on the other hand, is associated with a preference for immediate gratification, without planning or thinking through the consequences of one's actions, such as driving at high speeds on a city street (Eysenck, Pearson, Easting, & Allsopp, 1985; Zuckerman, 1990). Venturesomeness and impulsivity may encourage risky behaviour because reckless acts offer novel and intense stimulation that people high on these traits find pleasurable (Arnett, 1996).

Using the Arnett (1994) Inventory of Sensation Seeking, Arnett (1996) examined the relationship between venturesomeness and risky sexual behaviour (defined as sex without a contraceptive and sex with someone not well known) in a small group ($n=133$) of predominantly white (95%), 17-18 year old high school students. Venturesomeness was found to be positively related to the incidence of sexual relations with someone not well known ($R^2 = 0.30$, $p < .001$) but not to sex without a contraception ($R^2 = 0.13$). In a second study using the same methodology, Arnett (1996) found that sensation-seeking or venturesome characteristics among 346 predominantly white (90%), first year college students was positively related to having sex with someone not well known ($R^2 = 0.23$, $p < .001$), and with having sex without a contraceptive ($R^2 = 0.19$, $p < .001$).

Rawlings, Boldero, and Wiseman (1995) also examined impulsivity and venturesomeness in relation to the sexual risk behaviours of 97 females between 13 and 19 years of age who were attending pregnancy and contraceptive counselling clinics in Australia. Half of the participants in their sample were

terminating a pregnancy, while the remainder was receiving contraception advice. Discriminant function analysis revealed that, as suspected, greater impulsiveness was predictive of belonging to the pregnancy-termination group, although only for the younger participants ($R^2 = 0.64$, $p < .05$). Greater venturesomeness was predictive of belonging to the contraception-advice group, correctly classifying greater than half of the sample ($R^2 = -0.86$, $p < .05$). The authors suggest that this may reflect a tendency for the venturesome adolescents to recognise the possibility of engaging in sexual intercourse and to plan for this eventuality. Given the small sample size and lack of an appropriate non-clinic control group, more investigation is likely needed to explain their findings.

Locus of control is another individual difference that has also been associated with sexual behaviour. Individuals who believe that the course of their lives is amenable to their control (internal locus) may be more likely to plan and to take actions to cause events to go as they wish than individuals who believe that many of the events effecting them are beyond their influence (external locus) (Rawlings et al., 1995). A common scale measuring locus of control is Rotter's (1966) Internal-External Locus of Control (I-E) scale. Rotter's scale identifies the degree to which people tend to ascribe responsibility to either internal, personal forces (such as ability and effort) or to external forces over which they have little control (such as luck or powerful others) (Rotter, 1966). In a review of the literature, Morrison (1985) concluded that internal locus of control was positively related to the use of contraceptives, but not to the particular contraceptive used (i.e., pregnancy inhibitor versus STD and HIV infection inhibitor). Brewin and Shapiro (1984) have argued that the I-E scale predominantly accounts for attributions to positive outcomes and may not be effective for predicting responses to situations with negative outcomes. In response, they developed a Locus of Control for Positive and for Negative Outcomes scale (Brewin & Shapiro, 1984). Using Brewin and Shapiro's (1984) new scale, Rawlings and his colleagues (1995) examined locus of control in the same study in which they assessed the relationship of impulsivity and venturesomeness to the sexual risk behaviours. Discriminant function analysis revealed that neither locus of control for positive outcomes (R^2

= 0.19) nor locus of control for negative outcomes ($R^2 = 0.03$) were good predictors of why the respondents were attending the contraception clinics. So, while perceived control over one's environment should theoretically impact behaviour, perhaps deciding to attend a contraception clinic is too complex to be explained by any one variable (Murphy, Stein, Schlenger, Maibach, & National Institute of Mental Health Multisite Prevention Trial Group, 2001).

Another important concept in the adoption of healthy behaviours that can be conceptualised as a personal attribute is one's perception of personal risk or perceived susceptibility. Perceived susceptibility to disease is theoretically conceived as a motivational factor that supports the adoption of preventive health practices (Bryan, Aiken, & West, 1997). Perception of risk refers to individuals' assessments of their personal level of risk for a specified event (in this case, contracting an STD) in comparison to other individuals. Perception of risk is thought to be crucial in explaining why people engage in health-related behaviours, or what factors motivate them to seek medical attention (Prochaska, Albrecht, Levy, Sugrue, & Kim, 1990). The converse to perception of risk is perceived invulnerability. People with a perception of invulnerability tend to think that they are relatively invulnerable and that others are more likely to experience negative health consequences than they are (Weinstein, 1980). Such an unrealistic sense of personal optimism is seen as an impediment against protective behaviours. Specifically, believing that one is relatively unlikely to contract an STD, for example, may undermine their motivation to take preventive actions, in this case, condom use (van der Pligt & Richard, 1994). Conversely, researchers have demonstrated that increased perceived susceptibility was associated with greater behavioural effort to change unsafe sexual practices (e.g., McCusker, Zapka, Stoddard, & Mayer, 1989).

The literature on perception of risk and sexual behaviour really developed as a result of the AIDS epidemic. Indeed, perception of risk figures implicitly in research and intervention aimed at reducing the spread of AIDS. For example, educational campaigns are predicated on the belief that educating people to the risks and transmission routes of HIV encourages reduction in high-risk behaviour (Prochaska et al.,

1990). As well, subjective threat appraisals are explicit components of many models describing the formation of an intention to change one's behaviour (for example, Janz & Becker's (1984) Health Belief Model; Roger's (1975) Protection Motivation Theory; and Ajzen & Madden's (1986) Theory of Planned Behaviour). Prochaska and his colleagues (1990) examined whether individuals felt they had changed their behaviour in the past five years as a result of the threat of AIDS. Conducting telephone interviews with 1,491 adults aged 18-60 years, the authors assessed perceived risk and sexual risk practices (number of sexual partners, sexual orientation, condom usage for anal and/or vaginal intercourse, and engagement of anal intercourse) with single item measures (for example, "In terms of your own risk of getting AIDS, do you think you are ... at great risk ... at some risk ... "). The authors report that increased protective action compared to five years ago was positively associated with increased perceived risk for contracting HIV (odds ratio = 1.45, $p < .05$). The authors concluded that "more than 25% of the sample had changed their behaviour in the past year because of perceived risk" (Prochaska et al., 1990, p. 390).

One drawback of much of the research on the impact of perceived risk on sexual health behaviours is that much of it is specific to AIDS/HIV risk and, notwithstanding the Prochaska et al. (1990) study, many of these have typically failed to predict condom use (for example, Goldman & Harlow, 1993). Weinstein, Sandman, and Roberts (1990) have argued that the perception of susceptibility to remote diseases that have extraordinary consequences may not be associated with health-protective behaviour. Despite increasing prevalence rates, HIV infection is still relatively infrequent among the non-injection drug using, heterosexual population (Shulkin, Mayer, Wessel, de Moor, Elder, & Franzini, 1991), thus leading to a rather accurate perception of low vulnerability among college students. One such 'nil finding' was reported in a study by Goldman & Harlow (1993), who examined perceived risk and AIDS-preventive behaviour among a group of 600 male and female, predominately white (88%) university students. The authors assessed AIDS perceived risk with a four-question scale created earlier by one of the authors (Harlow, 1989). The four questions are designed to measure whether a person engages in certain safe-sex

behaviours. The author (Harlow, 1989) reported an alpha coefficient of .70 for the scale's internal consistency. The study's findings were that perceived susceptibility was not positively related to frequency of condom use for either males or females (Goldman & Harlow, 1993). In fact, regression analysis concluded that perceived risk was negatively related to a collection of AIDS-preventive behaviour (operationalised as celibacy, monogamy, condom usage, and knowing partner's HIV status) ($r = -.33$, $p < .001$). As this finding contradicts the theory that perceived susceptibility is a motivational factor that supports the adoption of healthier practices (Bryan et al., 1997), Goldman and Harlow (1993) suggest that perhaps those already engaging in safer sexual practices perceive themselves to be at lower risk by virtue of protecting themselves. The authors also found that perceived risk was less related to the collection of preventive behaviour for females than for males ($R^2 = .10$ for men, $R^2 = .03$ for women). They suggest that since condom use during sex may require the insistence of the woman, her preventive behaviour may be less dependant on her perception of risk, and mediated more by her communication skills and assertiveness, although males' perceived risk was not related to condom use either.

Although perceived risk may not be a good predictor of HIV-preventive behaviour, Bryan et al. (1997) suggest that perceived susceptibility to bacterial STDs may better correlate with condom use. Using intention to use condoms as their outcome variable, they explored their hypothesis among 198 female undergraduate students. Perceived susceptibility was assessed with a four-question scale with a reported alpha coefficient of .86. Using structural equation modelling, the authors reported that participant's perceived susceptibility for contracting a bacterial STD was associated with their intention to use condoms during their next sexual encounter (standardised path coefficient, $r = .19$, $p < .001$). The authors also reported a second study exploring the explanatory power of their model (which included perceived risk among other items, such as assertiveness and acceptance of sexuality) among 238 female undergraduate students. Again, perceived susceptibility to bacterial STDs correlated with intention to use condoms (standardised path coefficient, $r = .34$, $p < .001$). Contacting participants by telephone six weeks later to inquire about

condom use within the follow-up period, the authors found that intention to use condoms and actual condom use at six week follow-up were strongly correlated ($r=.66$, $p<.001$).

A key variable affecting risk perception that has recently received attention is being in a regular or monogamous sexual relationship. Indeed, researchers that have examined length and type of adolescent sexual relationships have identified being in a monogamous relationship as a primary impediment to condom use (MacDonald et al., 1990; Maticka-Tyndale, 1991). At issue here is serial monogamy, that is, a high rate of regular sex partner change (Brunham, 1997). The rate of partner change is not the same as the average number of sexual partners at a given time. Some individuals may have relatively few regular sexual partners, yet could conceivably be more at risk for an STD than individuals who have multiple partners, simply because of poor condom usage with regular partners (Brunham, 1997). Because each regular partner is known and trusted, an individual may assess their STD risk as being low. Indeed, in a study of the sexual health practices of 1099 men and women from Baltimore, Polacsek, Celetano, O'Campo, and Santelli (1999) reported that, while 70% of respondents with multiple partners were regularly using condoms, only 40% of those with only regular partners did so.

Studies examining the role of monogamy in sexually transmitted diseases concur that monogamy is not an effective STD prevention strategy because it's efficacy relies on consistent, uncompromised monogamy and on the ability of sexual partners to reveal their STD status (Ekstrand, Stall, Kegekes, Hays, DeMayo, & Coates, 1993). Using a provincial STD surveillance database to identify individuals who had contracted either gonorrhoea, chlamydia, or syphilis in a 12-month period, Elliott, Blanchard, and Mestery (1998) found that, while 37% of the 15-19 year old respondents used a condom during their last vaginal intercourse with a non-regular partner (non-regular was defined as a relationship lasting less than 12 months), only 25% used a condom with their regular sex partner. Furthermore, 75% of the respondents stated that one of the reasons they did not regularly use a condom was because they were in a mutually

exclusive relationship, suggesting the possibility that they may have contracted an STD from their regular sex partner.

Similarly, Bosga and colleagues (1995) assessed whether there was a discrepancy in reported risk behaviours and perceived risk for HIV infection between sexual encounters with steady versus casual partners in a sample of 164 homosexually active men. Respondents in their study were questioned regarding condom use during anal intercourse, separately for casual and for regular partners. A steady partner was defined as someone with whom the participant had been sexually active for at least 6 months. Perception of risk was assessed by the question "how high do you estimate the risk that you have become infected with HIV in the last 6 months?" The results of their investigation revealed that being in a sexual relationship with a steady partner was predictive of low perception of risk. Specifically, while 95% of the participants who were engaged in unprotected casual sexual relationships indicated that they considered themselves to be at risk for HIV infection, only 60% of those practising unprotected sex with a steady partner considered themselves to be at risk for HIV infection. Interestingly, contrary to the theory that perception of risk influences actual behaviour, those who believed that they were at risk of contracting HIV were nonetheless still engaging in high HIV-risky behaviour.

Summary. The underlying theme in all of these studies is that one's personal attributes make a significant contribution to the development of one's behavioural repertoire. The theoretical assumption is that personality traits shape one's preferences for and responses to certain stimuli. As prevention of sexual disease transmission relies on the behavioural choices of high-risk individuals, assessing the role of personality in these choices has the potential to better understand how best to create and/or modify prevention programmes.

The Behaviour System

The second component of this problem-behaviour theory is the behaviour system, which generally supposes that certain actions facilitate others. For example, if youth are involved in community or school

activities, then they likely have a commitment to prosocial goals and are then less likely to engage in risky behaviours. Conversely, the engagement in one or two unhealthy behaviours (e.g., smoking, drinking) may facilitate the involvement in other unhealthy behaviours. This notion of behavioural facilitation has been supported in a number of studies, mostly examining the influence of alcohol use (Elliott et al., 1998), smoking, and illicit drug use (Jessor et al., 1995) on sexual practices.

Behavioural Repertoire within a Problem Behaviour Model. In Jessor et al.'s (1995) problem behaviour model, the behavioural repertoire construct is measured by involvement in prosocial activities. This intuitively makes sense, as involvement in prosocial activities may pre-empt time to become involved in problem behaviours. Similarly, the degree to which an adolescent is integrated in conventional social activities forms the third piece to McBride et al.'s (1995) tri-partite social bonding model. Involvement in conventional activities was addressed by measuring the level of participation in sports, student government, church, and other community activities. The behavioural factors assessed in Benson's model (1990) include involvement in creative activities, youth programmes, and church, bonding to school, exercising restraint and responsibility, demonstrated competency in planning and decision-making, resistance skills, and peaceful conflict resolution. Although researchers have found some support for the notion that having a socially acceptable behavioural repertoire is protective against risky sexual involvement, McBride et al. (1995) suggest that more socially integrated adolescents who are at a lesser risk for engaging in problematic behaviour may be more prone to perceiving prosocial opportunities.

The third factor in Harvey and Spigner's (1995) tri-partite model of the determinants of sexual behaviour also addresses an individual's behavioural repertoire, although Harvey and Spigner examine these variables as risk, not protective, factors. Specifically, while Jessor et al. (1995) and McBride et al. (1995) examined whether greater involvement in prosocial activities was associated with less involvement in sexual activity, Harvey and Spigner (1995) examined whether greater involvement in problem behaviours was associated with greater involvement in sexual activity. In a survey of 1,026 high school students,

Harvey and Spigner examined the frequency of engaging in eight risk taking behaviours: lack of seatbelt use, alcohol consumption, drinking and driving, being a passenger in a car with a drunk driver, smoking cigarettes, smoking marijuana, use of hard drugs, and getting into fights (Harvey & Spigner, 1995). The outcome variable, sexual status, was a single, dichotomous variable ascertaining whether or not the participant had ever had sexual intercourse. The authors performed two discriminant function analyses, one for males and one for females, to distinguish factors most predictive of the adolescents' sexual status. For males, the factors best predictive of having had sexual intercourse were frequent alcohol consumption, high stress level, poor use of seat belts, and frequent physical fighting, as well as having little concern about AIDS, age, and low education level for adolescent's mother. The model correctly classified 77% of the males (single discriminant function, $\chi^2_{(n=542, df=7)} = 164.03, p < .001$). For females, the discriminant function analysis revealed that frequent alcohol consumption, frequent smoking, in addition to being older, having a father with a low level of education, and high stress level were positively related to having had sexual intercourse, with the model correctly classifying 76% of the females (single discriminant function, $\chi^2_{(n=484, df=5)} = 158.51, p < .001$). The most striking finding in Harvey & Spigner's analysis was that, for both the adolescent males and females, frequency of alcohol consumption emerged as the strongest predictor of sexual activity. It alone explained better than 20% of the variance in sexual experience, after age and parent's education (control variables) were entered into the stepwise discriminant analysis.

Independently Assessed Behavioural Repertoire Variables. Independent of other risky behaviours, alcohol consumption is frequently associated with risky sexual behaviours (e.g., Flora & Thorensen, 1988; Hawkins et al., 1992; Hingson, Strunin, Berlin, & Heeren, 1990). Indeed, Hingson et al. (1990) found that, for many teenagers, sexual contact appears to occur after drinking and the use of alcohol seems to increase the likelihood of engaging in risky sexual behaviour. In their survey of individuals who had contracted either gonorrhoea, chlamydia, or syphilis in a 12-month period, Elliott et al. (1998) examined self-reported reasons for engaging in unprotected sexual activity. In total, 72% (n=826) of all individuals in

the surveillance database consented to participate in the study. More than one-third of the respondents, 40% of whom were under 20 years of age, stated that they used drugs or alcohol before or during sex at least half of the time. In addition, 51% of the males and 42% of the females in that study stated that they did not use a condom during their last sexual intercourse because they were under the influence of alcohol or drugs (Elliott et al., 1998).

Summary. Involvement in socially approved and risky non-sexual behaviours have been suggested to impact on the probability of risky sexual activity. Engagement in risk behaviours may put one at risk by providing the context in which to engage in unhealthy sexual behaviours. For example, consumption of alcohol prior to sex may decrease the likelihood of engaging in safe sexual practices. In addition, perhaps youth who chose some unhealthy behaviours have philosophically committed to a riskier life style, and commitment to a one set of unhealthy behaviours may provide a segue into other such activities.

Interpersonal Environment

The interpersonal environment represents the external controls that the adolescent perceives as exerting either punishment or reinforcement for certain behaviours. One's interpersonal environment may include people (such as parents or peers) or environmental realities (such as employment opportunities or crime rates) that the individual recognises as salient for him or her. The key notion here is that the variable of interest lies outside of the adolescent (unlike personality traits) and exerts some influence over the individual's behaviour, either directly or indirectly.

Interpersonal Environment within a Problem Behaviour Model. In Jessor's model of problem behaviour (1991; Jessor et al., 1991; Jessor et al., 1995), three factors are identified as belonging to the interpersonal environment, namely friends' model for behaviour, the adolescent's orientation to his or her parents, and perceived regulatory controls. Friends' model for behaviour assesses perceived models among friends for engaging in either healthy or unhealthy activities. Exposure to friends who model risky

behaviour places one at risk for engaging in similar activities because it provides an opportunity for one to learn how to engage in certain activities, and offers peer reinforcement for such behaviour. Friends may also offer access to supplies that may be necessary for carrying out undesirable behaviour. Conversely, at the other end of the spectrum, friends' model for conventional behaviour reflects greater involvement with conventional peers and more time spent in conventional activities.

An adolescent's orientation to his or her parents, the second factor in Jessor et al.'s (1995) perceived environment construct, refers to the strength of the relationship between an adolescent and his or her parents. The authors suggest that a positive relationship with one's parents is protective because the adolescent is able to discuss personal problems with an adult. However, Jessor et al. (1995) cautions that the importance of the parental-child attachment is tempered by the strength of the relationship between the adolescent and his or her peers. In other words, risk may be indicated if one identifies the peer bond as being stronger or more influential than the bond with one's parents.

The third environmental factor in Jessor et al.'s (1995) model is perceived regulatory controls. This refers to the perceived expectations and/or sanctions from both peers and parents regarding risky behaviour and is suggested to increase the likelihood that adolescents will be deterred from problem behaviour. Assessing the validity of their model, Jessor and his colleagues surveyed the health-related behaviours of over 1500 junior high school students over the course of four years. Described in detail in an earlier section (see Personality System section), the authors concluded that the higher the numbers of risk factors, the greater the involvement in problem behaviours and, conversely, the higher the number of protective factors, the lower the involvement in problem behaviours. Unfortunately, the independent contribution of one's personal environment to the engagement in risky sexual behaviour (or in any risky health behaviour) cannot be ascertained, as the variables from this system were combined with those from the personality and behavioural systems to produce an overall risk or protection index.

The perceived environment in general, and attachment to family in particular, also plays a prominent role in McBride et al.'s (1995) tri-partite model of problem behaviour. Their model posits that a weak attachment to family, school, and conventional social activities "free the adolescent from the prescriptive norms that discourage risk-taking behaviour" (McBride et al., 1995, p. 63). The basic theory is that social opportunities for students to feel a sense of belonging and to participate in their social environment operate as protective factors by buffering stress, enhancing social integration, and thus decreasing adolescents' risk-taking behaviour (Hawkins, Catalano, & Miller, 1992). In their study of the sexual behaviour of grade nine and grade 12 students, McBride et al. (1995) assessed attachment by having students rate their relationship with their parents and friends. The risky behaviours identified were binge drinking, smoking, illicit drug use, and any sexual intercourse in the past month. As described earlier, the difficulty in this study is that attachment to parents and friends is combined with the factors from the personality and behavioural systems to create an overall social bonding score. Nonetheless, level of bonding negatively correlated with having had sexual intercourse in the past month for the grade nine students ($R^2 = -0.08$, $p < .05$), but not for the grade 12 students ($R^2 = -0.02$).

Ennett, Bailey, and Federman (1999) also assessed the protective influence of attachment to family from a social bonding perspective. The authors interviewed 327 youth aged 14-21 who had spent the previous night with a stranger or in a shelter, public place, or any other place not intended as a domicile, or who had spent the previous night away from home without their parents' permission. Participants provided information about their demographic characteristics, homeless/runaway experiences, substance use behaviour, sexual behaviour (including frequency of condom use), and social relationships. The quality of participants' social relationship was assessed in terms of frequency, longevity, and amount of conflict. Individuals who had a good relationship (i.e., frequent contact, little conflict) with at least one family member were hypothesised to engage in fewer unsafe sexual practices (defined in their study as numerous lifetime sexual partners, engagement in sex trade work, and low frequency of condom use).

Although having a close relationship with a family member was not related to number of multiple sex partners or frequency of condom use, individuals who listed a family member as one of their social contacts, even if the relationship was infrequent and/or conflictual, were less likely to engage in sex in exchange for shelter, food, money, or drugs (odds ratio = .23, $p < .01$) (Ennett et al., 1999).

In his 'developmental assets' study through the Search Institute, Benson (1990) also examined the relationship between a number of perceived environmental factors and sexual activity among adolescents. Environmental 'assets' included (a) perceived support from family, neighbourhood, and school officials, (b) feelings of value to the community, and (c) having clear roles, boundaries, and expectations for the adolescent, their peers, and their parents. Unfortunately, Benson (1990) did not report the independent contribution of any of the above factors, or even the contribution of the collection of environmental influences. Rather, he reported that generally those positively endorsing less than 11 of a total of 40 variables (of which some were environmental) were considerably more likely to be sexually active than were the high school students who endorsed 31 or more factors.

Independently Assessed Interpersonal Environment Variables. Suggested independently of one's relationship with parents, childhood abuse is another personal environmental factor that may influence sexual risk in adolescents and young adulthood. The impact of childhood sexual abuse on a number of both internalising and externalising behaviours in adolescence, such as major depression, conduct disorder, panic disorder, and delinquency, is well-documented (e.g. Briere & Elliott, 1994; Dinwiddle, Heath, Cunne, Bucholz, Madden, Slutske, Bierut, Stratham, & Martin, 2000). Additionally, there is considerable evidence suggesting that victims of childhood sexual abuse have much lower levels of self-esteem (Fleming, Mullen, Sibthorpe, & Bammer, 1999; Hawke, Jainchill, & DeLeon, 2000; Johnson, 1996) and more adolescent experiences with alcohol and illicit drugs (e.g., Briere & Elliott, 1994; Hawke, Jainchill, & DeLeon, 2000). As both self-esteem and substance use are potentially independent risk factors for high

risk sexual behaviour, one might expect a relationship between childhood sexual abuse and adolescent risky sexual behaviour.

Comparing the HIV-related behaviours of 116 sexually active 13-18 year old male and female psychiatric patients, Brown, Lourie, Zlotnick, & Cohn (2000) found that a history of child sexual abuse was associated with less frequent use of condoms and higher rates of STDs. Wingood and DiClemente (1997) examined the effects of childhood sexual on sexual risk behaviour among 185 18-29 year old African American women. The authors found that those who had been sexually abused were more likely to self-report having an STD and also to engage in binge drinking (3 or more drinks in a setting). Fergusson, Horwood, and Lynskey (1997) also studied the relationship between childhood sexual abuse and sexual risk behaviour in young women. The authors followed a birth cohort of 520 New Zealand-born women at regular intervals from birth to age 18, at which time retrospective reports of child sexual abuse were gathered. Young women reporting sexual abuse in their sample had higher rates of early onset consensual sexual activity, teenage pregnancy, multiple sexual partners, unprotected intercourse, and STDs. Similar findings have been reported with males. Dilorio, Hartwell, and Hansen (2002) found that men with a history of unwanted sexual activity during childhood were significantly more likely as those not reporting such activity to be involved in prostitution (O.R.=2.22, $p<.001$), have alcohol problems (O.R.=1.23, $p<.05$), and use injection drugs (O.R.= 1.64, $p<.001$).

The relationship between sexual abuse and HIV/STD related risks has also been studied at the population level. Analysing the results of a state-wide survey in the United States, Goodenow, Netherland, and Szalacha (2002), found that youths who had experienced forced or coerced sex were more likely to report having four or more sex partners (O.R.=2.44, $p<.05$), being diagnosed with an STD (O.R.=7.04, $p<.05$), and using injection drugs (O.R.=5.86, $p<.05$), compared to those without such an experience. Sexually victimised youth were also less likely to use condoms during their most recent sexual encounter (O.R.=0.62, $p<.05$). Specific to street-involved youth, Rotheram-Borus, Mahler, Koopman, & Langabeer

(1996) examined the relationship between childhood sexual abuse and risky behaviour among a sample of 190 runaways (mean age = 15.5 years). The authors found that youth who reported a history of sexual abuse were more likely than their sexual counterparts to engage in unprotected sex, have more sexual partners, and use alcohol and other drugs.

While the relationship between childhood sexual abuse and later STD risk has been supported, few studies have examined the relationship between other forms of childhood abuse, such as physical or emotional, on risky sexual behaviour. Those that have compared the effects of sexual abuse versus other forms of child abuse have found little differences (Mullen, Martin, Anderson and Romans, 1996). Mason, Zimmerman, and Evans (1998) examined self-reported physical and sexual abuse among incarcerated youth with respect to sexual activity, contraceptive use, and pregnancy among a group of 62 females and 334 males, aged 12-17 years. Both male and female participants who reported a history of physical and/or sexual abuse reported using no method of contraception during their last sexual encounter, compared to participants without a history of abuse, with no significant differentiation between type of abuse reported. The impact of reported child physical and emotional abuse history on psychological well-being and AIDS risk has also been examined in a sample of Native American women's. Hobfoll, Bansal, Schurg, Young, Pierce, Hobfoll, & Johnson found that among their sample of 160 Native American women, those with a history of marked physical and emotional abuse had 5.14 ($p < .05$) times greater odds of having an STD than women who had marginal or no abuse histories. examined the impact of childhood abuse on a sample of Native American women's emotional distress and AIDS risk.

Summary. The relationships that adolescents have, and how they perceive the people and circumstances in their environment may exert tremendous influence over the behavioural choices available to adolescents. For intervention/prevention purposes, it is important to understand what are these environmental forces and how they impact behaviour.

METHODOLOGY CONCERNS

Despite the rapid theoretical advancements in the study of risk and protective factors, gaps in the psychological literature exist, and tend to concentrate in one of three areas – outcome variables, predictor variables, and sample characteristics.

Outcome Variables

The infancy of the science and reliance on an abstinence model is apparent in the lack of research into the factors related to risky sexual behaviour as the outcome variable, as opposed to incidence of sexual contact. In 1993, Hein observed that, since the advent of the AIDS epidemic, concern about sexual risk-taking has gone beyond the problem of unintended pregnancy. Despite this concern about sexually transmitted diseases, many studies use incidence of sexual intercourse as the outcome variable and call this variable 'risky or problematic adolescent behaviour', often along with alcohol consumption and smoking. Identifying adolescent sexual activity as inherently problematic has a moral tone to it and has not helped to advance the science. Many of the risk and protective factors examined have only a very weak relationship to sexual activity, with most of the correlation coefficients being less than 0.20 (for a review of interpreting the size of a correlation coefficient, see Hinkle, Wiersma, & Jurs, 1988). Furthermore, it is unclear whether the factors involved in engaging in sexual intercourse have any explanatory value for why adolescents use or fail to use condoms, have multiple sex partners, use unclean injection drug equipment, or contract STDs.

Studies that have endeavoured to examine degrees of risk involved in sexual behaviour tend to focus exclusively on pregnancy inhibitors, e.g., "when you have had intercourse, have you used a contraceptive?". A consequence of this pregnancy-risk research is that much of it has focused on attributes of females rather than of males (Harvey & Spigner, 1995), suggesting that protected sexual activity is a female issue. Research into risky sexual behaviour cannot simply focus on pregnancy risk. If the aim of research is to provide information to policy and programme planners regarding primary STD prevention

initiatives, then research must endeavour to understand the range of sexual risk engaged in by both male and female adolescents.

Predictor Variables

Many of the studies reviewed describe the effect of a collection of independent variables on either one, or a collection of, outcome variables. The problem is that when the scores on a number of variables are taken as a composite score, the predictive power of any one construct is unknown (Jencks & Mayer, 1990). For example, Jessor et al. (1995) suggest that low self-esteem is a risk factor for engaging in a myriad of problem behaviours, while McBride et al. (1995) suggest that high self-esteem is protective against having sexual intercourse among adolescents. Unfortunately, as both of these studies examined self-esteem as part of a collection of predictor variables, it is impossible to know whether self-esteem, in and of itself, is a protective or a risk factor, or whether it even has an effect on STD risk.

A second issue with regards to predictor variables is the exclusion of epidemiological evidence that may provide important insights into the determinants of STD infection. As an STD moves through sub-populations, the extent and speed of its spread (the transmission rate) are affected, either directly or indirectly, by a number of factors. The three determinants of the reproductive rate are transmission efficacy (a quality specific to the bacteria or virus causing the infection), the duration of infectiousness, and the rate of sexual interaction between infected and susceptible people (Wasserheit & Aral, 1996). Furthermore, these determinants may be influenced by many external factors, such as ethnicity, poverty, and marginalisation. While these factors have largely been unrecognised in the psychosocial literature, their contribution to the understanding of the spread of STD within a population cannot be overstated.

Sample Characteristics

In examining the predictors of first intercourse among adolescents, Day (1992) explained that "the findings of racial and ethnic differences are so ubiquitous that the case has been made that the effects of other variables depend on these" (p. 750). Despite this observation, many general population studies

include only Caucasian participants. Since the overwhelming majority of studies in this area are conducted in the United States, racial variability in research tends to focus on African and Hispanic Americans in comparison to Caucasians. Many of these American studies have observed that young, Black adults have more permissive sexual attitudes and engage in sexual intercourse at a younger age than young, White adults (e.g., Centres for Disease Control and Prevention (Atlanta), 1992b; Sells & Blum, 1996). Less research has been conducted with Hispanic youths. What has been done suggests that they are similar in permissiveness to White students (Cortese, 1989; Sprecher & McKinney, 1993). However, when assessed, rates of condom use at time of first intercourse have been found to be disturbingly low regardless of race (30% or less; Cooksey, Rindfuss, & Guilkey, 1996). Nonetheless, Canadian research is conspicuously absent from the literature and, thus, Aboriginal data are almost non-existent in this area. This gap alone demands attention, as Canadian Aboriginals have rates of STDs as much as four times higher than the general population (Jolly, Orr, Hammond, & Young, 1995). Indeed, while people of Aboriginal descent account for about 12% of the provincial population, and about 7% of Winnipeg's population (Statistics Canada, 1998) more than one-quarter of all STD cases in Manitoba are among First Nations people and an additional 15% are among Métis (Elliott et al., 1998).

Another serious chasm related to sample characteristics is that results can often only be generalised to high school students (as is the case in school samples) or to adolescents living at home with their parents (as is the case with almost all population surveys, such as the National Population Health Survey). Teenagers who are either not in school or who do not have a permanent address (from here on referred to as street-involved youth) are often missed from most samples. While high school students are a large population, they are obviously not inclusive of all adolescents and, in particular, those adolescents who are potentially at greatest risk of engaging in risky sexual practices. Indeed, street-involved youth are 2.3 and 2.5 times more likely, for males and females respectively, to self-report an STD than non-street-involved youth within the age category of 14-24 years (Macdonald, Fisher, Wells, Doherty, & Bowie, 1994).

OBJECTIVES OF STUDY

The elimination of gonorrhoea and a significant reduction in chlamydia are proposed as national goals that Canada should achieve by the year 2010 (Health Canada, 1997). Already, the national incidence of gonorrhoea has declined by 27% and chlamydia by 66% since 1991 (Health Canada, 1998a), although the last few years have witnessed an upsurge in rates, both nationally and provincially. However, the overall rates are influenced by very high rates in certain vulnerable segments of the population, such as in First Nations people (Health Canada, 1998a; Elliott et al., 1998) and street-involved youth (Health Canada, 1998b). Because of their high STD rates, street-involved youth are a priority for STD prevention programmes. Unfortunately, reliable data on the demographics, personality, and behavioural characteristics of high-risk youth are scarce (Anderson et al., 1994). Understanding more about the determinants of risk and protection within this group is a necessary step in reducing sexual risk-taking activities and, consequently, the STD rates.

In an attempt to provide information on the sexual health and sexual behaviours of Canadian street youth, the Laboratory Centre for Disease Control (Health Canada, Division of Sexually Transmitted Diseases Prevention and Control Bureau of HIV/AIDS, STD, and TB; now the Centre for Infectious Disease Prevention and Control (CIDPC; circa 2001)) developed the Enhanced STD Surveillance in Canadian Street Youth project. This is a national, multi-centre, cross-sectional surveillance system that is to be repeated within the same time period for five consecutive years. The first wave of data collection began in January, 1999 and ended in August, 1999. The purposes of this surveillance system are: (a) to determine the prevalence rates and trends of chlamydia, gonorrhoea, and Hepatitis B in Canadian street-involved youth; (b) to identify and monitor determinants of Canadian youth leaving home and becoming street-involved; (c) to describe the socio-economic and demographic characteristics and the risk behaviour of Canadian street-involved youth; (d) to describe the attitudes and perceptions of street-involved youth

concerning safer sex, risk behaviour, and the consequences of unprotected sex; and (e) to assess barriers to STD diagnosis, treatment, and partner notification (Health Canada, 1998b).

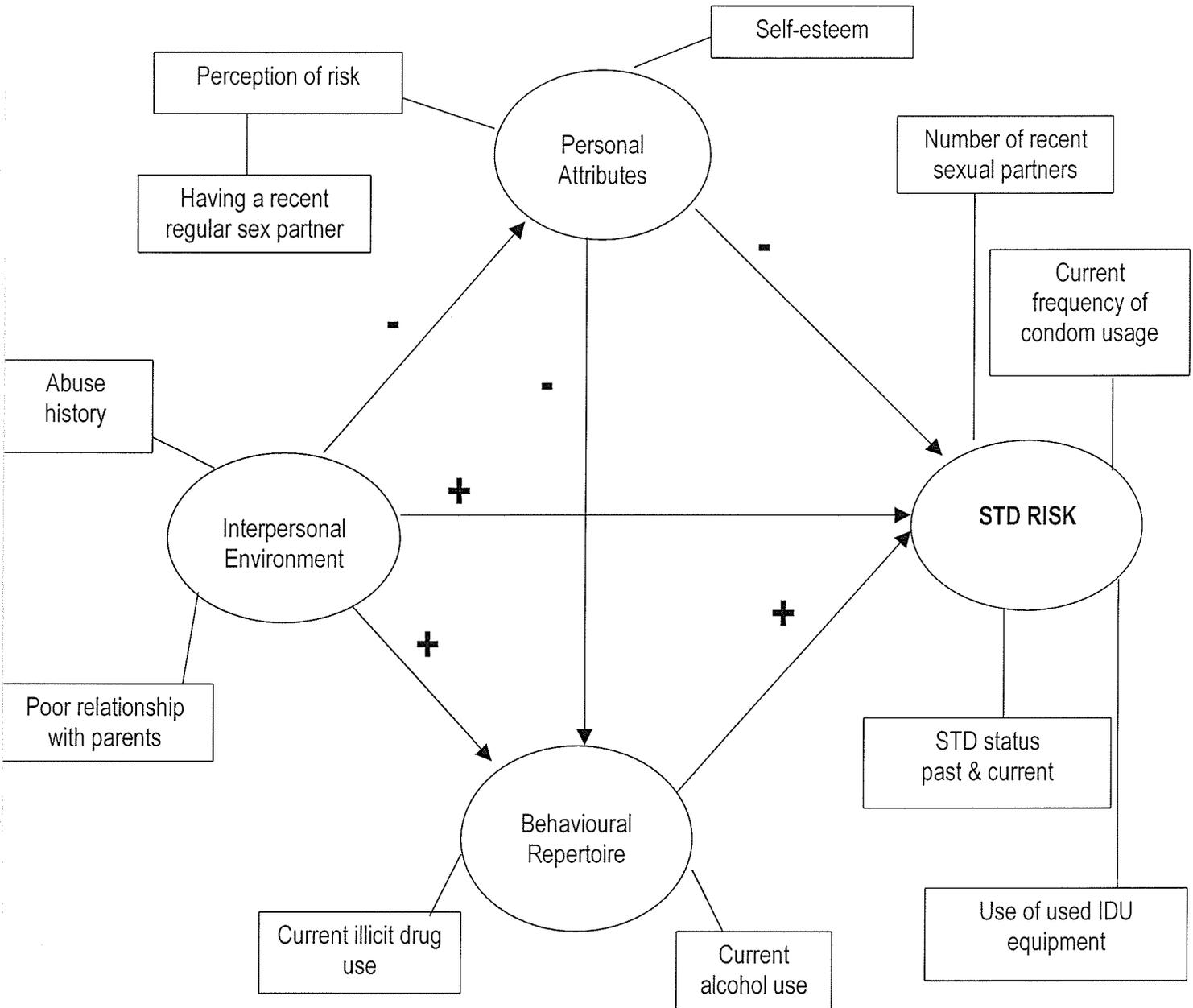
These data represent the first time that a Canadian national body has examined the prevalence of STD and the determinants of sexual risk behaviour among Canadian street-involved youth. The information available in this unique and timely data source is the focus for this thesis. The purpose of this study is to use these national data to assess the contribution of a tri-partite problem-behaviour model in understanding STD risk among a sample of street-involved youth in Winnipeg, Manitoba.

PROBLEM-BEHAVIOUR MODEL

While there are numerous unique variables that have been examined for their association with sexual activity among adolescents, only a few show an empirical association with STD risk and are applicable to street-involved youth. Figure 3 illustrates the problem-behaviour model tested here for its usefulness in understanding STD risk among street youth. As Figure 3 illustrates, one's personal attributes, their behavioural repertoire, and their interpersonal environment are proposed to influence one's STD risk, identified through condom use, number of recent sexual partners, use of used injection drug use equipment, and one's STD status. The hypothesised relationships between the indicator variables (indicated in Figure 3 by rectangular boxes) and the latent constructs (indicated in Figure 3 by ovals) are indicated with either plus (+) or negative (-) signs. A + sign suggests a positive relationship and a - sign suggests a negative relationship. The next section presents the rationale for selecting the specific indicator variables shown in Figure 3.

Figure 3

Theoretical Model of Psychosocial Determinants of STD Risk among Street-Involved Youth.



Personal Attributes

Numerous personality variables have been examined in relationship to the sexual behaviour of adolescents. These include expectations for success, orientation to school, educational aspirations, intolerance to deviance, commitment to prosocial goals, orientation to health, concern about AIDS, life satisfaction, value on societal contribution, empathy, locus of control, impulsivity or venturesomeness, hopelessness or depression, self-esteem, and perceived STD risk. Expectations for success, orientation to school, educational aspirations, life satisfaction, value on societal contribution, and empathy have been suggested as salient factors only for adolescents in school. For example, expectations for success, which typically assesses anticipated outcomes in school and employment, and orientation to school are questionable as appropriate explanatory variables when considering a street-involved youth sample of which more than half (55.2%) are not even registered for school. Intolerance to deviance, commitment to prosocial goals, orientation to health, and concern about AIDS really assess intent or attitudes toward certain behaviours rather than actual behaviour. Attitudinal research in social psychology suggests that our attitudes only guide our behaviour if outside influences on what we say and do are minimal (Kraus, 1991; Wallace, Lord, & Bond, 1996). With regards to attitudes about risky sexual behaviour such as condom use, it is unlikely that outside influences are minimal. Indeed, in Elliott et al.'s (1998) study, 38% of the male STD clients and 51% of the females said that one of the reasons they did not use a condom during their last sexual encounter was because their partner did not want to use one.

Unlike the other personality variables noted above, impulsivity and locus of control are likely applicable for adolescents regardless of their involvement in school and may be less influenced by the presence of others. However, the empirical relationship between venturesomeness or impulsivity and risky sexual behaviour is somewhat tenuous. The literature suggests that they may be related to contraception use, but only for younger adolescents (Arnett, 1996; Rawlings et al., 1995). Similarly, a review of the locus of control literature suggests that it may be positively correlated to contraception use, but allows for no

differentiation between type of contraception. Thus, in terms of inclusion in a STD-risk model, impulsivity and locus of control are not particularly strong candidates. Indeed, of the personality variables suggested in the literature, only self-esteem and perceived STD risk seem to repeat as factors of interest that are particularly salient for modelling determinants of STD risk among street-involved youth.

Self-Esteem. Although the literature regarding self-esteem and sexual risk behaviour is somewhat convoluted, self-esteem is often suggested to be an important factor in the engagement of a myriad of risky behaviours. Zimmerman, Sprecher, Langer, and Holloway (1995) suggest that self-worth may be a valuable predictor of the conditions under which adolescents enter into sexual relationships. Zimmerman et al. (1995) suggests that, without prior confidence and esteem, adolescents may enter sexual relationships vulnerable to the desires of their partner. At the high end of the self-esteem spectrum, McBride and her colleagues (1995) have suggested that self-esteem is a potent mediator between risk factors and engagement of socially unacceptable behaviours. The problem, however, in models incorporating self-esteem is that its unique contribution, independent of other personality variables, has not been examined. As this seems to be an important variable, quantifying its relationship to STD risk is a specific focus of this study. In the proposed model, individuals with low self-esteem are expected to have a higher STD risk compared to individuals with high self-esteem. It should be noted that hopelessness or depression has been suggested in some studies (e.g., Jessor et al., 1995) as a personal attribute that may be associated with risky behaviours in general, although not specifically with sexually risky behaviours. Assessing hopelessness or depression independent of self-esteem in a non-clinical research study may be unrealistic, as they are highly correlated. Thus, including depression as a variable in the proposed model is believed to offer little explanatory value over that already offered by self-esteem.

Perception of Risk. The second personal attribute suggested to influence STD risk is perception of susceptibility of contracting an STD. The theoretical understanding of perception of risk as an important determinant of STD/HIV risk underpins most educational campaigns designed to reduce high-risk sexual

behaviour (Prochaska et al., 1990). Individuals with a low perception of risk may be reluctant to engage in protective behaviours, as they believe that they are invulnerable to negative health consequences (van der Pligt & Richard, 1994; Weinstein, 1980). However, much of the research into perception of susceptibility and STD have focussed on HIV/AIDS. The relevance of perception of risk on less severe communicable diseases, such as gonorrhoea, chlamydia, and hepatitis B, is largely unknown. In the proposed model, having a low perception of STD risk is hypothesised to discourage protective behaviour and thus increase one's actual STD risk. Impacting on perception of risk is having a regular sex partner. Studies that examine the role of monogamy in STD incidence suggest that having a regular sex partner negatively effects one's perception of their STD risk (Ekstrand et al., 1993). As Maticka-Tyndale (1991) and MacDonald et al. (1990) have suggested, regular sex partners are known and trusted, and this sense of security increases one's sense of invulnerability and, hence, places them at greater risk for engaging in risky sexual behaviour (e.g., inconsistent use of condoms).

Interpersonal Environment

As previously reviewed, friends' model for behaviour, attachment to parents, perceived regulatory controls on behaviour, and child abuse history have been identified as potential risk factors for engaging in risky sexual behaviour. Friends' model for behaviour suggests that one's peer group is an important influence regarding the engagement in risky behaviours because peers offer an opportunity to learn certain behaviours, and provide the necessary tools for engaging in those acts (Jessor et al., 1996). The strength of this variable has only been assessed in studies on high school students in which the risky behaviours of interest include alcohol use, smoking, delinquency, and loss of virginity. While one's peers and the pressures that they exert may be important in understanding risky sexual behaviour among high-risk youth, what is of greater interest in a health determinants model is the underlying factors that make some youth particularly vulnerable to peer influences. Perhaps low self-esteem, poor parental attachment, or negative childhood experiences encourage one to seek out others who engage in self-medicating and/or risky

behaviours. In other words, it is not the potential influence of peers but rather the underlying vulnerability to those influences that is of interest in this STD determinants model.

Perceived regulatory controls, like the influence of peer behaviour, have only been assessed as a risk factor for a range of largely non-sexual risky behaviours among high school students. This variable refers to the effect of perceived sanctions from, and boundaries set by, parents and schools on adolescent behaviour (Benson, 1990; Jessor et al., 1995). Given that the sample of youth being addressed in the proposed determinants model are street-involved, the influence of scholastic boundaries may be a mute point. Indeed, more than half of the participants are not registered for school, so school-set expectations are not applicable for at least half of the sample. Although parental boundaries and expectations may be important in understanding STD risk, as with the potential influence of peers, it is the underlying context in which those boundaries exist that is being modelled. Thus, the relationship between the youths and their parents will be examined rather than the parental rules which evolve out of that relationship.

Relationship with Parents. Social control theory suggests that the presence of a family member in one's social network may be a constraining influence on unsafe sexual behaviour (Ennett, Bailey, & Federman, 1999). Although usually examined as part of a cluster of protective factors, positive relationship with one's parents has generally been found to lower one's risk of engaging in risky behaviours among adolescents (e.g., Jessor et al., 1995; McBride et al., 1995). Having a positive relationship with one's parents is suggested to be protective against a variety of socially unacceptable behaviours. This may be protective in part because the adolescent may not want to engage in behaviour that would displease the adult. Furthermore, in healthy parent-child relationships the youth is able to discuss personal problems with an adult. The participants in this street youth sample have been living away from their guardians for at least three days at a time. It is therefore likely that, for many of them, their relationship with their parents may be strained at best. However, it is possible that some of these adolescents have regular contact with their parents or guardians, which they would characterise as positive. Indeed, previous studies have

shown that many street-youth maintain ties with family members even once out of the home (e.g., Ek & Steelman, 1988). As Figure 3 indicates, the strength of the relationship that participants have with their parents or guardians is suggested to influence one's STD risk, such that those with poor and/or infrequent contact with one or both parents may be at greater risk for engaging in STD-risky behaviours.

History of Childhood Abuse. The impact of child sexual abuse on self-esteem and risky, unhealthy behaviours (e.g., drinking and illicit drug use) is fairly well documented (Briere & Elliott, 1994; Hawke et al., 2000). As both self-esteem and non-sexual unhealthy behaviours are considered potential risk factors for risky sexual behaviour in adolescents, including sexual abuse history as a risk factor in a model of the determinants of STD risk seems appropriate. Additionally, there is some evidence that any form of childhood abuse, that is, physical and emotional as well as sexual, may have a damaging impact in adolescence (Mason et al., 1998; Mullen et al., 1996). Hence, in the proposed model, individuals who report a history of childhood abuse of any kind are expected to have a greater STD risk.

Behavioural Repertoire.

Harvey and Spigner (1995) suggested that engaging in one or two risky and/or socially disapproved behaviours might lower one's inhibitions for engaging in other problematic activities. Previous studies have examined myriad of problem behaviours, including seatbelt use, drinking and driving, fighting in school, alcohol use, smoking, and illicit drug use. While there may be a connection between seatbelt use, drinking and driving, and fighting with sexual risk, the relationship between them is likely not a behaviourally facilitative one, but rather may be symptomatic of an individual's personal attributes and/or the context in which they have grown up. The purpose of the behavioural repertoire construct in this model is to suggest that some unhealthy or risky behaviours pave the way for other such behaviours. As such, only alcohol use, illicit drug use, and smoking have been emphasised in the literature as increasing one's STD risk. Unfortunately, over 90% of the street youth that are captured in the current surveillance system are lifetime smokers, and 86% are current smokers. Therefore, with little variability, this variable was

dropped from the measurement model, whereas alcohol and illicit drug use remained as potential risk factors.

Current Alcohol Use. Using Harvey and Signer's (1995) notion of behavioural facilitation, it is suggested that, as a potentially unhealthy behaviour, frequent alcohol consumption and/or binge drinking may lower one's inhibitions to engage in other risky behaviours (e.g., risky sex, sharing of needles), some of which may increase one's risk of contracting an STD.

Current Illicit Drug Use. Current use of illicit drugs, both injection and non-injection, is proposed as another risky behaviour that may increase the possibility of engaging in other risky behaviours, and consequently, one's STD risk.

STD Risk

Number of Recent Sexual Partners. The spread of an STD in a population is dependent on the transmission efficacy of the bacteria or virus, the duration of infectivity, and the rate of new partner acquisition (Wasserheit & Aral, 1996). Of particular importance in this model is the suggestion that high rates of sexual interaction among people is associated with rapid rates of STD spread (Klov Dahl, 1985). The proposed problem-behaviour model thus suggests that the more sexual partners one has, be they regular, casual, or client (i.e., paid for sex) partners, the greater the STD risk simply by virtue of more opportunities for transmission.

Use of Used Injection Drug Use (IDU) Equipment. As Hepatitis B is transmissible through blood, as well as semen and vaginal fluids, sexually active individuals are not the only ones at risk of infection; injection drug users are also susceptible. Indeed, one-quarter of individuals infected with HBV between 1994 and 1998 listed injection drug use as their primary risk factor (Moses & Beaudoin, unpublished data). In particular, the sharing of injection drug using paraphernalia (e.g., needles, rinse water, spoons), which may contain blood from a previous injection, greatly increases one's STD risk.

Current Frequency of Condom Use. With the exception of abstinence, use of a latex condom during penetrative sexual activity (i.e., vaginal, anal, and/or oral sex), is the best protection against contracting a sexually transmitted disease. Understanding the factors that are both conducive to and inconsistent with condom use is necessary for the effectiveness of programmes aimed at increasing consistent condom use among adolescents.

Past and Current STD Status. Chlamydia, gonorrhoea, and HBV, and their related sequelae are significant public health concerns for Manitoba, and particularly for Manitoba's youth. Individuals who have contracted gonorrhoea, chlamydia, or hepatitis B are at considerably higher risk for repeated infection.

HYPOTHESES

The purpose of this study is to test the explanatory power of a problem-behaviour model on frequency of condom use and STD prevalence for a sample of youth, aged 15 to 24, who are living on the streets in Winnipeg. The proposed problem-behaviour model (Figure 3) suggests that the constructs that are likely to influence STD risk are participants' personal attributes, the participants' interpersonal environment, and their behavioural repertoire.

Personal Attributes

Hypothesis 1. More positive personal attributes, identified as higher self-esteem and higher perception of risk, are hypothesised to have a direct negative effect on behavioural repertoire, as defined by current illicit drug use and current alcohol use.

Hypothesis 2. More positive personal attributes are hypothesised to have a direct negative effect on STD risk, as defined by number of recent sexual partners, current frequency of condom usage, STD history, and use of used IDU equipment.

Behavioural Repertoire

Hypothesis 3. A more negative behavioural repertoire, as defined by greater current illicit drug use and greater current alcohol use, are hypothesised to have a direct positive effect on STD risk.

Interpersonal Environment

Hypothesis 4. A more negative interpersonal environment, identified as a history of sexual, physical, and/or emotional abuse and the quantity and quality of current parent-child contact, is hypothesised to have a direct positive effect on behavioural repertoire.

Hypothesis 5. A more negative interpersonal environment is hypothesised to have a direct positive effect on STD risk.

Hypothesis 6. A more negative interpersonal environment is hypothesised to have a direct negative effect on personal attributes.

Additional Research Questions

The extent to which an STD is spread in a population depends on a number of factors, including the probability that a particular sexual partner is infected, the level of infectivity of the partner, and the number and types of unprotected sexual exposures (Calzavara, Bullock, Myers, Marshall, & Cockerill, 1999). Although little is known about the patterns of sexual partnering, recent surveys suggest that partner selection is not random, but is determined, to a great extent, by one's social network and environment (Calzavara et al., 1999; Michael, Gagnon, Laumann, & Kolata, 1994). Basically, people partner with similar others. If individuals and their sexual partners are from a somewhat segregated population, such as an ethnic group, that has high STD rates, then the risk that either partner has an STD and will transmit that infection is high (Kault, 1995). Statistically, Aboriginal youth appear to have a greater risk compared to non-Aboriginals for contracting an STD (Elliott et al., 1998; Jolly et al., 1995). Females are also disproportionately represented in STD statistics, although much of the gender difference in incidence may be a function of greater testing behaviour (i.e., females may be more likely to be tested for STD because of

greater comfort or familiarity with testing procedures). Over representation in the provincial STD incidence data of Aboriginals and of females does not suggest that the pathways to STD risk are different depending on ethnicity or gender, nor that gender or ethnicity are STD risk factors. Because neither ethnicity nor gender are proposed as STD risk factors, they have not been included in the proposed model. Rather, the epidemiological research suggests that First Nations youth are at greater STD risk simply by virtue of membership in an STD network, and that females are over-represented in the STD data simply by virtue of being tested for an STD more frequently. In addition to the formal hypotheses then, this research proposes to explore:

- (a) whether differences exist between male and female street-involved youth on the determinants proposed in the model; and
- (b) whether differences exist between street-involved Aboriginal youth and non-aboriginal youth on the determinants proposed in the model.

METHODOLOGY

Sample

Obtaining representative data on youth who are not enrolled in school or who do not have a permanent address (i.e., street-involved youth) can be very difficult because their lifestyles may exclude them from sampling frames used to obtain probability samples (Anderson et al., 1994). As an alternative to probability sampling, snowball sampling has been shown to be the best way to survey hard-to-reach populations (Faugier & Sergeant, 1997). In snowball sampling, study participants are asked to inform other youth within their social network that the study is being conducted. By using word of mouth as the mode of advertisement for the study, recruitment will reach youth that may not have intended to participate due to fear or to not knowing about the study (Faugier & Sergeant, 1997).

Initially, 10 drop-in/youth centres located in Winnipeg were identified as places where street-involved youth may be accessed. As youth were informed about the study, it was hoped that study participation would increase through a snowball effect. Participants were recruited between January, 1999 and August, 1999 in order to address biases in seasonal attendance at drop-in centres and other patterns of movement of street youth. To be eligible for participation, individuals had to be:

- (a) between 14 and 24 years of age;
- (b) able to understand spoken French or English;
- (c) able to understand and recognise the purpose of the study
and;
- (d) in the last six months have either run away from their permanent place of residence for three days or more, or been thrown out of their permanent place of residence for three days or more, or been without a fixed address for three days or more.

In order to enhance recruitment of street-involved youth, an honorarium of \$20.00 was offered to each study participant. As youth accessed the services available at these drop-in sites, the research nurse informed them of the purpose and procedure of the study and how the information would be used. Upon determination of eligibility for participation, individuals were asked to participate. Those who did not wish to participate in the study were given the option of returning at any time during the months of data collection to participate, should they change their minds. Upon completion of the interview, participants were asked to tell other street-involved youth with whom they have contact about the study, so that they would also have the opportunity to participate. Further information regarding the sampling method may be found in the attached Enhanced STD Surveillance in Canadian Street Youth Protocol (Appendix D).

Sample Characteristics. Between January and August of 1999, 320 street-involved youth between the ages of 14 and 24 years offered to participated in the Winnipeg portion of the Enhanced STD Surveillance in Canadian Street Youth study. All of the surveys, upon completion, were sent to Health

Canada in Ottawa for data entry, and then returned to Manitoba Health. Of the 320 youth interviewed, one participant questionnaire had to be removed from the all analysis as the interview was largely incomplete. Table 5 indicates the complete age and sex breakdown of the sample. Slightly more than half of the 319 participants on which there is complete data are male (56.4%, $n=180$), and the remaining 43.6% ($n=139$) are female. The mean age of the total sample is 17.5 years ($std=2.9$), with no significant difference between the males ($mean=17.7$, $std=3.3$) and the females ($mean=17.2$, $std=2.3$) ($F_{(1,319)}=1.67$, n.s.).

In addition to representation in all age categories between 14 and 24 years, the street-involved sample of youth is also representative of a variety of racial backgrounds. The majority of the sample self-identified as either Aboriginal (53.0%) or Caucasian (39.2%). In addition, 3.4% identified their racial group as Black, 0.9% as Hispanic, 0.3% as Asian, 1.3% as Jamaican, and the remaining 1.9% as other. Other characteristics of the sample that distinguish them from a more traditional sampling of youth (i.e., those that are not street-involved) include school involvement and encounters with the law. More than half of the street-involved youth sample ($n=176$, 55.2%) were not, at the time of interview, registered for school. Additionally, two-thirds of the sample ($n=213$, 66.8%) admitted having been in trouble with the law to the extent that they spent at least one overnight stay in a detention facility.

To increase confidence that the street-involved youth sampled in the surveillance system are representative of high STD-risk youth in Winnipeg, the sample was compared to two other high-STD risk samples surveyed recently in Winnipeg. The first comparison group was a sample of individuals who contracted gonorrhoea, chlamydia, or syphilis in 1997 and were entered into the Manitoba STD surveillance database (Elliott, Blanchard, & Mestery, 1998). The second comparison group was a sample of injection drug users who were part of an epidemiological study conducted in 1998 to quantify the growing epidemic of HIV among injection drug users (the WIDE study; Elliott, Blanchard, Dawood, Beaudoin, & Dinner, 1999). Table 6 compares the three samples on descriptive variables (i.e., age, racial category, age of sexual debut, and number of sexual partners) that are important to the epidemiology of STDs.

Table 5

Age and Sex Breakdown of Enhanced STD Surveillance in Canadian Street Youth Study Participants

<i>Age of Participants (in years)</i>	<i>Males</i>		<i>Females</i>		<i>Total Sample</i>	
	N	% of Males	N	% of Females	N	% of Total Sample
14	9	5.0	7	5.0	16	5.0
15	16	8.9	17	12.2	33	10.3
16	19	10.6	27	19.4	46	14.4
17	44	24.4	27	19.4	71	22.3
18	34	18.9	33	23.7	67	21.0
19	14	7.8	11	7.9	25	7.8
20	16	8.9	3	2.2	19	6.0
21	12	6.7	3	2.2	15	4.7
22	6	3.3	3	2.2	9	2.8
23	5	2.8	4	2.9	9	2.8
24	3	1.7	2	1.4	5	1.6
Missing	2	1.1	2	1.4	4	1.2
Mean (std)	17.66(std=3.30)		17.23 (std=2.32)		17.47 (std=2.92)	

Table 6

Descriptive Epidemiological Comparison of High-Risk Winnipeg Samples

Comparison Variable	Street-Involved Youth ¹ N=319			Winnipeg STD Clients ² N=826			W.I.D.E Study Participants ³ N=608		
	% Caucasian	% Aboriginal	% Other	% Caucasian	% Aboriginal	% Other	% Caucasian	% Aboriginal	% Other
Self-Reported Racial Identification Total Sample	39.2%	53.0%	7.8%	41.1%	43.3%	15.6%	30.6%	65.8%	3.6%
Age of Sample	Mean Age	Standard Deviation		Mean Age (not reported)	Standard Deviation		Mean Age	Standard Deviation	
Males	17.7 years	3.3		64.3% 15-24 years	not reported		34.8 years	8.2	
Females	17.2 years	2.3		79.4% 15-24 years	not reported		31.4 years	7.8	
Age of Voluntary Sexual Debut	Mean Age	Standard Deviation		Mean Age	Standard Deviation		Mean Age	Standard Deviation	
Males	13.9 years	1.6		15.6 years	not reported		14.0 years	3.0	
Females	13.8 years	7.8		15.4 years	not reported		14.7 years	2.0	
Number of Recent Sexual Partners ⁴	Mean Number of Partners	Standard Deviation		Mean Number of Partners	Standard Deviation		Mean Number of Partners	Standard Deviation	
Males	3.7 partners	5.0		6.9 partners	not reported		5.8 partners	11.0	
Females	5.3 partners	9.6		3.0 partners	not reported		3.2 partners	3.8	

¹Street-Involved Youth: Participants from the Enhanced STD Surveillance in Canadian Street Youth Study – Winnipeg Sample. Sample was typed and interviewed on behalf of Health Canada in Winnipeg, Manitoba from January to August, 1999. ²Winnipeg STD Clients: Participants identified in the provincial STD surveillance database as having tested positive for either gonorrhoea, chlamydia, or syphilis in the 1997 calendar year. Study was conducted by Elliott, Blanchard, and Mestery in Winnipeg, Manitoba in 1998. ³W.I.D.E Study Participants: Participants in the Winnipeg Injection Drug Epidemiology Study conducted in Winnipeg, Manitoba in 1998. Study conducted by Elliott, Blanchard, Dawood, Beaudoin, and Dinner, 1999. ⁴The operational definition of recent sexual partners is “number of sexual partners in the last 12 months” for both the STD Client and the Injection Drug Use sample. For the Street-Involved Youth sample, recent sexual partners is defined as the “number of sexual partners in the last 3 months”.

What seems to be the largest difference between the samples in terms of descriptive characteristics important to STD epidemiology is age, with the W.I.D.E study comprising a much older sample.

Procedure

Upon agreeing to participate in the study¹, participants were asked to read the consent form (see Appendix A). If unable to read the form, the research nurse read it to the participant. Participants were questioned as to their understanding of the study purpose and procedure. Each participant was given an identification number that was then used on all subsequent forms and specimens. Participants were also asked to give a name (fictitious, a nickname, or their real name) so that the nurse would be able to give them their test results upon completion of the laboratory tests.

Participants then completed the interview-administered Enhanced STD Surveillance in Canadian Street Youth Questionnaire, female or male version, whichever was applicable (see Appendices B and C, respectively). After completing the questionnaire, participants were asked to provide a urine sample for gonorrhoea and chlamydia tests, and blood samples for Hepatitis B and possible future HIV tests. Urine samples were collected for 299 participants, or 93.4% of the sample, and 85.3% of the sample (272 participants) provided a blood sample. Participants were thanked for their time, given \$10.00 as compensation, and were told that, if they returned in one week to receive their test results, they would be given another \$10.00 honorarium. If participants, upon return, were identified as positive for any of the tested STDs, they were treated appropriately and referred for further counselling and treatment (if necessary).

¹The Faculty Committee on the Use of Human Subjects in Research, Faculty of Medicine, University of Manitoba, granted ethical approval to Dr. Stephen Moses, principal investigator, to conduct the Winnipeg portion of this project on January 11, 1999.

Measurement

Self-Esteem. Self-esteem was assessed in the current survey using an eleven-item questionnaire (see Section 6, items 31a—31h, 32a—32c), in which participants responded to a series of questions on a five-point scale, with responses ranging from strongly agree (5) to strongly disagree (1). Item scores are then added to total a score ranging from 11 to 55, the higher scores indicating a higher level of self-esteem than lower scores. These questions were originally developed for the Canada Youth and AIDS Study (Health Canada, 1988) and were used in this survey for comparison purposes. These self-esteem items were chosen from a large pool of items related to decision-making, appearance, confidence, and feelings of regret over past personal actions. The scale was refined using factor analysis employing principal components analysis with varimax rotation (King, Coles, & King, 1991). The authors report that the Scree test was used to make decisions on the viability of factors by plotting the latent roots. Cronbach's alpha provided the measure of internal reliability. Sufficient reliability is indicated with a minimum Cronbach's alpha of .65. These self-esteem items were pilot-tested on 6 different adolescent cohorts: students (grade 7, 9, and 11), high school drop outs, college/university students, and street youth. The average alpha was .67, although there was some variability between cohorts (King et al., 1991).

Perception of Risk. There seems to be little consistency in how perceived risk or susceptibility is measured, despite its emergence as an important variable. Some have used single item measures (e.g., Bosga et al., 1995; Prochaska et al., 1990), while others have used study-specific scales (e.g., Bryan et al., 1997; Goldman & Harlow, 1993). Perceived risk in the Enhanced STD Surveillance in Canadian Street Youth Study was assessed with a single item. After completing the rest of the survey, and immediately after being asked if they'd ever had any of a series of bacterial and viral STDs, respondents were asked how at risk for contracting an STD they believed they were (see Section 7, item 38 on the female version; item 37 on the male version). Participants responded on a four-point scale from 'at no risk at all' (0) to 'high risk' (3).

Having a Recent Regular Sexual Partner. As having a regular sex partner has been identified as deflating one's level of perceived susceptibility and, thus, impeding condom use, participants were asked if they have had a regular sex partner in the last 3 months (Section 6, items 23c (opposite sexed regular partner), and 24c (same sexed regular partner)). Responses were scored simply as either 'yes' (1) or 'no' (0). Generally, a regular partner is defined as someone with whom the participant has been in a steady relationship for at least one year. Given the age of this sample, and the suspected high rate of partner change, a regular partner was defined as someone with whom the participant had been in a steady relationship with and whom they would consider the priority in their love life, but with no time criteria. There is also no expectation that having a regular partner implies monogamy.

Child Abuse History. Similar to perception of risk, there is little consistency in how abuse history is screened or how child abuse is defined. Indeed, estimated prevalence rates for child abuse fluctuate greatly depending on the definition of abuse applied, that is, emotional, physical, or sexual, or all three. Abuse history is included in these analyses as a proxy measure of the interpersonal environment in which one was raised; therefore, all three forms of abuse were deemed equally relevant in terms of why the youth left home. Each participant was asked, separately, if sexual, physical, or emotional abuse was a factor in why left their parents'/guardians' home (see Section 1, item 6c). Each response was scored 0 for a 'no' response, and 1 for a 'yes' response, for a range of 0 to 3.

Relationship with Parents. Although a number of studies have examined relationship to parents, there seems to be very little consistency in how this variable is assessed. While Jessor et al. (1995) asked a series of four questions pertaining to respondent's relationship with parents and the extent to which the parents show interest in the respondent, McBride et al. (1995) asked participants to rank their level of satisfaction with their parents. The current study asked participants how often they had been in contact with their mother and/or father in the past 3 months, and how they would characterise their interactions with each parent (i.e., very good, good, average, bad, very bad; see Section 3, items 8a-c and 9a-c). In total,

there are three questions per parent assessing whether the participant had contact with a parent, frequency of contact, and quality of contact. Consistent with the scoring hierarchy of child abuse history (the other interpersonal environment variable), item responses for these three questions were scored such that a low score (on a range between 0 and 16) indicates frequent contact that the adolescent evaluated to be positive, whereas a higher score indicates less frequent contact that was evaluated as negative.

Alcohol Use. Participants were asked if they'd consumed alcohol in the last three months (see Section 4, item 15a). Respondents who indicated that they had never consumed alcohol or had quit consuming alcohol within the last three months were given an alcohol use score of 0. If respondents said they had consumed alcohol in the past 3 months, they were asked to classify their alcohol use in terms of general frequency [i.e., 'less than once a month' (1) to 'everyday' (5); Section 4, item 15b] and bingeing frequency [i.e., 'less than once a month' (1) to 'everyday' (5); Section 4, item 15c]. The responses to these questions were summed, resulting in an alcohol use score ranging from 0, indicating a non-drinker, to 10, indicating frequent regular consumption with habitual binge drinking.

Current Illicit Drug Use. Current use of illicit drugs, both injection and non-injection, was also assessed. Participants were asked, with an open-ended question (i.e., no predetermined response scale), how often in a typical week in the last 3 months, if ever, they used non-injection and/or injection drugs [see Section 4, items 19f (non-injection drugs); and 19o (injection drugs)]. Responses to these two questions were put into categories consistent with those used for the questions relating to general and bingeing frequency of alcohol consumption [i.e., responses ranging from 'never' (0) to 'less than once a month' (1) to 'everyday' (5)]. Responses to these two questions were added, resulting in a current drug use score ranging from 0 to 10, with a low score indicating little or no use of illicit drugs, compared to a high score.

Number of Recent Sexual Partners. For each type of sexual partnership, participants were asked how many sexual partners they have been with in the last three months [see Section 5, items 23c (regular, female sex partner), 24c (regular, male sex partner), 25c (casual, female sex partner), 26c (casual, male

sex partner), 28e (female sex client), 28g (male sex client)]. Responses were summed such that a higher score indicates a greater number of sexual partners (of any type) within the last 3 months compared to a lower score. Given that paid-for-sex partners are included, results of the WIDE study (Elliott et al., 1999) suggest that a potential range of scores could be 0 to 100.

Use of Clean Injection Drug Use (IDU) Equipment. If participants positively endorsed the item relating to injection drugs (Section 4, item 19o), participants were asked how often, in the last three months, they used clean equipment (Section 4, item 19l). Responses were recorded on a five point Likert-type scale, ranging from 'never' (0) to 'all of the time' (3). Respondents were also asked if, in the last 3 months, they had used injection equipment that someone else had already used (Section 4, item 19p), to which they could answer 'no' (0) or 'yes' (1). Response scores on these two items were added to provide a score ranging from 0, indicating consistent use of clean IDU equipment, to 4, indicating regular use of unclean or used IDU equipment.

Current Frequency of Condom Use. For each type of sexual partner, participants were asked how often they use condoms [see Section 5, items 23g (regular, female sex partner), 24g (regular, male sex partner), 25g (casual, female sex partner), 26g (casual, male sex partner)], with responses ranging from 'never' (0) to 'every time' (4). The scoring pattern being used provides those participants not engaging in high-risk behaviours with lower scores than those engaging in STD-risky activities. Consistent with this pattern, condom-frequency scores were reversed such that individuals using condoms frequently (and consequently at lower STD-risk) will receive lower scores than participants not using condoms frequently (i.e., 'every time' scored as 0; 'never' scored as 4). If respondents had engaged in sex trade work within the last three months, they were asked if they used a condom the last time that event had occurred (Section 5, item 29), with responses being either 'yes' (1), 'no' (0), or 'unsure' (treated as missing). 'Yes' responses for this item were given a score of 0 and 'no' responses a score of 4 to correspond with the 'every time/never' response scores on the other condom usage questions.

Research has demonstrated that consistent use of condoms lowers one's risk of contracting an STD. With these data, though, an individual may engage in more than one type of sexual relationship and may use condoms with varying frequency depending on the relationship. Thus, adding the response scores as they are recorded on the questionnaire (i.e., not reversed) to each of the 5 condom-use items may reflect greater sexual diversity, not necessarily less STD-risk behaviour. The other advantage, therefore, of reversing the condom-frequency scores is that those involved in numerous types of sexual relationships and who use condoms frequently during those encounters will receive a score reflecting their 'safer-sex' activities.

STD Status, Past and Current. The current analysis attempted to model the factors that place street-involved youth at high risk for contracting an STD. Therefore, both past as well as current STD status have been assessed. Current STD status was determined through lab testing. Urine (for Gc and Ct tests) and blood (for HBV test) samples taken at the time of the initial interview were coded with the same non-nominal identifier as the individual's questionnaire. Samples were sent to Cadham Provincial Laboratory for testing. Urine samples were tested for Gc and Ct using standard PCR testing methods for detecting STD in urine. Each sample was tested twice and only dual positives were accepted as true positives. The blood samples were screened for both surface and core HBV antibodies. As a positive test result for surface HBV antibodies does not distinguish between an HBV infection and an HBV immunisation, only the core HBV antibodies test result were used to identify youth as HBV positive. Past STD status was determined through self-report. Participants were asked if they had ever been told that they had an STD (see Section 7, item 36a). Participants were given a score between 0 and 14, with 0 indicating no past STD and no current positive test results. Scores above 0 reflect either a positive STD test result, or an admission of having been diagnosed with one (or any combination) of 11 different STDs in the past (e.g., gonorrhoea, chlamydia, herpes, genital warts, other STD, unknown STD, hepatitis B, hepatitis C, unknown hepatitis, trichomoniasis, crabs/lice/scabs).

ANALYSIS

As noted in a previous section (see Methodology Concerns) many studies of predictors of condom usage analyse the effect of a collection of independent variables on either one, or on a collection, of outcome variables. When scores on a number of variables are used to derive a composite measure, the effects on the outcome variable(s) cannot be attributed to any single characteristic (Jencks & Mayer, 1990; Ramirez-Valles, Zimmerman, & Newcomb, 1998). A second interpretative difficulty with this strategy is not knowing how multiple characteristics are weighted (Ramirez-Valles et al., 1998). As a result, one does not know what specific combination of characteristics may affect individual behaviour (Jencks & Mayer, 1990).

Structural equations modelling (SEM) offers a solution to these measurement issues because it allows for the combination of several observed indicators in a single construct (Bentler, 1995; Newcomb, 1990) – “through SEM, the combined effects of a set of indicators as well as their unique effects can be simultaneously assessed” (Ramirez-Valles et al., 1998, p. 240).

Structural Equations Modelling

In his doctoral dissertation, Kuelker (1996) gives a detailed overview of structural equations modelling in which he highlights the advantages that SEM offers over multiple regression when testing theories using non-experimental data. Stepwise multiple regression determines whether the variables in a theoretical model are related to each other. Multiple regression is exploratory however; it only determines whether or not a relationship between variables exist. It does not confirm whether or not the relationships in the theory are sufficient to explain the data well (Kuelker, 1996). By comparison, SEM is a confirmatory technique, in that it assesses whether or not the theorised structure among the variables fits the data well, and whether important variables have been omitted.

The second strength of SEM is the necessary formulation of a causal theory (Saris & Stronkhorst, 1984). Unlike multiple regression, SEM requires that a causal structure be hypothesised before the

analytic tool is applied. Kuelker (1996) suggests that this may result in enhanced comprehensiveness and rigour with SEM.

The specification of the theoretical structure (e.g., Figure 3) that is suggested to underlie a particular dataset is the starting point of the SEM technique. If the theoretical model has only linear relationships among the variables, as is the case in the proposed model, it can be specified as a group of linear equations (James, Mulaik, & Brett, 1982). The unknown values in the equations can be solved for, or estimated, simultaneously. Consequently, the relationships among the variables are estimated simultaneously. This is another advantage that the SEM procedure has over multiple regression. Sequentially adding or subtracting variables, as in multiple regression, leads to problems with regression coefficients changing as each variable is added to or removed from the model, as well as the direct and indirect effects of variables on each other being masked by shared variance (Kuelker, 1996). These problems do not occur with simultaneous estimation of variables.

As Kuelker (1996) explains, SEM also permits estimation of the relationships among both measured variables and latent variables (or factors). A latent variable (indicated with circles in SEM) is not measured directly, but is assessed by the loading of indicator variables on the factor. The indicator variables (indicated with rectangles in an SEM diagram) are composed of error of measurement, unexplained item variance (often grouped with error of measurement and labelled as error variance), and variance from the latent construct that the indicator variable is measuring (Martin, 1987). SEM can be used to separate these types of variance from one another (Kuelker, 1996).

Once estimates of the relationships (or parameters) among the variables (forming the measurement model) have been generated, evaluating the accuracy of these estimated values is the next step involved. The estimated or predicted correlation or covariance matrix Σ^{\wedge} is compared to the sample covariance matrix \mathbf{S} and if, element for element, Σ^{\wedge} is nearly identical to \mathbf{S} , then the structural model that

generated Σ^{\wedge} is a possible candidate to be the structure underlying the population covariance matrix Σ (Bentler & Bonett, 1980; Kuelker, 1996). The difference between Σ^{\wedge} and \mathbf{S} can be evaluated by different formulas and, when multiplied by $N-1$, has an asymptotic chi-square distribution with degrees of freedom equal to the number of sample variances and covariances ($p(p+1)$) divided by 2, minus the number of parameters that were estimated (Kuelker, 1996). If there is little difference between Σ^{\wedge} and \mathbf{S} , the X^2 value will be non-significant. A significant X^2 value indicates a considerable discrepancy between the model tested (Σ^{\wedge}) and the sample data (\mathbf{S}), suggesting that the model should be rejected (Kuelker, 1996).

In summary, arranging the variables of interest into a structural equations model allows for:

- a) the combination of several observed indicators in a single construct in order to assess both the combined effects of a set of indicators and their unique effects;
- b) a confirmatory assessment of whether or not the theorised structure among the variables fits the data well, and whether important variables have been omitted; and
- c) the simultaneous estimation of the relationships among both measured and latent variables.

As this study seeks to combine the epidemiological knowledge of STD risk with the psychological understanding of the importance of underlying determinants of risky behaviour, a structural equation model seems the most appropriate way of exploring theoretical, but largely untested, relationships. The size of the study sample also lends itself well to a structural equations model, as SEM requires between 5 and 10 observations per parameter. With 10 parameters, the current model requires a minimum sample size of 100 participants (there are 319 participants in the current sample).

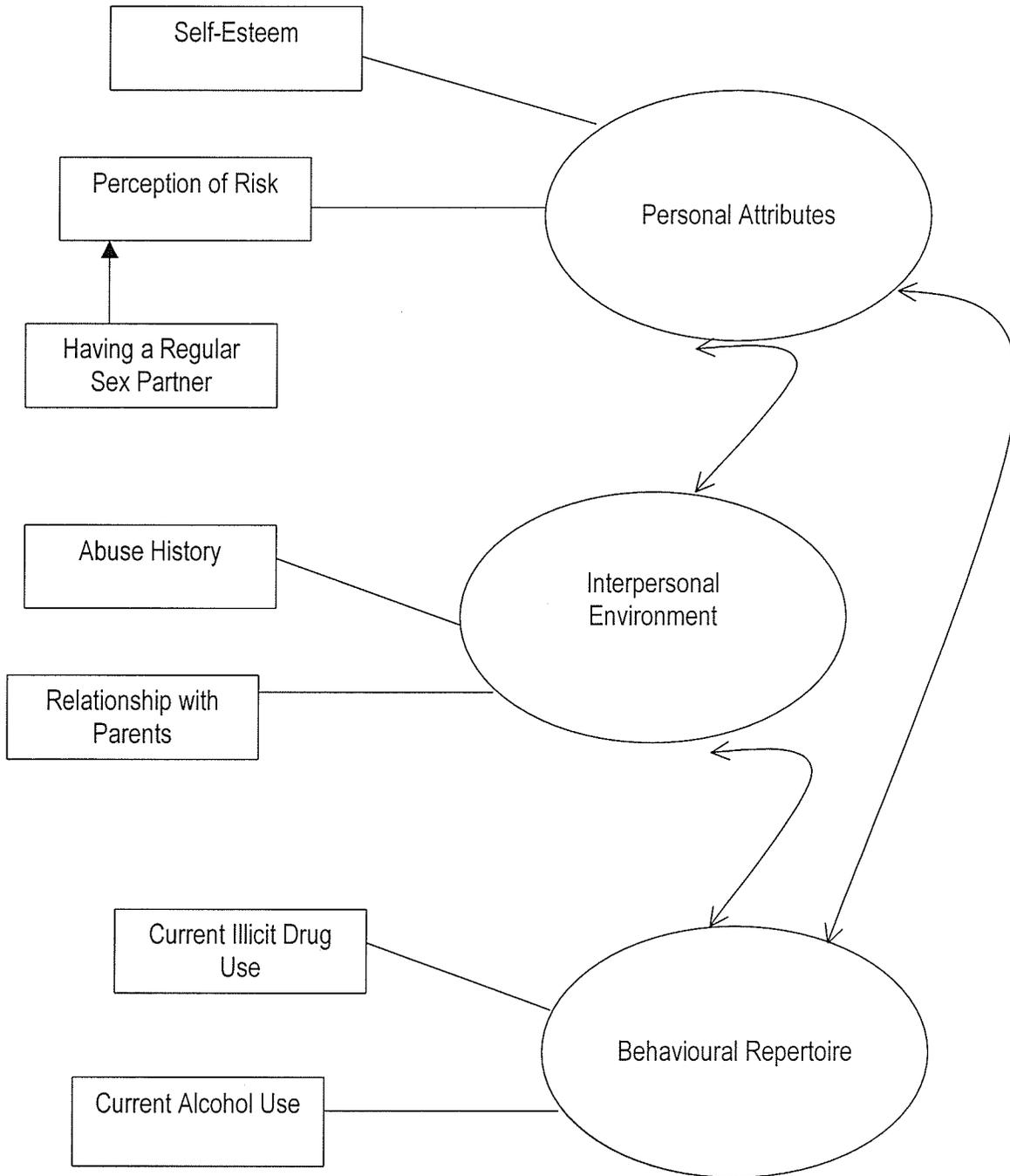
Figure 3 illustrates the theoretical model to be tested. Hypotheses 1 through 20 were tested using SEM, as per the following 3 steps:

Step 1: Descriptive Statistics. Before testing the theoretical model, descriptive statistics (i.e., mean and standard deviation) for each of the observed indicator variables and for the outcome variables were assessed and are reported in the Results section of this thesis.

Step 2: Assessing the Measurement Model. The measurement model (shown in Figure 4) was assessed for each of the latent variables using confirmatory factor analysis (Bentler, 1995; Ramirez-Valles et al., 1998). All confirmatory models were assessed using the SAS 8.2 package (SAS Institute Inc., 2001) using maximum likelihood estimation. Several indices of fit were used to evaluate the models. The goodness of fit index (GFI; Jöreskog & Sörbom, 1986) looks at the proportion of variance accounted for in the sample covariance matrix by the estimated population covariance matrix. The adjusted goodness of fit index (AGFI; Jöreskog & Sörbom, 1986) is an adjustment of the GFI for the number of parameters in the model. Both of these indices show downward biases with smaller sample sizes (Fan & Wang, 1998). The comparative fit index (CFI; Bentler, 1988) compares the hypothesized model against an independent model, and is normally between 0 and 1. Values at or greater than .90 are indicative of good fitting models (Tabachnick & Fidell, 1996), and there is little influence due to sample size effects (Fan & Wang, 1998). The root mean square error of approximation (RMSEA) assesses the amount of model misfit, and values less than .05 (Fan & Wang, 1998; Raykov, 1998) or .06 (Hu & Bentler, 1999) indicate a relatively good fit between the hypothesized model and the observed data. Accordingly, the following frequently used criteria were utilised in evaluating the adequacy of the models: GFI > .90, AGFI > .80, CFI > .90, TLI > .90, RMSEA < .06. All models had items loading on only a single factor and correlated errors were not present. Along with theoretical considerations, the deletion of hypothesized paths was assessed with the Wald tests and the inclusion of non-hypothesized paths was assessed with the Lagrange Multiplier tests (Bentler, 1995; Ramirez-Valles et al., 1998).

Figure 4

Measurement Model Assessing Psychosocial Determinants of STD Risk among Street-Involved Youth.



Step 3: Assessing the Structural Model. The relationships among the latent variables in the structural model (shown in Figure 5) were assessed using maximum likelihood estimates. The same indices as used to assess the measurement model were used to evaluate the structural model for its goodness of fit to the sample covariance matrix (i.e, chi-square values, the Goodness of Fit Index, the Adjusted Goodness of Fit Index, the Bentler Comparative Fit Index, and the RMSEA).

RESULTS

Descriptive Statistics

Mean and standard deviations are listed in Table 7 for each of the indicator and outcome variables. Statistics are reported for the entire sample, with gender and Aboriginal status reported separately in Appendices E and F, respectively. Shown in Table 7, despite being at fairly high risk of contracting an STD, 62.7% of the street-involved youth average perceive themselves as being at little or no STD risk. Additionally, the street-involved youth who have had an STD in the past do not have a higher perception of risk compared to those with no STD-positive history (for those with an STD-positive history, $X_{(n=68)}=1.0$, $std=0.91$; for those with an STD-negative history, $X_{(n=243)}=1.28$, $std=0.93$).

Overall, 45.5% of the sample cited some form of abuse (2.5% sexual, 15.7% physical, and 27.3% emotional) as one of the reasons they left home, and 7.2% cited abuse as the main reason (0.6% sexual, 3.2% physical, 3.4% emotional). As a reason for leaving home, the definition of sexual abuse was left to the participant's interpretation. In order to fully understand the sexual history of the street-involved youth, participants were directly asked if someone in their family, a relative, or person in a position of authority ever had sex with them. Almost one-quarter of the sample (23.5%, $n=75$) reported that a family member or other person in authority has had sex with them. The mean age of the first sexual encounter of this kind

Figure 5

Structural Model Assessing Psychosocial Determinants of STD Risk among Street-Involved Youth.

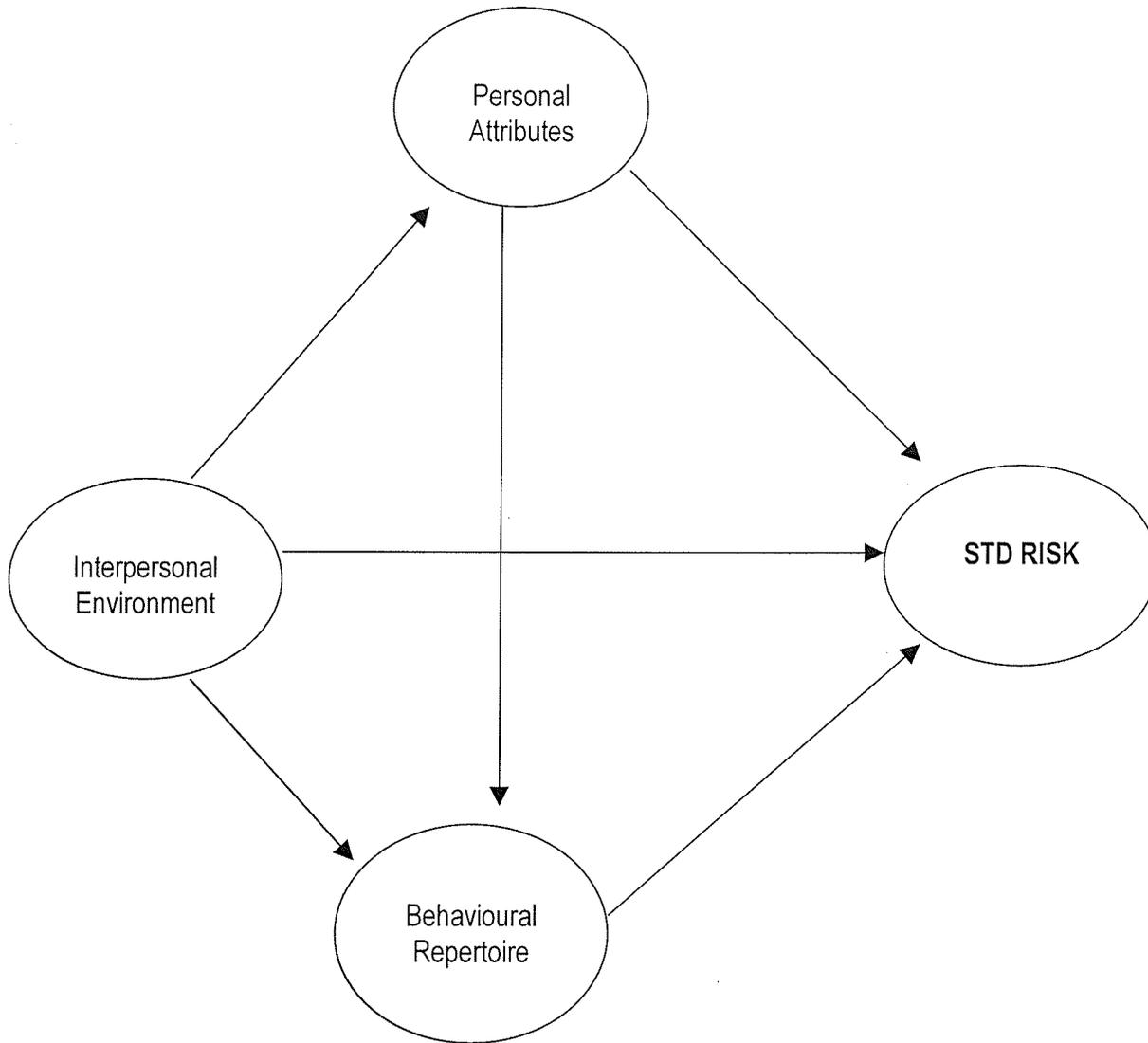


Table 7.

Descriptive Statistics of Indicator and Outcome Variables for Winnipeg Street-Involved Youth

Variable	Mean (N=319)	Standard Deviation	Theoretical Range of Values
Personal Attributes			
Self-esteem	34.6	7.6	11 – 55
Perception of Risk	1.2	0.9	0 – 3
Interpersonal Environment			
History of Abuse	0.67	0.90	0 – 3
Relationship with Parents	7.4	4.0	0 – 16
Behavioural Repertoire			
Current Illicit Drug Use	4.5	2.5	0 – 10
Current Alcohol Use	4.2	2.7	0 – 10
STD Risk			
Use of Used IDU Equipment	0.1	0.3	0 – 4
STD Status, Past and Current	0.5	0.8	0 – 11
Frequency of Condom Use	4.0	3.0	0 – 20
Number of Recent Sexual Partners	4.0	7.2	0 – 100

was $X=8.99$ years, $std=3.63$. The age of first incident was younger for females ($n=46$, $X=8.54$ years, $std=3.68$) compared to that for males ($n=26$, $X=9.65$ years, $std=3.49$). Each of the 75 youth who reported having had such a sexual encounter told the study nurse that the incident(s) had been reported to Child and Family Services (personal communiqué, Ms. Margaret Ormond, study nurse/interviewer, Health Canada, March, 2001).

As indicated by the mean value reported in Table 7, many of the study participants had some contact with at least one of the parents, and that contact was judged by the adolescent to be fairly positive. This is encouraging, given that almost two-thirds of the sample (65.2%) had established separate residence at the time of interview. Overall, the contact between the street-involved youth and their mothers seems both more frequent and more positive compared to the contact with their fathers. A detailed description of the self-reported relationship between youth and their mothers and fathers is provided in Appendix G.

As evident from the mean, alcohol consumption is regular among this sample. Indeed, 89.0% of the youth had consumed alcohol in the past 3 months. Of those who have consumed alcohol in the past 3 months, the amount and frequency of consumption is fairly heavy. Almost half of the current alcohol consumers (46.9%) consumed alcohol on a weekly basis, and 38.4% reported binge drinking on a weekly basis. A more detailed description of alcohol consumption is provided in Appendix H. Similar to alcohol consumption, almost all (98.4%) of the street-involved youth had used non-injection drugs at least once in their lives, and 79.9% had used in the last 3 months. Also similar to the amount of alcohol consumption reported, almost half of the current non-injection drug users used non-injection drugs on a weekly basis. In addition to non-injection drugs, almost one-fifth of the sample had injected drugs at least once in their lives (7.2% in the last 3 months). Appendices I and J indicate the type and amount of usage of non-injection and injection drugs, respectively. Of the 23 youths who used injection drugs in the last 3 months, 21.7% had injected with used needles or used other used equipment. Of the 62 respondents who reported having

used injection drugs at some point in their lives (but not necessarily in the last 3 months), 22.5% reported using used equipment at least some of the time.

While Table 7 reports the means for number of and condom use with all types of sexual partners together, the data allow for analysis by type of sexual partner. Appendices K and L report the type and frequency of sexual partnering and condom use by type of sexual partnering, respectively. Similar to the results of other studies, among the young people in this sample, the highest rate of condom use (i.e., uses a condom most or all of the time) was with client partners and the lowest rate was with regular sex partners.

Table 7 reports the mean score on the STD status variable. Of the 298 youth (93.4%) who consented to urine testing, 11.6% tested positive for Ct and 1.9% tested positive for Gc. Of the 272 youth (85.3%) who consented to blood testing, 4.1% tested positive for core HBV antibodies, indicating that they had contracted HBV. In order to estimate the number of youth who had been immunised against HBV, the blood samples were also screened for surface HBV antibodies. Of those who offered a blood sample, 6.6% tested positive for HBV surface antibodies. Interestingly, the youth were asked if they had ever been vaccinated against HBV, to which 92 youth answered positively. In other words, 23.2% of the street-involved youth think they have been vaccinated against HBV but, in fact, have not. In addition to current STD status, about one-fifth of the youth admitted to having had an STD in the past (mostly chlamydia, gonorrhoea, and genital warts). In summary, 66.1% (n=211) of the youth have never had an STD, 17.9% have had a past STD but did not test positive for a current one, 12.2% have not had a past STD, but tested positive for a current one, and an additional 3.8% of the youth have had a past STD and tested positive for a current one.

Assessing the Measurement Model

The measurement model was assessed for each of the latent variables using confirmatory factor analysis (Bentler, 1995; Ramirez-Valles et al., 1998), and all confirmatory models were assessed using maximum likelihood estimation. The standardised estimates for the measurement model are presented in

Table 8, and the correlation co-efficients reflecting the relationships between each of the indicator variables is presented in Table 9.

Personal Attributes Construct. As part of the personal attributes construct, self-esteem and perception of risk were expected to positively correlate. As anticipated, these two variables correlated, however not in the expected direction. Shown in Table 9, as self-esteem increases, perception of risk decreases, and this relationship is significant ($r = -0.23, p < .001$). While these two variables significantly correlated, perception of risk failed to significantly load on the personal attributes construct ($r = 0.20, n.s.$; self-esteem was used as a scalar term, that is, it was set to 1 so that perception of risk could be estimated; see Table 8). Not part of the measurement model, but suggested to be related to perception of risk, was having a regular sex partner. It was predicted that those with a regular sex partner would have a lower perception of risk compared to those who did not have a regular sex partner. Unfortunately, this item was a dichotomous variable, and there was almost no variability in the responses – 94.2% of the males and 91.1% of the females responded that they had a regular sex partner. This variable was removed from the measurement model.

The relationship between the personal attributes factors and interpersonal environment factors is also shown in Table 9. As implied by the hypothesised relationship between their constructs, self-esteem and perception of risk were expected to negatively correlate with both child abuse history and relationship to one's parents. Those who report having been a victim of child abuse (emotional, physical, and/or sexual) tended to have lower self-esteem ($r = -0.27, p < .001$). Similarly, those with a poor relationship with their parents (both quantity and quality) had lower self-esteem ($r = -0.18, p < .01$; relationship scores were reversed such that a higher score indicated a poorer relationship). Unlike self-esteem, perception of risk did not significantly correlate with either abuse history or relationship with parents. Overall, a negative relationship between the interpersonal environment and one's personal attributes negatively covaried as expected (covariance coefficient = $-0.16, p < .01$).

Table 8.

Measurement Model Estimates

Variable	Factor Loading ^a	Measurement Error ^b
Personal Attributes		
Self-esteem	.40 ^a	.92
Perception of Risk	.20	.93
Interpersonal Environment		
Relationship with Parents	.44 ^a	.90
History of Abuse	.77*	0.64
Behavioural Repertoire		
Current Illicit Drug Use	.50 ^a	.87
Current Alcohol Use	.39*	.92

* $p < .001$ ^aStandard factor loadings. First item in each construct was used as a scalar term.^bThe measurement error is from the standardised solution.

Table 9

Covariance Structure Analysis: Maximum Likelihood Estimates

	Partners	Condom	Esteem	Ever Std	Any Abuse	Perceived Risk	Relationship	Alcohol Use	Drug Use
Condom	0.22***								
Esteem	-0.24***	-0.28***							
Ever Std	0.09	0.22***	-0.02						
Any Abuse	0.22***	0.13*	-0.27***	0.23***					
Perceived Risk	0.21***	0.23***	-0.23***	-0.05	0.06				
Relationship	0.17**	0.03	-0.18**	-0.26***	0.34***	0.08			
Alcohol Use	0.14*	0.20***	-0.08	-0.06	0.04	0.21***	0.01		
Drug Use	0.07	0.10	0.03	-0.02	0.06	0.10	-0.02	0.18**	
Used IDU	0.05	0.12*	0.08	0.01	-0.01	0.12*	-0.06	0.23***	0.37***

* $p < .05$; ** $p < .01$; *** $p < .001$

Partners = Number of recent sexual partners

Condom = Current frequency of condom usage

Esteem = Self-esteem

Ever Std = STD status, past and current

Any Abuse = Abuse (physical, sexual, emotional) history

Perceived Risk = Perception of risk of contracting an STD

Relationship = Current relationship with one's parents

Alc Use = Current alcohol use, quantity and frequency

Drug Use = Current illicit drug use

Used IDU = Use of used IDU equipment

As suggested by the hypothesised relationship between their respective constructs, self-esteem and perception of risk were expected to negatively correlate with both alcohol use and illicit drug use; as self-esteem decrease and relationship with parents disintegrate, both alcohol use and illicit drug use are presumed to increase. Seen in Table 9, no such significant relationship exists between self-esteem and either alcohol use or illicit drug use, or between perception of risk and illicit drug use. There is a significant relationship between perception of risk and alcohol use. However, it is in the opposite direction from what was expected ($r = 0.21, p < .001$). Consistent with an overall lack of significance in the relationship between the indicator variables, the personal attributes construct and the behavioural repertoire construct did not covary in the measurement model (covariance coefficient = $-0.02, n.s.$).

Interpersonal Environment Construct. As part of the interpersonal environment construct, relationship with parents and history of having been abuse were expected to positively correlate. As expected, as self-reported history of being abused increases, the quality of the adolescent-parent relationship decreases ($r = 0.34, p < .001$; scores were reversed, so the resulting correlation is positive). Consistent with the factor loadings suggested in the hypothesised measurement model (Figure 4), parental relationship significantly loaded on the interpersonal environment construct ($r = 0.77, p < .001$; abuse history was used as a scalar term; see Table 8).

The relationship between the interpersonal environment factors and the behavioural repertoire factors is detailed in Table 9. As implied by the hypothesised relationship between their respective constructs, alcohol use and illicit drug use were anticipated to be positively correlated with both relationship with parents and abuse history. None of these relationships were significant. Consistent with a lack of significance in the relationship between the indicator variables, the interpersonal environment construct and the behavioural repertoire construct did not covary in the measurement model (covariance coefficient = $0.02, n.s.$).

Behavioural Repertoire Construct. As factors in the behavioural repertoire construct, alcohol use and illicit drug use were expected to positively correlate. As expected, as alcohol use increases, use of illicit drugs also increase ($r=0.18$, $p<.01$). Consistent with the factor loadings suggested in the hypothesised measurement model (Figure 4), illicit drug use significantly loaded on the behavioural repertoire construct ($r=0.39$, $p<.001$; alcohol use was used as a scalar term; see Table 8).

Overall Assessment of Measurement Model. Along with theoretical considerations, the deletion of hypothesised paths was assessed with the Wald test and the inclusion of non-hypothesised paths was assessed with the Lagrange Multiplier test (Bentler, 1995; Ramirez-Valles et al., 1998). The Wald test suggested that the measurement model would be strengthened with the removal of alcohol use from the behavioural construct. There is a substantial body of literature suggesting that among adolescents alcohol consumption is one of the strongest predictors of sexual activity generally (e.g., Harvey & Spigner, 1995), and of high risk sexual behaviour in particular (e.g., Elliott et al., 1998; Hingson et al., 1990). This path was therefore not deleted from the measurement model. There were no non-hypothesised paths that were suggested for inclusion via the Lagrange Multiplier test. Having a regular sex partner was deleted from the final measurement model because it was not significantly related to the perception of risk factor, it was not directly related to a construct, and there was not enough variability in the responses.

The measurement model as hypothesised in Figure 4 with only one deletion (removal of regular sex partner), and no additions, was assessed using three fit indices: the goodness of fit index (GFI; Jöreskog & Sörbom, 1986), the adjusted goodness of fit index (AGFI; Jöreskog & Sörbom, 1986), and the comparative fit index (CFI; Bentler, 1988). The GFI looks at the proportion of variance accounted for in the sample covariance matrix by the estimated population covariance matrix, and the standard criteria is $GFI > .90$. Using the Proc Calis procedure in SAS 8.2 (SAS Institute Inc., 2001), the GFI for the measurement model shown in Table 8 was .97. The AGFI is an adjustment of the GFI for the number of parameters in the model, and an acceptable AGFI is $> .80$. The AGFI for the measurement model was .93. The

comparative fit index compares the hypothesised model against an independent model. Bentler's CFI for this model was .89, which is just below the criteria of .90. In addition to the fit indices, the root mean square error of approximation (RMSEA) assesses the amount of model misfit; values less than .06 are considered to be indicative of good fitting models (Hu & Bentler, 1999). The RMSEA for this measurement model was .059. All models had items loading on only a single factor and correlated errors were not present. As the measurement model passed three of the four indices (the GFI, the AGFI, and the RMSEA), and came very close to the criteria for the remaining index (the CFI - .89; criteria CFI>.90), the measurement model was accepted as appropriately reflecting the sample data, and was thus accepted for inclusion in the structural model.

Assessing the Structural Model

Like the measurement model, the structural model as shown earlier in Figure 5 was assessed for each of the latent variables using confirmatory factor analysis (Bentler, 1995; Ramirez-Valles et al., 1998), and all confirmatory models were assessed using maximum likelihood estimation. Table 10 reports the standardised estimates for the hypothesised structural equation model. The correlation co-efficients reflecting the relationships between each of the indicator variables was shown earlier in Table 9. Based on their position in the structural model (Figure 5), these relationships were formally hypothesised earlier (see Hypotheses section).

STD Risk Construct. The outcome variable in the tested structural model identifies STD risk as being observed through number of recent sexual partners, frequency of condom use, frequency of using used injection drug equipment, and number of past or current sexual transmitted infections. As each of these factors increase (the condom use score is reversed), risk of having an STD was expected to also increase. Indeed, a significant and positive relationship was found between frequency of condom usage and each of the remaining three STD Risk factors: number of recent sexual partners ($r=0.22$, $p<.001$), use of used idu equipment ($r=0.12$, $p<.05$), and history of STD ($r=0.22$, $p<.001$). In other words, participants

who reported inconsistent condom usage with their sexual partners (an indicator of heightened STD risk) also tended to have more sexual partners, have a history of sexually transmitted infections, and have injected drugs with used equipment. Similar significant correlations were not observed between number of recent sexual partners, STD history, or use of used idu equipment. Factor loadings for the STD risk construct are reported in Table 10. Both condom usage and number of recent sexual partners significantly loaded on the STD risk construct, while use of used IDU equipment did not (STD status was used as a scalar term, i.e., was set to 1 so that the other observed factors could be estimated).

Personal Attributes Construct. Hypothesis 1 states that personal attributes have a negative effect on behavioural repertoire. This hypothesis was not supported by the data. Indeed, greater personal attributes was significantly associated with more negative behavioural choices (path coefficient = 0.70). The significance of this path was not tested (i.e., it was a scalar term; it was set to 1 so that the other path from personal attributes could be estimated), however, the Wald test did not select it for removal. Hypothesis 2 suggested that personal attributes also have a direct negative effect STD risk. This hypothesis was supported by the data (path coefficient = -1.31, $p < .001$).

Behavioural Repertoire Construct. Hypothesis 3 proposed that increased negative behavioural choices have a direct positive effect on STD risk. This hypothesis was also supported by the data (path coefficient = 0.57), although its significance was not tested (i.e., one path per construct was set to 1 so other paths could be estimated), however, the Wald test did not select it for removal.

Interpersonal Environment Construct. Hypothesis 4 suggested that negative interpersonal environment have a direct positive effect on the behavioural repertoire construct. This hypothesis was not supported and, in fact, the opposite was found. A more negative interpersonal environment was associated with less negative behavioural choices (path coefficient = -1.08, $p < .001$). A negative interpersonal environment was also hypothesised (Hypothesis 5) to have a direct positive effect on STD risk. This

Table 10.

STD Risk Construct Estimates

Variable	Factor Loading ^a	Measurement Error ^b
STD Risk		
STD Status	.22 ^a	.97
Use of Used IDU Equipment	-.29	.69
Number of Recent Sexual Partners	.47*	.88
Frequency of Condom Use	.55*	0.84

* $p < .001$ ^aStandard factor loadings. First item in each construct was used as a scalar term.^bThe measurement error is from the standardised solution.

hypothesis was supported by the data (path coefficient = 2.17, $p < .001$). Finally, a more negative interpersonal environment was hypothesised (Hypothesis 6) to have a direct negative effect on personal attributes. The data did not support this hypothesis. Rather, a more negative interpersonal environment was associated with poorer personal attributes (path coefficient = 1.23). The significance of this path was not tested (i.e., it was a scalar term; it was set to 1 so that the other paths from interpersonal environment could be estimated), however, the Wald test did not select it for removal.

Relationship between Observed Factors: Personal Attributes and STD Risk. One of the strengths of structural equation modelling is that the methodology allows for the assessment of the relationship between the constructs, and the relationship between the observed factors simultaneously. Implied by Hypotheses 1 through 6, each of the indicator variables in the measurement model is expected to correlate with each of the observed STD Risk factors. For example, since the personal attributes construct has a negative effect on STD risk, self-esteem and perception of risk were expected to negatively correlate with number of recent sexual partners, current frequency of condom usage, STD history, and use of used IDU equipment. Shown in Table 9, as self-esteem increases, indicating lower STD risk, condom usage also increases ($r = -0.28$, $p < .001$; correlation is negative because condom use scores were reversed) and the number of recent sexual partners decreases ($r = -0.24$, $p < .001$; both of which similarly indicate a lower STD risk. No significant relationship was found between self-esteem and either use of used IDU equipment or history of STD infection. Significant correlations were also found between perception of risk and condom usage and between perception of risk and number of sexual partners, however in the opposite direction from what was expected. The lower one's perception of risk for contracting an STD, the more likely one was to use condoms frequently ($r = 0.23$, $p < .001$) and to have fewer sexual partners ($r = 0.21$, $p < .001$), both of which would lower one's risk of contracting an STD. In apparent contradiction, perception of risk did

have a negative relationship with use of used IDU equipment ($r = 0.12, p < .05$). No significant relationship was found between perception of risk and history of STD infection.

Relationship between Observed Factors: Interpersonal Environment and STD Risk. As the interpersonal environment construct was found to have a positive influence on STD risk, abuse history and the quality of the adolescent-parent relationship were expected to positively correlate with number of recent sexual partners, current frequency of condom usage, STD history, and use of used IDU equipment. Indeed, as abuse history increased, suggesting greater STD risk, three of the four STD risk factors also increased: condom usage dropped ($r = 0.13, p < .05$); number of recent sexual partners increased ($r = 0.22, p < .001$); and number of sexually transmitted infections rose ($r = 0.23, p < .05$). No significant relationship was found between abuse history and use of used IDU equipment. Similarly, as adolescents reported a more strained or infrequent relationship with their parents, number of recent sexual partners also increased ($r = 0.17, p < .01$). A significant relationship between relationship with parents and history of STDs was also found, however, in the opposite direction from what was anticipated. Participants reporting a more strained or infrequent relationship with their parents reported fewer sexually transmitted infections ($r = -0.26, p < .001$). There was no significant relationship between relationship with parents and either condom use or use of used IDU equipment.

Relationship between Observed Factors: Behavioural Repertoire and STD Risk. Because the behavioural repertoire construct was found to have a positive influence on STD risk, alcohol and illicit drug use was expected to positively correlate with number of recent sexual partners, current frequency of condom usage, STD history, and use of used IDU equipment. Indeed, as alcohol consumption (both binge and frequency) increased, suggesting greater STD risk, three of the four STD risk factors also increased: condom usage dropped ($r = 0.20, p < .001$); number of recent sexual partners increased ($r = 0.14, p < .05$); and frequency of using used IDU equipment rose ($r = 0.23, p < .001$). No significant relationship was found between alcohol use and STD status. Unlike the positive associations seen with alcohol use, illicit drug use

significantly correlated only with use of used IDU equipment ($r = 0.37, p < .001$). No significant relationship was found between illicit drug use and STD status, frequency of condom usage, or number of recent sexual partners.

Overall Assessment of the Structural Model. Along with theoretical considerations, the deletion of hypothesised paths was assessed with the Wald tests and the inclusion of non-hypothesised paths was assessed with the Lagrange Multiplier tests (Bentler, 1995; Ramirez-Valles et al., 1998). There were no hypothesised paths that were suggested for removal via the Wald test. The Lagrange Multiplier test suggested a strengthened structural model with the inclusion of a direct path from the STD risk construct to perceived risk, whereby increases in perception of risk are associated with increases in STD risk. Originally, perception of risk was hypothesised to have a negative correlation with STD risk, following the belief that those who perceive their STD risk as low are less likely to take precautions against infection and engage in more sexually risky behaviours. However, perception of risk was found to be negatively correlated with self-esteem, and positively correlated with number of recent sexual partners, infrequent of condoms, and use of used IDU equipment; all of which indicate an increased risk of contracting an STD. These relationships suggest that perhaps perception of risk is actually an accurate reflection of one's STD risk, rather than a negative determinant. A path from STD risk to perception of risk was thus added to the final model (path coefficient = .58, $p < .001$).

The Lagrange Multiplier test also suggested a strengthened structural model with the inclusion of a direct path from the behavioural repertoire construct to use of used IDU equipment, suggesting that injection drug use behaviours should be considered as part of one's behavioural repertoire, in addition to defining one's STD risk. Since using used injection drug equipment is clearly a behaviour, and strongly correlated with both alcohol and illicit drug use (reflected in Table 9), this path was also added to the final model (path coefficient = .84, $p < .001$). Figure 6 depicts the final structural model with the inclusion of a

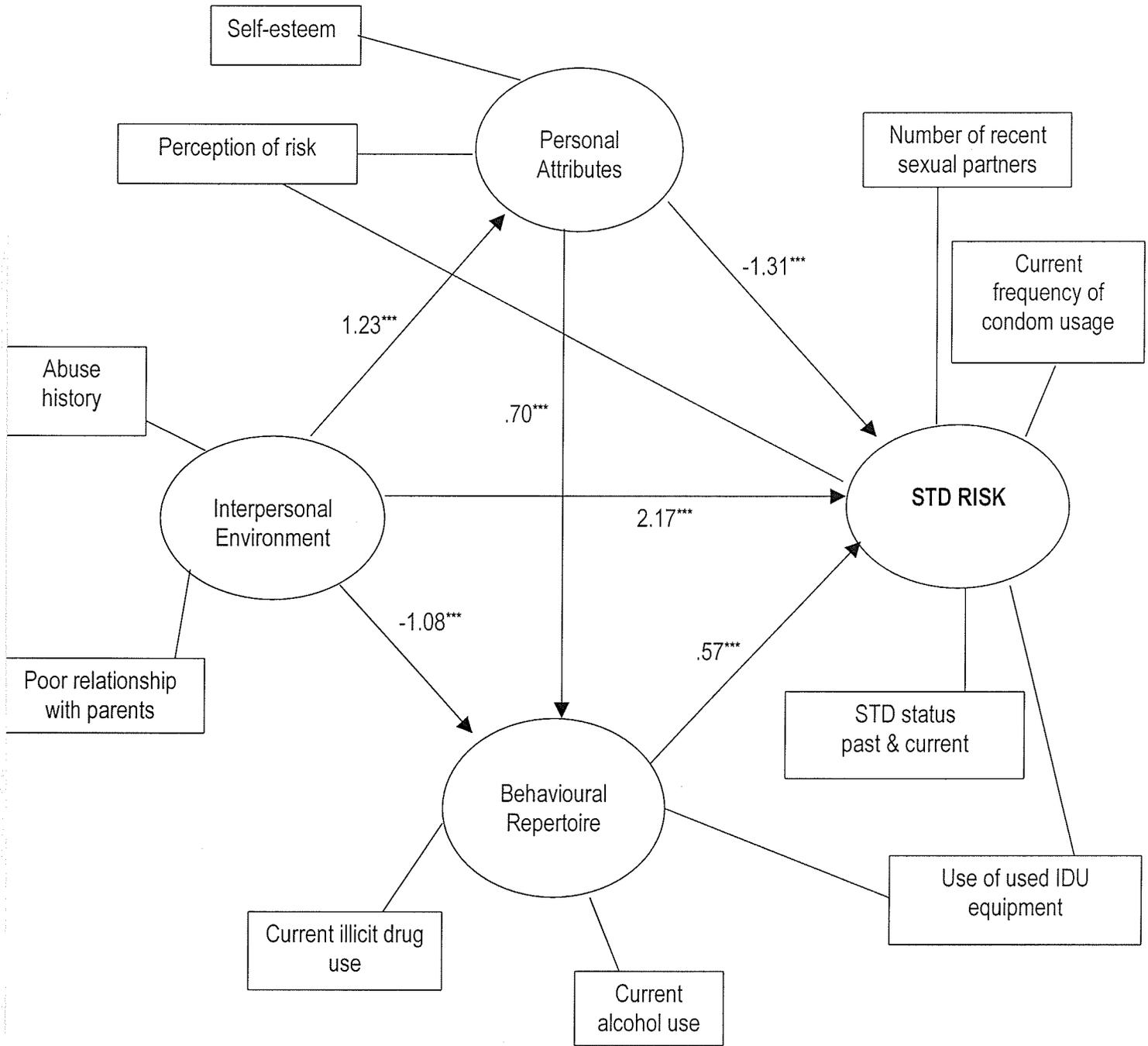
path from STD risk to perception of risk and a path from behavioural repertoire to use of used IDU equipment.

Like the measurement model, the final structural model shown in Figure 6 was assessed using the goodness of fit index (GFI; Jöreskog & Sörbom, 1986), the adjusted goodness of fit index (AGFI; Jöreskog & Sörbom, 1986), the comparative fit index (CFI; Bentler, 1988), and the root mean square error of approximation (RMSEA; Hu & Bentler, 1999). The criteria used to assess the model was: GFI > .90, AGFI > .80, CFI > .90, RMSEA < .06. The modified model (Figure 6) fit the data well. The goodness of fit index was 0.96, the adjusted goodness of fit index was 0.93, Bentler's comparative fit index was 0.88, and the RMSEA was 0.058.

Assessment of the Gender and/or Ethnicity Differences in the Structural Model. In addition to the formal objectives of the study, potential gender and ethnic differences in the determinants proposed in the model. As were reported earlier, there were some gender differences, mostly in the expected direction: males had greater self-esteem; females reported more child abuse, more sex partners and more condom usage (both likely related to involvement in sex trade work), and greater history of STDs (see Appendix E). There were also some ethnic differences: non-Aboriginal youth had higher self-esteem scores, and reported more illicit drug and alcohol use, and greater use of used IDU equipment (a function of more illicit drug use); while Aboriginal youth reported a greater number of recent sex partners (see Appendix F). Given the presence of gender and ethnic differences, the final structural model was re-run separately for males and females, and separately for Aboriginal and non-Aboriginal youth. As expected, while gender and ethnic differences may exist for the degree to which certain groups exhibit certain traits, the way those characteristics interact is essentially the same. Appendices M through P show the latent variable equations with standardised estimates for each of the paths identified in the structural model for males, females, non-Aboriginal, and Aboriginal youth, respectively. The structural model, while supported for each sub-sample, is strongest for males and Aboriginal youth.

Figure 6

Final Structural Model of Psychosocial Determinants of STD Risk among Street-Involved Youth.



***p<.001

DISCUSSION

The current study proposed, tested, and replicated a multi-component model of the determinants of STD risk among street-involved youth in Winnipeg. Overall, the hypothesised model was supported by the data and determined to be a good fit. Specifically, the data supported a model of STD risk that included personal attributes, interpersonal environment, and behavioural repertoire. Traditionally, STD risk has been determined by condom use and rate of partner change. This study demonstrated that in addition to these proximate factors, broader determinants of risk are important and should be considered. In particular, possessing poor personal attributes, having a unhealthy interpersonal environment, and making poor behavioural choices are associated with an increased risk of contracting a sexually transmitted disease.

Methodological Issues

In addition to quantifying the influence of each indicator construct on STD risk, analysing these data using structural equation modelling also allows for an understanding of the influence of specific observed variables and their impact on the relationship between the constructs. For example, the results confirm that STD risk is, in part, indicated by proximal determinants such as number of recent sexual partners, condom usage, and history of sexually transmitted infections. However, the appropriateness of placing use of used IDU equipment under the rubric of STD risk was not supported. While using used IDU equipment places one at risk for contracting HIV, hepatitis B, and hepatitis C, these results suggested that this variable may be better included in the behavioural repertoire construct. Indeed, of all the factors included in the model, only alcohol and illicit drug use, both of which are in the behavioural repertoire construct, correlated with sharing of injection drug equipment.

A second methodological issue relates to the personal attributes construct. Two personal level attributions were tested in this model: self-esteem and perception of risk. Participants with low self-esteem scores had elevated STD risk, as identified through poorer condom usage and more sexual partners,

compared to those with high self-esteem scores. Similarly, perception of risk correlated with condom usage and number of sexual partners, but not with IDU behaviour or STD history. Contrary to expectation, however, the relationship between perception of risk and STD risk for this sample was negative. This contradicts previous research that found that high-risk individuals may assess their STD risk as low and, thus, be more careless and engage in riskier behaviour (e.g., poorer condom use, greater number of sexual partners). Another interesting finding in this study was that perception of risk failed to significantly load on the personal attributes construct, but did significantly load on the STD risk construct. The positive correlation between perception of risk and STD risk suggests that perhaps STD risk-associated behaviours are influencing perception of risk (not the other way around). In this way, as condom use becomes more infrequent and number sexual partners increases, perception of risk (accurately) increases. In other words, the results of this study suggest that perception of STD risk appears to be an accurate reflection, rather than a determinant, of participant's actual STD risk.

The personal attributes construct was hypothesised to have a negative influence on behavioural repertoire, whereby a strong sense of self-worth and high perception of risk would correspond with a decrease in alcohol and drug use. This relationship was in fact the reverse, whereby presumably more positive personal attributes were associated with poorer behavioural choices. If perception of risk can be conceived of as an accurate reflection of one's risky lifestyle, then it would make sense for perception of risk to positively correlate with alcohol and drug use. Indeed, perception of risk and alcohol use did positively correlate, and perhaps it is this correlation that is driving the positive influence between personal attributes and behavioural repertoire (the correlation between self-esteem and either of the two behavioural repertoire variables was not significant). The measurement of self-esteem may also be influencing the impact of the personal attributes construct on the behavioural repertoire construct. The self-esteem measurement tool used was originally developed for the Canada Youth and AIDS Study (Health Canada, 1988) and was chosen in this study for comparison purposes. This tool was pilot tested on a cohort of

street-involved youth, however, the average Cronbach's alpha was only .67 (minimum requirement is usually .65; King et al., 1991). A comparison of this scale to other, more traditional, tools may need to be conducted to ascertain its validity with street youth samples. Another possible reason for the lack of significant relationship between the personal construct and the behavioural construct may be related to power for those engaged in illicit drug use. There was a relatively small number of individuals reporting injection drug use, and many of these were not frequent users, as would be expected in such a young population.

Another methodological issue relates to the interpersonal environment construct. Two characteristics of one's interpersonal environment were also tested: history of child abuse and relationship with parents. Participants who report having been emotionally, physically, and/or sexually abused as a child had elevated STD risk, as identified through poorer condom usage, more sexual partners, and history of having sexually transmitted infections compared to those with no such history of abuse. History of abuse however did not correlate with the sharing of injection drug equipment. This may be related to the finding that sharing of IDU equipment may be a poor predictor of STD risk, as noted earlier. Participants who reported infrequent and unsatisfactory contact with one or both parents also had a greater STD risk, but only via the number of sexual partners. Relationship with parents did not correlate with condom usage, IDU behaviour, or STD history. Similar to self-esteem, this may be related to how relationship with parents was ascertained in the study. This item was designed to assess both frequency and quality of contact between youth and their parents, however with no standard in the literature, the validity of this item is uncertain.

While the structural model did support the inclusion of the interpersonal environment construct as a determinant of STD risk, the hypothesised relationship between the interpersonal environment and the other two psychosocial constructs (personal attributes and behavioural repertoire) was not supported. A poor interpersonal environment was hypothesised to be associated with poorer personal attributes,

however the opposite was found. Again, as perception of risk was found to be likely an accurate reflection of one's STD risk, the inclusion of this variable in the personal attributes construct may be distorting the overall relationship between the constructs. Having a poor interpersonal environment was also hypothesised to be associated with poorer behavioural choices (i.e., alcohol and illicit drug use). However this relationship was also in the opposite direction. This unexpected relationship is difficult to interpret, as a positive relationship between the constructs is supported in the literature and analysis of the measurement model supported their inclusion in the final model. As discussed below (see Implications for Future Research), perhaps there are some valuable observed variables that could be added to the model (such as the influence of peers) that may strengthen the relationships between the constructs and, thus, further strengthen the final model.

Implications for Future Research

As is the case with most studies involving complex relationships between multiple factors, the current study raises more questions than it answers. For example, the high proportion of the street-youth sample that self-identified as Aboriginal suggests that future analysis could focus on prevention specifically targeted to First Nations youth. This may also include a social-geographic analysis of sexual and/or drug networks between First Nations communities and Winnipeg. One question raised here is whether youth are a conduit for STD in selected reserves.

The fact that the three indicator constructs influenced STD risk in expected ways is encouraging; however, the fact that the relationship between the three are opposite to the hypothesised relationships raises the question of operationalisation. It is possible that the observed factors that defined personal attributes, interpersonal environment, and behavioural repertoire need to be expanded. For example, this study observed the interpersonal environment via abuse history and quality of adolescent-parent relationship. However, variability in the developmental age at which child abuse may have occurred may influence the impact of that abuse upon the other constructs. Additionally, although the quality of parent-

child relationship was analysed, the impact of other significant relationships, such as between siblings or one's peer group has not been addressed in these data. Another question that arises is the role of gangs in maintaining STD in a population via their support of prostitution and drug addiction. Similarly, the Winnipeg Injection Drug Epidemiology study (Elliott et al., 1999) found that a disturbing number of both male and female prostitutes who use injection drugs were paid more if they did not use a condom. Thus, in the context of sex as a form of employment income, perhaps another important aspect of one's interpersonal environment is the interpersonal pressure to engage in high STD-risk behaviours.

The presence of other personal characteristics that were not assessed may also explain the counterintuitive relationship between personal attributes and the other constructs. For example, self-efficacy, or the perceived ability to accomplish certain tasks (Bandura, 1991), has been suggested as an important personal attribute in other studies looking at non-sexual risky behaviours (e.g., Bryan, Aiken, & West, 1997; Hobfoll, Jackson, Lavin, Britton, & Shepherd, 1994). The significant finding in the current study regarding self-esteem and STD risk may be related to a sense of control over the sexual encounter, that is, having the behavioural and negotiation skills necessary to facilitate condom use. However, the development of a valid measurement of self-efficacy that could address such a complex behaviour such as negotiating condom use is still evolving, and likely needs to be modified depending on the population in question (see Murphy et al., 2001 for a review of the issues involved in assessing self-efficacy as it relates to STD).

Implications for Prevention

Notwithstanding the formal objectives of the current study, the broader goals of this study were (a) to employ a robust methodology to put high STD rates into a psychosocial context; and (b) to encourage the use of enhanced surveillance to focus a public health response. These goals were achieved through the use of structural equation modelling that supported the theory that STD transmission among a high-risk

group could be framed as result of a combination of personal, interpersonal, and behavioural variables, each of which may present opportunities for targeted prevention and control efforts.

Developing effective interventions that assist persons in changing high-risk sexual behaviour practices requires the identification of factors that contribute to risk. As each of the constructs examined in this study may present opportunities for targeted prevention and control efforts, one of the public health uses of these results could be to examine their inclusion in STD control strategies that target high risk youth. For example, as self-esteem was related to many of the STD risk factors, greater efforts to institutionalise self-esteem should be made. Further, if self-esteem is related to a sense of control over the sexual encounter, then perhaps the teaching of negotiation skills and the boosting of self-confidence to use those skills could enhance self-esteem and, both directly and indirectly, lower STD risk. Another avenue for public health intervention given the current findings is in the area of child abuse. Clearly considerable interpersonal, social, and psychological resources need to be provided to children and youth who have been victimised. Anecdotally, many of the street youth reported a common theme of having been discarded by everybody – first their families, then school, social services, and finally society in general.

The finding that the quality of the child-parent relationship was related to STD history raises the question of whether this and other significant relationships in the lives of high risk youth could be used as a conduit for STD education, skills training, or self-esteem building. Similarly, as alcohol and illicit drug use related to STD risk, perhaps a component of street outreach programmes that target the sexual practices of youth can widen their services to include alcohol and drug related issues, such as prevention, treatment, and harm reduction.

As young people often have high STD incidence rates, protecting youth is key to stemming the epidemic of STD in Manitoba. In Manitoba, the evolution of STD in the province have undoubtedly been influenced by a number of diverse factors, including the changing socioeconomic and demographic characteristics of the population, altered patterns of risk behaviours, emerging social and sexual networks,

and the introduction of various disease prevention and control activities (Elliott, Blanchard, Beaudoin, Green, Nowicki, Matusko, & Moses, 2002). As STDs evolve in the province, there is a need to respond both to the changing phases of the epidemics, and to the specific underlying and proximate determinants that help to maintain relatively high rates in core populations (Elliott et al., 2002; Wasserheit & Aral, 1996). In 1998 the rate of reported chlamydia cases in Manitoba was more than twice the national average (275 vs 130 per 100,000) and the rate of reported gonorrhoea cases in Manitoba was three times the national average (54 vs 17 per 100,000) (Elliott et al., 2002). While both gonorrhoea and chlamydia have declined since the early 1990s, the recent halt in the declining incidence of infections and subsequent rise in incidence rates suggests that new control strategies are required. There is a need to focus efforts in populations of the province, such as street youth, where rates are the highest and previous progress has been halted (Elliott et al., 2002; Jha, Nagelkerke, Ngugi, Prasada Rao, Willbond, Moses, & Plummer, 2001).

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Appendix A

Enhanced STD Surveillance in Canadian Street Youth

Information and Verbal Consent Form



ENHANCED SEXUALLY TRANSMITTED DISEASE (STD) SURVEILLANCE IN CANADIAN STREET YOUTH

Information and Verbal Consent Form

We are currently conducting a study on sexually transmitted diseases in Winnipeg, looking at what factors place people at risk of getting these diseases. Understanding such factors will help us to prevent these important diseases and to provide better health services. Similar studies are being conducted in other Canadian cities. 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 that you may require from any source. If you agree to participate, you will be asked by the study nurse to answer questions about yourself, your family, your sexual behaviour, and your history of certain risk factors such as medical procedures, injection drug and alcohol use. Some of the questions are of a very personal nature, and you may refuse to answer any questions at any time. The study nurse is willing to discuss any issues of concern during the interview or later on during the course of the study.

After the interview, you will then be asked to provide a urine sample, which will be tested for the presence of gonorrhoea and chlamydia infection, two common sexually transmitted diseases. However, you may decline to provide a urine specimen if you do not wish to, and this will **not** influence your access to any services that you may require from any source. You will also be asked to provide a blood sample, which will be tested for hepatitis B, an infection which causes damage to the liver. Again, you may decline to provide a blood sample if you do not wish to, and this will **not** influence your access to any services that you may require from any source.

We will also wish to take a second blood sample from you, and to store the blood for up to 10 years to perform other laboratory tests, looking for other kinds of infections. These are HTLV-1 infection, hepatitis G, hepatitis C infection, HIV infection, and herpes simplex types 1 and 2 infection. We will **not** be looking for markers of drugs of any kind. This testing will be done anonymously. Your name will **not** be attached to your blood sample, so there will be no way of linking the results of the blood tests to you, and you will not be informed of these results. If for any reason you do not wish your blood to be taken and tested for one or more of these infections, you may again decline to provide the blood sample. Whether you provide the sample or not, if it is felt that you may be at risk for one or more of these infections, the study nurse will refer you to a health clinic for appropriate follow-up.

You will then be asked to make a return appointment, where you will be given the results of the gonorrhoea, chlamydia and hepatitis B tests. If you are found to have gonorrhoea or chlamydia infection, you will be offered effective treatment to cure you of the infection, at no charge. If you are found to have hepatitis B infection, you will be referred for appropriate treatment, also free of charge. If you do not have, and have never had hepatitis B infection, you will be referred to a clinic where you will be offered immunization against hepatitis B, again free of charge. If you are found to have any one of these infections, no report will be made to the Public Health Department. However, you will be advised to go to a health clinic where you can obtain more information and advice, and provide information about your sexual partners, so that they may be offered appropriate treatment as well.

The general benefit that you will receive from this study is that the information we learn will help us to provide better health services. You will also benefit specifically with treatment for gonorrhoea and/or chlamydia, should you have one of these infections, as well as referral for care for hepatitis B, should you have hepatitis B, or hepatitis B vaccination, should you not have hepatitis B. In addition, as indicated above, if you require any additional advice or counselling while you are completing the questionnaire or providing blood or urine samples, or subsequently during the course of the study, the study nurse will provide it.

Your participation is expected to last between 30 and 45 minutes for the first visit, and about 10-15 minutes for the return appointment. We will give you \$10.00 in appreciation of the time you have taken to help us.

All of the above information will remain strictly confidential. **NO** identifying information will be used in the analysis of data from the study. All information, including history of risk factors and test results, will be entered into this study using a code, such as "case 1" or "case 213".

Do you have any questions about this study?

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

Name or alias of the person interviewed _____

Name of Interviewer _____

Signature of Interviewer _____

Time of Interview (e.g. 13:45) _____ Date of Interview (dd/mm/yyyy) ____/____/____

Appendix B

Enhanced STD Surveillance in Canadian Street Youth Questionnaire

Female Version

Enhanced STD Surveillance In Canadian Street Youth

Questionnaire

Female Version

Phase II

Section One

Subject information sheet. Please ensure all study numbers are the same on the questionnaire as they are on the urine &/or sera containers.

Date of Interview _____

Interviewer _____

Location Of Interview _____

Location of Recruitment _____

Identification Number _____

1. Urine Collected?

no

yes → Test Results

Positive?

Treated?

Chlamydia →

no

no

yes

yes

Gonorrhea →

no

no

yes

yes

2. Blood Collected for Hepatitis B?

no

yes

3. Permission for blood storage granted?

no

yes → Tested to be run on stored blood

ALL TESTS LISTED BELOW

HIV

HTLV

Hepatitis C

Hepatitis G

HSV-1 & HSV-2

Section Two

I would like to start off by asking you some questions regarding your background.

1. Where were you born?

1 in Canada Which city and province? (specify) _____

2 outside Canada Which country? (specify) _____

2. How long have you been in (city were interview taking place)?

- 0 always lived in this city → go to question 4
1 I'm only passing through
2 for less than 3 months
3 for more than 3 months but less than 6 months → go to question 4
4 for more than 6 months but less then 1 year → go to question 4
5 other → (specify) _____

3. In the last three months, in which city did you live the longest ?

(specify) _____

4. What ethnic origin do you consider yourself to be?

(specify) _____

5. Have you ever . . .

	0-no	1-yes
had a social worker	<input type="checkbox"/>	<input type="checkbox"/>
been in a foster home	<input type="checkbox"/>	<input type="checkbox"/>
been in a group home	<input type="checkbox"/>	<input type="checkbox"/>
had a probation / parole officer	<input type="checkbox"/>	<input type="checkbox"/>

6a. Are you living with your parent(s) / caregiver (s)? (Ask the youth not to refer to their street mom or dad when responding to this question)

1 yes, living with parent(s) / caregiver (s) → go to question 7a

0 no, no longer living with parent(s) / caregiver(s) → 6b. Since when?

(specify) _____

6c. Why did you leave home?

Check all that apply

1 - yes

- | | | |
|----|---|--------------------------|
| 1 | fighting/arguing with your parent(s) / caregiver(s) | <input type="checkbox"/> |
| 2 | independence | <input type="checkbox"/> |
| 3 | moved to go to school | <input type="checkbox"/> |
| 4 | sexual abuse | <input type="checkbox"/> |
| 5 | too many rules | <input type="checkbox"/> |
| 6 | taken away by Social Services / Children's Aid | <input type="checkbox"/> |
| 7 | trouble with the law | <input type="checkbox"/> |
| 8 | physical abuse | <input type="checkbox"/> |
| 9 | parent(s) 's / caregiver(s) 's alcohol/ drug use | <input type="checkbox"/> |
| 10 | being thrown out | <input type="checkbox"/> |
| 11 | your drug / alcohol use | <input type="checkbox"/> |
| 12 | emotional abuse | <input type="checkbox"/> |
| 13 | other (specify): _____ | <input type="checkbox"/> |

6d. What was the main reason for leaving ?

(Write the corresponding number from 6c) _____

7a. Are you currently living with no permanent home?

no → 7b. Is it because:

- living with parent(s) / caregiver(s)
- living with friend/boyfriend/girlfriend
- have your own apartment/house
- on the road travelling
- other → (specify) _____

→ go to question 8a

yes → 7c. How long have you been living with no permanent home?

- a few days, but less than a week
- a few weeks, but less than a month
- a few months, but less than a year
- more than one year, but less than 5 years
- other → (specify) _____

7d. How long do you intend to be with no permanent home?

- no plan at all
- a few more days, but less than a week
- a few more weeks, but less than a month
- a few months, but less than a year
- more than one year but less than 5 years
- never plan to get off the streets
- don't know

7e. Are you uncomfortable with your current living situation?

no → go to question 8a

yes → 7f. What do you see as stopping you from getting a permanent home?

Check all that apply

- 0 lack of money
- 1 drug dependance
- 2 fear of losing friends
- 3 don't know where to get help
- 4 no services to help me off the street
- 5 pimp, involved in commercial sex
- 6 sense of freedom
- 7 other (*specify*): _____
- 79 don't know

→ 7g. What is the main reason you see as stopping you from getting a permanent home?

(Write the corresponding number from 7f) _____

Section Three

I would like to ask you now about your relationship with your caregivers and a bit about school.

8a. In the last three months, were you in contact with your mother or female caregiver? (*Ask the youth not to refer to their street mom when responding to this question*)

no → go to question 9a

does not have a mother figure or mother is dead → go to question 9a

yes → 8b. How often were you in touch with her ?

regularly, once or more a week

occasionally, not every week

very irregularly

→ 8c. In general, would you say that these contacts were . . .

very good

good

average

bad

very bad

9a. In the last three months, were you in contact with your father or male caregiver? (*Ask the youth not to refer to their street dad when responding to this question*)

no → go to question 10

does not have a father figure or father is dead → go to question 10

yes → 9b. How often were you in touch with him ?

regularly, once or more a week

occasionally, not every week

very irregularly

→ 9c. In general, would you say that these contacts were . . .

very good

good

average

bad

very bad

10. What is your birth date ?

____/____/____
Day Month Year

11a. Are you currently registered for school?

no →

11b. Is it because . . . (Give all choices)

- you finished school
- you dropped out of school
- you were kicked out of school
- other (specify) _____

→ go to question 11c

yes → go to question 11c

yes, but has not started yet → go to question 11c

→ 11c. What level are you at ? (Ask the youth to answer the following question referring to the period when she was in school in the last three months. Give all choices. If she is at two different levels, mark the lowest level.)

- primary school
- secondary
- trade school or training program
- college
- university
- other (specify) _____

12. What is the closest intersection to where you "hang-out" most often?

(specify) _____

refused

13. Have you ever been to a detention facility, youth detention centre, prison or jail, overnight or longer ?

- no
- yes
- refused

14a. In the last three months, how did you get the money you live on ? I will give you some possible sources of income. (read and check all answers that apply)

	0-no	1=yes
1 social welfare	<input type="checkbox"/>	<input type="checkbox"/>
2 employment insurance or U.I.C.	<input type="checkbox"/>	<input type="checkbox"/>
3 occasional work (small contracts every now and then)	<input type="checkbox"/>	<input type="checkbox"/>
4 regular work (part-time or full-time)	<input type="checkbox"/>	<input type="checkbox"/>
5 money from my family	<input type="checkbox"/>	<input type="checkbox"/>
6 money from friends	<input type="checkbox"/>	<input type="checkbox"/>
7 prostitution	<input type="checkbox"/>	<input type="checkbox"/>
8 stealing	<input type="checkbox"/>	<input type="checkbox"/>
9 selling drugs or doing drug runs	<input type="checkbox"/>	<input type="checkbox"/>
10 panhandling	<input type="checkbox"/>	<input type="checkbox"/>
11 money from a youth centre or from a social worker	<input type="checkbox"/>	<input type="checkbox"/>
12 squeegee	<input type="checkbox"/>	<input type="checkbox"/>
13 other (specify): _____	<input type="checkbox"/>	<input type="checkbox"/>

14b. In the last three months, what was your principal source of income ? (write the corresponding number) _____

Section Four

I would like to ask you some questions on drugs and alcohol. We ask these questions to everyone, even those who do not drink or take drugs.

15a. Have you used alcohol in the last three months?

no, never used alcohol (except for possibly religious reasons)

no, quit in the last three months

yes → 15b. How would you classify your alcohol use in the last three months?

a nondrinker

once in awhile → less than once a month

occasionally → 1-3 times a month

frequently → 1-3 times a week

regularly → 4-6 times a week

habitually → everyday

→ 15c. The times that you consume alcohol, do you binge drink?

once in awhile → less than once a month

occasionally → 1-3 times a month

frequently → 1-3 times a week

regularly → 4-6 times a week

habitually → everyday

16a. Do you currently smoke cigarettes?

never

occasionally →

everyday →

16b. On average, how many cigarettes do you smoke, including shared cigarettes, in a day?

_____ cigarettes

17a. Since your birth, would you say that your father or the person you consider as your father is now having or has ever had . . . (Ask the youth not to refer to their street dad when responding to this question)

does not have a father figure → go to question 18a

a nondrinker

a drink once in awhile → less than once a month

a drink occasionally → 1-3 times a month

a drink frequently → 1-3 times a week

a drink regularly → 4-6 times a week

a drink habitually → everyday

17b. Since your birth, would you say that your father or the person you consider as your father is now using or has ever used . . . (Ask the youth not to refer to their street dad when responding to this question)

- 0 is a non drug user → go to question 18a
- 1 drugs once in awhile → less than once a month
- 2 drugs occasionally → 1-3 times a month
- 3 drugs frequently → 1-3 times a week
- 4 drugs regularly → 4-6 times a week
- 5 drugs habitually → drug use everyday

17c. Has he ever injected drugs?

- 0 no
- 1 yes
- 79 don't know

18a. Since your birth, would you say that your mother or the person you consider as your mother is now having or has ever had . . . (Ask the youth not to refer to their street mom when responding to this question)

- 99 does not have a mother figure → go to question 19a
- 0 is a nondrinker
- 1 a drink once in awhile → less than once a month
- 2 a drink occasionally → 1-3 times a month
- 3 a drink frequently → 1-3 times a week
- 4 a drink regularly → 4-6 times a week
- 5 a drink habitually → everyday

18b. Since your birth, would you say that your mother or the person you consider as your mother is now using or has ever used . . . (Ask the youth not to refer to their street mom when responding to this question)

- 0 is a non drug user → go to question 19a
- 1 drugs once in awhile → less than once a month
- 2 drugs occasionally → 1-3 times a month
- 3 drugs frequently → 1-3 times a week
- 4 drugs regularly → 4-6 times a week
- 5 drugs habitually → drug use everyday

18c. Has she ever injected drugs?

- 0 no
- 1 yes
- 79 don't know

Please note the next set of questions does not include tobacco, alcohol or prescription drugs in its definition of drugs.

19a. In your life, have you ever taken any drugs at least once, WITHOUT injecting (or being injected) in your veins or under your skin ?

- no
- yes

19b. In the last three months, in terms of non injection drugs, did you do more, about the same, less or quit?

- 3 more
- 2 about the same
- 1 less
- 0 quit

→ 19c. Since when? (specify) _____

→ 19d. Did you go through drug treatment to quit non injection drugs?

- no
- yes → Go to question 19 g

19e. Which drug did you take the most often in the last three months, WITHOUT injecting ?

(specify) _____

19f. In a typical week, how often do you take drugs WITHOUT injecting?

(specify) _____

19g. In your life, have you ever injected or been injected at least once with drugs in your veins or under your skin (make a fix or to shoot yourself up) ?

no → Go to question 20

yes → 19h. How old were you the first time you injected drugs ?

_____ years old

19i. In the last three months, in terms of injecting drugs, did you do more, about the same, less or quit?

- 3 more
- 2 about the same
- 1 less
- 0 quit

→ 19j. Since when? (specify) _____

→ 19k. Did you go through drug treatment to quit injecting drugs?

- no
- yes → Go to question 19 q

19l. When using needles or other drug equipment, would you say you use clean equipment . . .

- 3 all of the time
- 2 most of the time
- 1 some of the time
- 0 never

19m. In the last three months, what drug did you inject ? (read and check all choices)

- | | 0-no | 1-yes | |
|-----------------|--------------------------|--------------------------|-----------------|
| 1 cocaine, coke | <input type="checkbox"/> | <input type="checkbox"/> | |
| 2 heroin | <input type="checkbox"/> | <input type="checkbox"/> | |
| 3 speed ball | <input type="checkbox"/> | <input type="checkbox"/> | (specify) _____ |
| 4 PCP | <input type="checkbox"/> | <input type="checkbox"/> | |
| 5 alcohol | <input type="checkbox"/> | <input type="checkbox"/> | |
| 6 other | <input type="checkbox"/> | <input type="checkbox"/> | (specify) _____ |

19n. Which drug did you inject the most often in the last three months ?

(write the corresponding number from 19 m) _____

19o. In a typical week, how many times do you inject drugs ?

(specify) _____

19p. In the last three months, did you shoot up with a needle or other drug equipment already used by someone else ?

- 0 no
- 1 yes

19q. Have you ever used a needle or other drug equipment already used from somebody who had the HIV virus or AIDS ?

- 0 no → go to question 20
- 79 don't know

1 yes → 19r. If yes, did you know it when you used the needle or drug equipment ?

- 0 no
- 1 yes
- 79 don't know

Section Five

For the next few questions, we are going to talk about various sexual activities that you have perhaps had, about different types of people with whom you might have had sexual relations and whether or not you used condoms. We realize that these questions are very personal but your answers are very important for this research project. Remember that these questions are anonymous and that your answers will not be linked to your name.

20. **Have you ever had sexual activities with men or with women? These activities could have been anything from sexual fondling, penetration with penis, or genital contact with a finger, the mouth or an object. These activities could have been forced on you or not.**

- no → go to question 31a
 yes

21a. **Has someone in your family, a relative, or others in a position of authority (for example, a parent, a brother, an uncle, boyfriend of your mother, girlfriend of your father, or father in a foster family) ever had sex with you? This does not necessarily mean that there was force used or that there was penetration.**

- no → Go to question 22a
 yes → 21b. **How old were you the first time?** _____ years old

→ 21c. **With whom did you have this type of activity? (read and check all choices)**

	0-no	1-yes
father	<input type="checkbox"/>	<input type="checkbox"/>
mother	<input type="checkbox"/>	<input type="checkbox"/>
siblings (brothers, sisters)	<input type="checkbox"/>	<input type="checkbox"/>
uncle, grandfather, aunt	<input type="checkbox"/>	<input type="checkbox"/>
mother's boyfriend or girlfriend	<input type="checkbox"/>	<input type="checkbox"/>
father's boyfriend or girlfriend	<input type="checkbox"/>	<input type="checkbox"/>
the father in a foster home	<input type="checkbox"/>	<input type="checkbox"/>
babysitter or caregiver	<input type="checkbox"/>	<input type="checkbox"/>
coach of a sports team	<input type="checkbox"/>	<input type="checkbox"/>
other (specify) _____	<input type="checkbox"/>	<input type="checkbox"/>

→ 21d. **How many times have you viewed this as sexual abuse?**

- 3 all of the time
 2 most of the time
 1 some of the time
 0 never

→ 21e. **How often do you have sex after bingeing on alcohol or taking drugs?**

- 3 all of the time
 2 most of the time
 1 some of the time
 0 never

The following questions will be on voluntary sexual activities. I know these questions are very personal but your answers are very important and will help the research project. No answer will be linked to your name.

22a. Have you ever willingly had sexual activities with men or with women (vaginal, anal or oral)? These voluntary activities could have been with a friend, a lover, a one night stand or someone who has given you or to whom you have given something in exchange.

- no → go to question 27a
 yes → 22b. How old were you? _____ years old

23a. Have you ever had a regular male sexual partner? A regular partner is someone with whom you have a steady relationship. It is the person who is the priority in your love life. In other words, you would call him a boyfriend.

- no → go to question 24a
 yes → 23b. How many regular male sexual partners have you been with, in your life?

(specify): _____

→ 23c. How many regular male sexual partners have you been with, in the last three months?

(specify): _____

→ 23d. Can you tell me where you meet your regular male sexual partner(s)?

- | | | |
|-----------------------------|--|--------------------------|
| <i>Check all that apply</i> | | 1-yes |
| 1 | on the street | <input type="checkbox"/> |
| 2 | through a family member (brothers, sisters, parents) | <input type="checkbox"/> |
| 3 | same hotel | <input type="checkbox"/> |
| 4 | through a pimp or sex trade worker | <input type="checkbox"/> |
| 5 | at a shooting gallery | <input type="checkbox"/> |
| 6 | through mutual friend (s) | <input type="checkbox"/> |
| 7 | at a bar | <input type="checkbox"/> |
| 8 | at school | <input type="checkbox"/> |
| 9 | at work | <input type="checkbox"/> |
| 10 | at a youth shelter | <input type="checkbox"/> |
| 11 | other (specify): _____ | <input type="checkbox"/> |

→ 23e. Where did you meet your most recent regular male sexual partner?

(Please write in corresponding number from 23 d) _____

→ 23f. In the last three months, with your regular male sexual partner(s), has there been ...

- | | | |
|--------------------|--------------------------|--------------------------------|
| | 1-yes | most frequent in last 3 months |
| | | <i>check only one</i> |
| oral sex ? | <input type="checkbox"/> | <input type="checkbox"/> |
| anal penetration ? | <input type="checkbox"/> | <input type="checkbox"/> |
| vaginal sex? | <input type="checkbox"/> | <input type="checkbox"/> |

→ 23g. How often do you use condoms, when you are with your regular male sexual partner(s)?

never sometimes about half most times every time

24a. Have you ever had a regular female sexual partner? A regular partner is someone with whom you have a steady relationship. It is the person who is the priority in your love life. In other words, you would call her a girlfriend.

no → go to question 25a

yes → 24b. How many regular female sexual partners have you been with in your life ?

(specify): _____

→ 24c. How many regular female sexual partners have you been with, in the last three months?

(specify): _____

→ 24d. Can you tell me where you meet your regular female sexual partner(s)?

Check all that apply

1-yes

- | | | |
|----|--|--------------------------|
| 1 | on the street | <input type="checkbox"/> |
| 2 | through a family member (brothers, sisters, parents) | <input type="checkbox"/> |
| 3 | same hotel | <input type="checkbox"/> |
| 4 | a sex trade worker | <input type="checkbox"/> |
| 5 | at a shooting gallery | <input type="checkbox"/> |
| 6 | through mutual friend (s) | <input type="checkbox"/> |
| 7 | at a bar | <input type="checkbox"/> |
| 8 | at school | <input type="checkbox"/> |
| 9 | at work | <input type="checkbox"/> |
| 10 | youth shelter | <input type="checkbox"/> |
| 11 | other (specify): _____ | <input type="checkbox"/> |

→ 24e. Where did you meet your most recent regular female sexual partner?

(Please write in corresponding number from 24 d) _____

→ 24f. In the last three months, with your regular female sexual partner(s), has there been . . .

	1-yes	most frequent in last 3 months check only one
giving oral sex ?	<input type="checkbox"/>	<input type="checkbox"/>
receiving oral sex ?	<input type="checkbox"/>	<input type="checkbox"/>

→ 24g. How often do you use a barrier, such as a dental dam, when you are with your regular female sexual partner(s)?

never sometimes about half most times every time

25a. Have you ever had a casual male sexual partner? A casual partner is someone you may just meet one evening or a person that you have a sexual activity with once in a while, either once or several times. For example, you could have a regular partner and have sexual activities every now and then with another person. Some people do not have a regular partner and just have casual partners.

no → go to question 26a

yes → 25b. How many casual male sexual partners have you been with, in your life?

(specify) _____

→ 25c. How many casual male sexual partners have you been with, in the last three months?

(specify) _____

→ 25d. Can you tell me where you meet your casual male sexual partner(s)?

Check all that apply

1-yes

- 1 on the street
 - 2 through a family member (brothers, sisters, parents)
 - 3 same hotel
 - 4 a sex trade worker
 - 5 at a shooting gallery
 - 6 through mutual friend (s)
 - 7 at a bar
 - 8 at a school
 - 9 at work
 - 10 at a youth shelter
 - 11 other
- (specify): _____

→ 25e. Where did you meet your most recent casual male sexual partner?

(Please write in corresponding number from 25 d) _____

→ 25f. In the last three months, with your casual male sexual partner(s), has there been ...

- | | 1-yes | most frequent in last 3 months
check only one |
|----------------------|--------------------------|--|
| oral sex ? | <input type="checkbox"/> | <input type="checkbox"/> |
| anal penetration ? | <input type="checkbox"/> | <input type="checkbox"/> |
| vaginal penetration? | <input type="checkbox"/> | <input type="checkbox"/> |

→ 25g. How often do you use condoms, when you are with your casual male sexual partner?

- never sometimes about half most times every time

26a. Have you ever had a casual female sexual partner? A casual partner is someone you may just meet one evening or a person that you have a sexual activity with once in a while, either once or several times. For example, you could have a regular partner and have sexual activities every now and then with another person. Some people do not have a regular partner and just have casual partners.

no → go to question 27a

yes → 26b. How many casual female sexual partners have you been with, in your life?

(specify) _____

→ 26c. How many casual female sexual partners have you been with, in the last three months?

(specify) _____

→ 26d. Can you tell me where you meet your casual female sexual partner(s)?

Check all that apply

1-yes

- | | |
|--|--------------------------|
| 1 on the street | <input type="checkbox"/> |
| 2 through a family member (brothers, sisters, parents) | <input type="checkbox"/> |
| 3 same hotel | <input type="checkbox"/> |
| 4 a sex trade worker | <input type="checkbox"/> |
| 5 at a shooting gallery | <input type="checkbox"/> |
| 6 through mutual friend (s) | <input type="checkbox"/> |
| 7 at a bar | <input type="checkbox"/> |
| 8 at school | <input type="checkbox"/> |
| 9 at work | <input type="checkbox"/> |
| 10 at a youth shelter | <input type="checkbox"/> |
| 11 other | <input type="checkbox"/> |
| (specify): _____ | |

→ 26e. Where did you meet your most recent casual female sexual partner?

(Please write in corresponding number) _____

→ 26f. In the last three months, with your casual female sexual partner(s), has there been ...

- | | | |
|----------------------|--------------------------|--|
| | 1-yes | most frequent in last 3 months
check only one |
| giving oral sex ? | <input type="checkbox"/> | <input type="checkbox"/> |
| receiving oral sex ? | <input type="checkbox"/> | <input type="checkbox"/> |

→ 26g. How often do you use a barrier, such as a dental dam, when you are with your casual female sexual partner(s)?

- never sometimes about half most times every time

27a. **IN YOUR LIFE, have you ever had sex and then received money, gifts, drugs or a place to sleep? This could include oral, anal or vaginal sex.**

no → go to question 30a

yes → 27b. **How old were you the first time?** _____ years old

→ 27c. **In your life, what were some of the items you received after having sex?**

Check all that apply

1 money

2 gifts

3 drugs and/or alcohol

4 shelter

5 food

6 other (specify) _____

→ 27d. **What item did you receive most often?**

(Please enter number from 27 c) _____

→ 27e. **From how many partners have you received something in exchange for sexual activities, in your life ?**

(specify) _____

28a. **In the last three months, did you have sex and received money, gifts, drugs or a place to sleep?**

no → go to question 30a

yes → 28b. **In last three months, what were some of the items you received after having sex?**

Check all that apply

1 money

2 gifts

3 drugs and/or alcohol

4 shelter

5 food

6 other (specify) _____

→ 28c. **What item did you receive most often?**

(Please enter number from 28 b) _____

→ 28d. **In the last three months, when having sex in exchange for things, whom was it from ?**

→ men

no

yes →

28e. **How many in the last three months ?**

(specify) _____

→28f. In the last three months, with your male partner(s), had there been ...

	1-yes	most frequent in last 3 months check only one
oral sex ?	<input type="checkbox"/>	<input type="checkbox"/>
anal penetration ?	<input type="checkbox"/>	<input type="checkbox"/>
vaginal penetration?	<input type="checkbox"/>	<input type="checkbox"/>

→ women

no

yes → 28g. How many in the last three months ?

(specify) _____

→ 28h. In the last three months, with your female partner(s), had there been ...

	1-yes	most frequent in last 3 months check only one
giving oral sex ?	<input type="checkbox"/>	<input type="checkbox"/>
receiving oral sex?	<input type="checkbox"/>	<input type="checkbox"/>

29. The last time that you had sex with penetration and received something in return, such as money, gifts, drugs or other things, did you use a condom?

- no
- yes
- I'm not sure

30a. In the last three months, did you have sexual activities with someone who was infected with HIV (AIDS virus), Hepatitis B or Hepatitis C?

- no
- yes

→ 30b. Was it HIV, Hepatitis B or Hepatitis C?

- HIV
- Hepatitis B
- Hepatitis C

→ 30c. Did you know they had HIV, Hepatitis B or Hepatitis C when you had these sexual activities ?

- no
- I'm not sure
- refused

- no
- yes

30d. On average, how often do you have sex in a typical week?

(specify and include all types of partners - regular, casual or paying partner.) _____

Section Six

In this last section, I would like you to tell me how you feel about each of the statements. If you agree then answer "Strongly agree" or "Agree" depending on how much you agree. If you do not agree then answer "Disagree" or "Strongly disagree" depending on how much you disagree. If you do not know how you feel about the statement, answer "Uncertain".

31a. I often am sorry for the things I do.

strongly agree agree uncertain disagree strongly disagree

31b. I have confidence in myself.

strongly agree agree uncertain disagree strongly disagree

31c. I have trouble making up my mind.

strongly agree agree uncertain disagree strongly disagree

31d. I would change how I look if I could.

strongly agree agree uncertain disagree strongly disagree

31e. I often wish I were someone else.

strongly agree agree uncertain disagree strongly disagree

31f. No one cares much about what happens to me.

strongly agree agree uncertain disagree strongly disagree

31g. I have little interest or pleasure in doing things.

strongly agree agree uncertain disagree strongly disagree

31h. I am feeling down, depressed or hopeless.

strongly agree agree uncertain disagree strongly disagree

32a. Sometimes I think about committing suicide.

strongly agree agree uncertain disagree strongly disagree

32b. I am a happy person.

strongly agree agree uncertain disagree strongly disagree

32c. I like myself.

strongly agree agree uncertain disagree strongly disagree

Section Seven

For the next few questions, we are going to talk about various sexual transmitted diseases. Remember that these questions are anonymous and that your answers will not be linked to your name.

33a. Have you ever been tested for an STD?

- 0 no
 1 yes

→ 33b. When you did go to be tested was it because...

- | | 0-no | 1-yes |
|---|--------------------------|--------------------------|
| 1 you had symptoms | <input type="checkbox"/> | <input type="checkbox"/> |
| 2 no symptoms, wanted to be sure | <input type="checkbox"/> | <input type="checkbox"/> |
| 3 no symptoms, but a contact told you to go | <input type="checkbox"/> | <input type="checkbox"/> |
| 4 a doctor recommended it | <input type="checkbox"/> | <input type="checkbox"/> |
| 5 part of routine while in jail | <input type="checkbox"/> | <input type="checkbox"/> |
| 6 other (specify) _____ | <input type="checkbox"/> | <input type="checkbox"/> |

34a. Have you had any of the following symptoms?

34b. Did you have sexual intercourse without a condom between the first time you noticed your symptoms and the time you saw a doctor?

- | | 0-no | 1-yes | 0-no | 1-yes |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| 1 vaginal discharge that is different than usual | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2 pain on passing urine | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3 itching of the genitals | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4 pain in the lower back or abdomen | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5 sore(s) on the genitals | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6 pain during sexual intercourse | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7 other
(specify): _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 8 none | <input type="checkbox"/> | <input type="checkbox"/> | | |

35a. In the last year, when you were sick or needed medical attention, who or where did you usually go to?

Check all that apply

- | | 1-yes | |
|---------------------------------|--------------------------|------------------|
| 1 a family doctor | <input type="checkbox"/> | |
| 2 street nurse | <input type="checkbox"/> | |
| 3 a drop-in-clinic doctor | <input type="checkbox"/> | |
| 4 hospital /emergency/ambulance | <input type="checkbox"/> | |
| 5 spiritual healer | <input type="checkbox"/> | |
| 6 friend | <input type="checkbox"/> | |
| 7 police detox or youth detox | <input type="checkbox"/> | |
| 8 jail doctor | <input type="checkbox"/> | |
| 9 methadone doctor | <input type="checkbox"/> | |
| 10 AIDS doctor | <input type="checkbox"/> | |
| 11 another health professional | <input type="checkbox"/> | (specify): _____ |
| 12 other, | <input type="checkbox"/> | (specify): _____ |

35b. In your last visit, did you receive help or medical attention from a doctor, GP, nurse, street youth worker or clinic regarding an STD?

- no
- yes

36a. Have you ever been told you had an STD?

- no
- yes →

36b. Have you ever had an STD like . . .

- | | 0-no | 1=yes |
|------------------------------------|--------------------------|--------------------------|
| 1 gonorrhea | <input type="checkbox"/> | <input type="checkbox"/> |
| 2 herpes | <input type="checkbox"/> | <input type="checkbox"/> |
| 3 chlamydia | <input type="checkbox"/> | <input type="checkbox"/> |
| 4 syphilis | <input type="checkbox"/> | <input type="checkbox"/> |
| 5 genital warts/condylomas | <input type="checkbox"/> | <input type="checkbox"/> |
| 6 HIV / AIDS | <input type="checkbox"/> | <input type="checkbox"/> |
| 7 other STD (specify): _____ | <input type="checkbox"/> | <input type="checkbox"/> |
| 8 an unknown STD | <input type="checkbox"/> | <input type="checkbox"/> |
| 9 hepatitis B | <input type="checkbox"/> | <input type="checkbox"/> |
| 10 hepatitis C | <input type="checkbox"/> | <input type="checkbox"/> |
| 11 hepatitis other (specify) _____ | <input type="checkbox"/> | <input type="checkbox"/> |

→ 36c. After having an STD, did you do anything different to protect yourself from getting another?

- no
- yes → 36d. Are you still doing this?

- no
- yes

→ 36e. Did you inform your sexual partner at the time that you had this STD?

- no, did not want to tell anyone
- no, did not inform anyone, could not find them
- yes, tried to get a hold of my past partner(s)
- yes, informed my past partner(s)

37a. Have you ever been pregnant?

- no
- yes → 37b.

Are you currently pregnant ?

- no
- yes

38. In terms of risk of getting an STD, do you believe you are . . .

- at no risk at all
- at low risk
- medium risk
- high risk

39a. Have you ever been vaccinated for Hepatitis B?

no

yes → 39b. When? (specify) _____

39a. Do you think you do have an STD?

no

yes

don't know

39b. Do you think you have Hepatitis B?

no

yes

don't know

40. Would you inform any of your sexual partners from the last three months about having an STD and or Hepatitis B, if you were informed that you had it?

no

yes

don't know

41a. Have you been treated for an STD in the last three months?

no

yes 41b. Which STD have you been treated for?

(specify) _____

42a. Is there anything that prevents you from getting medical services that you need?

no

yes 42b. What are they? (specify) _____

Thank you for taking part in the study.

Section Eight

Follow up questionnaire - to be asked of youth when they return for their results and have a positive test result. Please inform youth about their results and then proceed with the remaining questions.

1. Are you surprised you have an STD or Hepatitis B?

 no
 yes
 refused

2. How many sex partners have you had sex (anal, vaginal or oral) with whom you used condoms consistently (every single time) over the last three months?

(specify the number) _____

3. How many sex partners have you had sex (anal, vaginal or oral) with whom you used no condoms at all over the last three months?

(specify the number) _____

4. How many of your sex partners in the last three months could you find so that you could tell them you have an STD &/or Hepatitis B, if you wanted to?

(specify the number) _____

5. How many of your sex partners in the last three months could you NOT find to tell them you have an STD &/or Hepatitis B, if you wanted to?

(specify the number) _____

6. Will you be informing any of sexual partner(s) from the last three months that you do have an STD &/or Hepatitis B?

 no
 yes
 don't know

Thank you for taking part in the study.

Additional Services Requested ? Please specify _____

Appendix C

Enhanced STD Surveillance in Canadian Street Youth Questionnaire

Male Version

Enhanced STD Surveillance In Canadian Street Youth

Questionnaire

Male Version

Phase II

Section One

Subject information sheet. Please ensure all study numbers are the same on the questionnaire as they are on the urine &/or sera containers.

Date of Interview _____

Interviewer _____

Location Of Interview _____

Location of Recruitment _____

Identification Number _____

1. Urine Collected?

2. no

yes →

Test Results

Positive?

Treated?

Chlamydia →

no

no

yes

yes

Gonorrhoea →

no

no

yes

yes

3. Blood Collected for Hepatitis B?

no

yes

4. Permission for blood storage granted?

no

yes → Tested to be run on stored blood

ALL TESTS LISTED BELOW

1 HIV

2 HTLV

3 Hepatitis C

4 Hepatitis G

5 HSV-1 & HSV-2

Section Two

I would like to start off by asking you some questions regarding your background.

1. Where were you born?

in Canada Which city and province? (specify) _____

outside Canada Which country? (specify) _____

2. How long have you been in (city were interview taking place)?

- always lived in this city → go to question 4
 I'm only passing through
 for less than 3 months
 for more than 3 months but less than 6 months → go to question 4
 for more than 6 months but less than 1 year → go to question 4
 other → (specify) _____

3. In the last three months, in which city did you live the longest ?

(specify) _____

4. What ethnic origin do you consider yourself to be?

(specify) _____

5. Have you ever ...

	0-no	1-yes
had a social worker	<input type="checkbox"/>	<input type="checkbox"/>
been in a foster family	<input type="checkbox"/>	<input type="checkbox"/>
been in a group home	<input type="checkbox"/>	<input type="checkbox"/>
had a probation / parole officer	<input type="checkbox"/>	<input type="checkbox"/>

6a. Are you living with your parent(s) / caregiver(s)? (Ask the youth not to refer to their street mom or dad when responding to this question)

yes, living with parent(s) / caregiver (s) → go to question 7a

no, no longer living with parent(s) / caregiver(s) → 6b. Since when?

(specify) _____

6c. Why did you leave home?

Check all that apply

1 - yes

- | | | |
|----|---|--------------------------|
| 1 | fighting/arguing with your parent(s) / caregiver(s) | <input type="checkbox"/> |
| 2 | independence | <input type="checkbox"/> |
| 3 | moved to go to school | <input type="checkbox"/> |
| 4 | sexual abuse | <input type="checkbox"/> |
| 5 | too many rules | <input type="checkbox"/> |
| 6 | taken away by Social Services / Children's Aid | <input type="checkbox"/> |
| 7 | trouble with the law | <input type="checkbox"/> |
| 8 | physical abuse | <input type="checkbox"/> |
| 9 | parent(s) 's / caregiver(s)'s alcohol/ drug use | <input type="checkbox"/> |
| 10 | being thrown out | <input type="checkbox"/> |
| 11 | your drug / alcohol use | <input type="checkbox"/> |
| 12 | emotional abuse | <input type="checkbox"/> |
| 13 | other (specify): _____ | <input type="checkbox"/> |

6d. What was the main reason for leaving ?

(Write the corresponding number from 6c) _____

7a. Are you currently living with no permanent home?

no →

7b. Is it because ...

- living with parent(s) / caregiver(s)
- living with friend/boyfriend/girlfriend
- have your own apartment/house
- on the road travelling
- other → (specify) _____

→ go to question 8a

yes →

7c. How long have you been living with no permanent home?

- a few days, but less than a week
- a few weeks, but less than a month
- a few months, but less than a year
- more than one year, but less than 5 years
- other → (specify) _____

7d. How long do you intend to be with no permanent home?

- no plan at all
- a few more days, but less than a week
- a few more weeks, but less than a month
- a few months, but less than a year
- more than one year, but less than 5 years
- never plan to get off the streets
- don't know

7e. Are you uncomfortable with your current living situation?

no → go to question 8a

yes → 7f. What do you see as stopping you from getting a permanent home?

Check all that apply

- 0 lack of money
- 1 drug dependance
- 2 fear of losing friends
- 3 don't know where to get help
- 4 no services to help me off the street
- 5 pimp, involved in commercial sex
- 6 sense of freedom
- 7 other (specify): _____
- 79 don't know

→ 7g. What is the main reason you see as stopping you from getting a permanent home?

(Write the corresponding number from 7f) _____

Section Three

I would like to ask you now about your relationship with your caregivers and a bit about school.

8a. In the last three months, were you in contact with your mother or female caregiver? (Ask the youth not to refer to their street mom when responding to this question)

no → go to question 9a

does not have a mother figure or mother is dead → go to question 9a

yes → 8b. How often were you in touch with her ?

regularly, once or more a week

occasionally, not every week

very irregularly

8c. In general, would you say that these contacts were ...

very good

good

average

bad

very bad

9a. In the last three months, were you in contact with your father or male caregiver? (Ask the youth not to refer to their street dad when responding to this question.)

no → go to question 10

does not have a father figure or father is dead → go to question 10

yes → 9b. How often were you in touch with him ?

regularly, once or more a week

occasionally, not every week

very irregularly

→ 9c. In general, would you say that these contacts were ...

very good

good

average

bad

very bad

10. What is your birth date ?

_____/_____/_____
Day Month Year

11a. Are you currently registered for school?

no → 11b. Is it because... (Give all choices)

- 1 you finished school
 - 2 you dropped out of school
 - 3 you were kicked out of school
 - 4 other (specify) _____
- go to question 11c

1 yes → go to question 11c

2 yes, but has not started yet → go to question 11c

11c. What level are you at? (Ask the youth to answer the following question referring to the period when he was in school in the last three months. Give all choices. If he is at two different levels, mark the lowest level.)

- 1 primary school
- 2 secondary
- 3 trade school or training program
- 4 college
- 5 university
- 6 other (specify) _____

12. What is the closest intersection to where you "hang-out" most often?

(specify) _____

refused

13. Have you ever been to a detention facility, youth detention centre, prison or jail, overnight or longer?

- 0 no
- 1 yes
- 2 refused

14a. In the last three months, how did you get the money you live on? I will give you some possible sources of income. (read and check all answers that apply)

	0-no	1-yes
1 social welfare	<input type="checkbox"/>	<input type="checkbox"/>
2 employment insurance or U.I.C.	<input type="checkbox"/>	<input type="checkbox"/>
3 occasional work (small contracts every now and then)	<input type="checkbox"/>	<input type="checkbox"/>
4 regular work (part-time or full-time)	<input type="checkbox"/>	<input type="checkbox"/>
5 money from my family	<input type="checkbox"/>	<input type="checkbox"/>
6 money from friends	<input type="checkbox"/>	<input type="checkbox"/>
7 prostitution	<input type="checkbox"/>	<input type="checkbox"/>
8 stealing	<input type="checkbox"/>	<input type="checkbox"/>
9 selling drugs or doing drug runs	<input type="checkbox"/>	<input type="checkbox"/>
10 panhandling	<input type="checkbox"/>	<input type="checkbox"/>
11 money from a youth centre or from a social worker	<input type="checkbox"/>	<input type="checkbox"/>
12 squeegee	<input type="checkbox"/>	<input type="checkbox"/>
13 other (specify): _____	<input type="checkbox"/>	<input type="checkbox"/>

14b. In the last three months, what was your principal source of income? (write the corresponding number) _____

Section Four

I would like to ask you some questions on drugs and alcohol. We ask these questions to everyone, even those who do not drink or take drugs.

15a. Have you used alcohol in the last three months?

no, never used alcohol *(except for possibly religious reasons)*

no, quit in the last three months

yes →

15b. How would you classify your alcohol use in the last three months?

a nondrinker

once in awhile → less than once a month

occasionally → 1-3 times a month

frequently → 1-3 times a week

regularly → 4-6 times a week

habitually → everyday

15c. The times that you consume alcohol, do you binge drink?

once in awhile → less than once a month

occasionally → 1-3 times a month

frequently → 1-3 times a week

regularly → 4-6 times a week

habitually → everyday

16a. Do you currently smoke cigarettes?

never

occasionally →

everyday →

16b. On the days when you do smoke, how many cigarettes do you smoke, including shared cigarettes, in a day?

_____ cigarettes

17a. Since your birth, would you say that your father or the person you consider as your father is now having or has ever had. . . (Ask the youth not to refer to their street dad when responding to this question)

does not have a father figure → go to question 18a

is a nondrinker

a drink once in awhile → less than once a month

a drink occasionally → 1-3 times a month

a drink frequently → 1-3 times a week

a drink regularly → 4-6 times a week

a drink habitually → everyday

17b. Since your birth, would you say that your father or the person you consider as your father is now using or has ever used. . . (Ask the youth not to refer to their street dad when responding to this question)

- 0 is a non drug user → go to question 18a
- 1 drugs once in awhile → less than once a month
- 2 drugs occasionally → 1-3 times a month
- 3 drugs frequently → 1-3 times a week
- 4 drugs regularly → 4-6 times a week
- 5 drugs habitually → drug use everyday

17c. Has he ever injected drugs?

- 0 no
- 1 yes
- 79 don't know

18a. Since your birth, would you say that your mother or the person you consider as your mother is now having or has ever had. . . (Ask the youth not to refer to their street mom when responding to this question)

- 0 does not have a mother figure → go to question 19a
- 0 is a nondrinker
- 1 a drink once in awhile → less than once a month
- 2 a drink occasionally → 1-3 times a month
- 3 a drink frequently → 1-3 times a week
- 4 a drink regularly → 4-6 times a week
- 5 a drink habitually → everyday

18b. Since your birth, would you say that your mother or the person you consider as your mother is using or has used. . . (Ask the youth not to refer to their street mom when responding to this question)

- 0 is a non drug user → go to question 19a
- 1 drugs once in awhile → less than once a month
- 2 drugs occasionally → 1-3 times a month
- 3 drugs frequently → 1-3 times a week
- 4 drugs regularly → 4-6 times a week
- 5 drugs habitually → drug use everyday

18c. Has she ever injected drugs?

- 0 no
- 1 yes
- 79 don't know

Please note the next set of questions does not include tobacco, alcohol or prescription drugs in its definition of drugs.

19a. In your life, have you ever taken any drugs at least once, WITHOUT injecting (or being injected) in your veins or under your skin ?

- no
- yes

19b. In the last three months, in terms of non injection drugs, did you do more, about the same, less or quit?

- more
- about the same
- less
- quit → 19c. Since when?

(specify) _____

→ 19d. Did you go through drug treatment to quit non injection drugs?

- no
- yes → Go to question 19 g

19e. Which drug did you take the most often in the last three months, WITHOUT injecting ?

(specify) _____

19f. In a typical week, how often do you take drugs WITHOUT injecting?

(specify) _____

19g. In your life, have you ever injected or been injected at least once with drugs in your veins or under your skin (make a fix or to shoot yourself up) ?

- no → Go to question 20

yes → 19h. How old were you the first time you injected drugs ?

_____ years old

19i. In the last three months, in terms of injecting drugs, did you do more, about the same, less or quit?

- more
- about the same
- less

quit → 19j. Since when? (specify) _____

→ 19k. Did you go through drug treatment to quit injecting drugs?

- no
- yes → Go to question 19 q

19l. When using needles or other drug equipment, would you say you use clean equipment . . .

- 3 all of the time
- 2 most of the time
- 1 some of the time
- 0 never

19m. In the last three months, what drug did you inject ? (read and check all choices)

- | | 0-no | 1-yes | |
|-----------------|--------------------------|--------------------------|-----------------|
| 1 cocaine, coke | <input type="checkbox"/> | <input type="checkbox"/> | |
| 2 heroin | <input type="checkbox"/> | <input type="checkbox"/> | |
| 3 speed ball | <input type="checkbox"/> | <input type="checkbox"/> | (specify) _____ |
| 4 PCP | <input type="checkbox"/> | <input type="checkbox"/> | |
| 5 alcohol | <input type="checkbox"/> | <input type="checkbox"/> | |
| 6 other | <input type="checkbox"/> | <input type="checkbox"/> | (specify) _____ |

19n. Which drug did you inject the most often in the last three months ?

(write the corresponding number from 19 m) _____

19o. In a typical week, how many times do you inject drugs ?

(specify) _____

19p. In the last three months, did you shoot up with a needle or other drug equipment already used by someone else ?

- 0 no
- 1 yes

19q. Have you ever used a needle or other drug equipment already used from somebody who had the HIV virus or AIDS ?

0 no → go to question 20

79 don't know

1 yes → 19r. Did you know it when you used the needle or drug equipment ?

- 0 no
- 1 yes
- 79 don't know

Section Five

For the next few questions, we are going to talk about various sexual activities that you have perhaps had, about different types of people with whom you might have had sexual relations and whether or not you used condoms. We realize that these questions are very personal but your answers are very important for this research project. Remember that these questions are anonymous and that your answers will not be linked to your name.

20. Have you ever had sexual activities with women or with men? These activities could have been anything from sexual fondling, penetration with penis, or genital contact with a finger, the mouth or an object. These activities could have been forced on you or not.

- no → go to question 31a
 yes

21a. Has someone in your family, a relative, or others in a position of authority (for example, a parent, a brother, an uncle, boyfriend of your mother, girlfriend of your father, or father in a foster family) ever had sex with you? This does not necessarily mean that there was force used or that the activity included penetration.

no → Go to question 22a

yes → 21b. How old were you the first time? _____ years old

→ 21c. With whom did you have this type of activity? (read and check all choices)

	0-no	1-yes
father	<input type="checkbox"/>	<input type="checkbox"/>
mother	<input type="checkbox"/>	<input type="checkbox"/>
siblings (brothers, sisters)	<input type="checkbox"/>	<input type="checkbox"/>
uncle, grandfather, aunt	<input type="checkbox"/>	<input type="checkbox"/>
mother's boyfriend or girlfriend	<input type="checkbox"/>	<input type="checkbox"/>
father's girlfriend or boyfriend	<input type="checkbox"/>	<input type="checkbox"/>
the father in a foster home	<input type="checkbox"/>	<input type="checkbox"/>
babysitter or caregiver	<input type="checkbox"/>	<input type="checkbox"/>
coach of a sports team	<input type="checkbox"/>	<input type="checkbox"/>
other (specify): _____	<input type="checkbox"/>	<input type="checkbox"/>

→ 21d. How many times have you viewed this as sexual abuse?

- 3 all of the time
 2 most of the time
 1 some of the time
 0 never

→ 21e. How often do you have sex after bingeing on alcohol or taking drugs?

- 3 all of the time
 2 most of the time
 1 some of the time
 0 never

So far, I have asked you about abusive or forced sexual activities. The following questions will be on voluntary sexual activities.

22a. Have you ever willingly had sexual activities with women or with men (vaginal, anal or oral) ? These voluntary activities could have been with a friend, a lover, a one night stand or someone who has given you or to whom you have given something in exchange.

no → go to question 27a

yes → 22b. How old were you? _____ years old

23a. Have you ever had a regular female sexual partner? A regular partner is someone with whom you have a steady relationship. It is the person who is the priority in your love life. In other words, you would call her a girlfriend.

no → go to question 24a

yes → 23b. How many regular female sexual partners have you been with, in your life?

(specify): _____

→ 23c. How many regular female sexual partners have you been with, in the last three months?

(specify): _____

→ 23d. Can you tell me where you meet your regular female sexual partner(s)?

Check all that apply

- | | | | |
|----|--|--------------------------|-------|
| 1 | on the street | <input type="checkbox"/> | 1-yes |
| 2 | through a family member (brothers, sisters, parents) | <input type="checkbox"/> | |
| 3 | same hotel | <input type="checkbox"/> | |
| 4 | through a pimp or sex trade worker | <input type="checkbox"/> | |
| 5 | at a shooting gallery | <input type="checkbox"/> | |
| 6 | through mutual friend (s) | <input type="checkbox"/> | |
| 7 | at a bar | <input type="checkbox"/> | |
| 8 | at school | <input type="checkbox"/> | |
| 9 | at work | <input type="checkbox"/> | |
| 10 | at a youth shelter | <input type="checkbox"/> | |
| 11 | other (specify): _____ | <input type="checkbox"/> | |

→ 23e. Where did you meet your most recent regular female sexual partner?

(Please write in corresponding number from 23 d) _____

→ 23f. In the last three months, with your regular female sexual partner(s), has there been . . .

	1-yes	most frequent in last 3 months
		check only one
oral sex ?	<input type="checkbox"/>	<input type="checkbox"/>
anal penetration ?	<input type="checkbox"/>	<input type="checkbox"/>
vaginal sex?	<input type="checkbox"/>	<input type="checkbox"/>

→ 23g. How often do you use condoms, when you are with your regular female partner(s)?

never sometimes about half most times every time

24a. Have you ever had a regular male sexual partner? A regular partner is someone with whom you have a steady relationship. It is the person who is the priority in your love life. In other words, you would call him a boyfriend.

no → go to question 25a

yes → 24b. How many regular male sexual partners, in your life, have you been with?

(specify): _____

→ 24c. How many regular male sexual partners have you been with, in the last three months?

(specify): _____

→ 24d. Can you tell me where you meet your regular male sexual partner(s)?

Check all that apply

- | | | |
|----|--|--------------------------|
| 1 | on the street | 1-yes |
| 2 | through a family member (brothers, sisters, parents) | <input type="checkbox"/> |
| 3 | same hotel | <input type="checkbox"/> |
| 4 | a sex trade worker | <input type="checkbox"/> |
| 5 | at a shooting gallery | <input type="checkbox"/> |
| 6 | through mutual friend (s) | <input type="checkbox"/> |
| 7 | at a bar | <input type="checkbox"/> |
| 8 | at school | <input type="checkbox"/> |
| 9 | at work | <input type="checkbox"/> |
| 10 | youth shelter | <input type="checkbox"/> |
| 11 | other (specify): _____ | <input type="checkbox"/> |

→ 24e. Where did you meet your most recent regular male sexual partner?

(Please write in corresponding number from 24d) _____

→ 24f. In the last three months, with your regular male sexual partner(s), has there been . . .

	1-yes	most frequent in last 3 months check only one
oral sex ?	<input type="checkbox"/>	<input type="checkbox"/>
anal penetration ?	<input type="checkbox"/>	<input type="checkbox"/>
passive anal penetration?	<input type="checkbox"/>	<input type="checkbox"/>

→ 24g. How often do you use condoms, when you are with your regular male sexual partner (s)?

never sometimes about half most times every time

25a. Have you ever had a casual female sexual partner? A casual partner is someone you may just meet one evening or a person that you have a sexual activity with once in a while, either once or several times. For example, you could have a regular partner and have sexual activities every now and then with another person. Some people do not have a regular partner and just have casual partners.

no → go to question 26a

yes → 25b. How many casual female sexual partners have you been with, in your life?

(specify) _____

→ 25c. How many casual female sexual partners have you been with, in the last three months?

(specify) _____

→ 25d. Can you tell me where you meet your casual female sexual partner(s)?

Check all that apply

1=yes

- 1 on the street
- 2 through a family member (brothers, sisters, parents)
- 3 same hotel
- 4 a sex trade worker
- 5 at a shooting gallery
- 6 through mutual friend (s)
- 7 at a bar
- 8 at a school
- 9 at work
- 10 at a youth shelter
- 11 other

(specify): _____

→ 25e. Where did you meet your most recent casual female sexual partner?

(Please write in corresponding number from 25 d) _____

→ 25f. In the last three months, with your casual female sexual partner(s), has there been ...

	1=yes	most frequent in last 3 months check only one
oral sex ?	<input type="checkbox"/>	<input type="checkbox"/>
anal penetration ?	<input type="checkbox"/>	<input type="checkbox"/>
vaginal penetration?	<input type="checkbox"/>	<input type="checkbox"/>

→ 25g. How often do you use condoms, when you are with your casual female sexual partner?

never sometimes about half most times every time

26a. Have you ever had a casual male partner? A casual partner is someone you may just meet one evening or a person that you have a sexual activity with once in a while, either once or several times. For example, you could have a regular partner and have sexual activities every now and then with another person. Some people do not have a regular partner and just have casual partners.

no → go to question 27a

yes → 26b. How many casual male partners have you been with, in your life?

(specify) _____

→ 26c. How many casual male partners have you been with, in the last three months?

(specify) _____

→ 26d. Can you tell me where you meet your casual male partner(s)?

Check all that apply

1=yes

- | | |
|--|--------------------------|
| 1 on the street | <input type="checkbox"/> |
| 2 through a family member (brothers, sisters, parents) | <input type="checkbox"/> |
| 3 same hotel | <input type="checkbox"/> |
| 4 a sex trade worker | <input type="checkbox"/> |
| 5 at a shooting gallery | <input type="checkbox"/> |
| 6 through mutual friend (s) | <input type="checkbox"/> |
| 7 at a bar | <input type="checkbox"/> |
| 8 at school | <input type="checkbox"/> |
| 9 at work | <input type="checkbox"/> |
| 10 at a youth shelter | <input type="checkbox"/> |
| 11 other | <input type="checkbox"/> |

(specify): _____

→ 26e. Where did you meet your most recent casual male sexual partner?

(Please write in corresponding number) _____

→ 26f. In the last three months, with your casual male sexual partner(s), has there been ...

		most frequent in last 3 months
	1=yes	check only one
oral sex ?	<input type="checkbox"/>	<input type="checkbox"/>
anal penetration ?	<input type="checkbox"/>	<input type="checkbox"/>
passive anal penetration?	<input type="checkbox"/>	<input type="checkbox"/>

→ 26g. How often do you use condoms, when you are with your casual male sexual partner(s)?

never sometimes about half most times every time

27a. **IN YOUR LIFE, have you ever had sex and then received money, gifts, drugs or a place to sleep ? This could include oral, anal or vaginal sex.**

no → go to question 30a

yes → 27b. How old were you the first time? _____ years old

→ 27c. In your life, what were some of the items you received after having sex?

Check all that apply

- 1 money
- 2 gifts
- 3 drugs and/or alcohol
- 4 shelter
- 5 food
- 6 other (specify) _____

→ 27d. What was the most common item you received?

(Please enter number from 27 c) _____

→ 27e. How many partners have you received something in exchange for sexual activities, in your life ?

(specify) _____

28a. **In the last three months, have you have sex and received money, gifts, drugs or a place to sleep ?**

no → go to question 30a

yes → 28b. In last three months, what were some of the items you received after having sex ?

- 1 money
- 2 gifts
- 3 drugs and/or alcohol
- 4 shelter
- 5 food
- 6 other (specify) _____

→ 28c. What was the most common item?

(Please enter number from 28 b) _____

→ 28d. In the last three months, from whom did you receive things from in exchange for sexual activities ?

→ women

no

yes → 28e. How many in the last three months ?

(specify) _____

→28f. In the last three months, with your female partner(s), has there been ...

		1-yes	most frequent in last 3 months
			<i>check only one</i>
oral sex ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
anal penetration ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
vaginal penetration?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

→ men

no

yes

→ 28g. How many in the last three months ?

(specify) _____

→ 28h. In the last three months, with your male partner(s), has there been ...

		1-yes	most frequent in last 3 months
			<i>check only one</i>
oral sex ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
anal penetration ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
passive anal penetration?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

29. The last time that you had sex with penetration and received something in return, such as money, gifts, drugs or other things, did you use a condom?

no

yes

I'm not sure

30a. In the last three months, did you have sexual activities with someone who was infected with HIV (AIDS virus), Hepatitis B or Hepatitis C?

no

yes

→ 30b. Was it HIV, Hepatitis B or Hepatitis C ?

HIV

Hepatitis B

Hepatitis C

30c. Did you know it when you had these sexual activities ?

no

yes

I'm not sure

refused

30d. On average, how often do you have sex in a week?

(Specify and include all types of partners - regular, casual and paying partners) _____

Section Six

In this last section, I would like you to tell me how you feel about each of the statements. If you agree then answer "Strongly agree" or "Agree" depending on how much you agree. If you do not agree then answer "Disagree" or "Strongly disagree" depending on how much you disagree. If you do not know how you feel about the statement, answer "Uncertain".

31a. I often am sorry for the things I do.

strongly agree agree uncertain disagree strongly disagree

31b. I have confidence in myself.

strongly agree agree uncertain disagree strongly disagree

31c. I have trouble making up my mind.

strongly agree agree uncertain disagree strongly disagree

31d. I would change how I look if I could.

strongly agree agree uncertain disagree strongly disagree

31e. I often wish I were someone else.

strongly agree agree uncertain disagree strongly disagree

31f. No one cares much about what happens to me.

strongly agree agree uncertain disagree strongly disagree

31g. I have little interest or pleasure in doing things.

strongly agree agree uncertain disagree strongly disagree

31h. I am feeling down, depressed or hopeless.

strongly agree agree uncertain disagree strongly disagree

32a. Sometimes I think about committing suicide.

strongly agree agree uncertain disagree strongly disagree

32b. I am a happy person.

strongly agree agree uncertain disagree strongly disagree

32c. I like myself.

strongly agree agree uncertain disagree strongly disagree

Section Seven

For the next few questions, we are going to talk about various sexual transmitted diseases. Remember that these questions are anonymous and that your answers will not be linked to your name.

33a. Have you ever been tested for an STD?

- no
 yes

→ 33b. When you did go to be tested was it because...

- | | 0-no | 1-yes |
|---|--------------------------|--------------------------|
| 1 you had symptoms | <input type="checkbox"/> | <input type="checkbox"/> |
| 2 no symptoms, wanted to be sure | <input type="checkbox"/> | <input type="checkbox"/> |
| 3 no symptoms, but a contact told you to go | <input type="checkbox"/> | <input type="checkbox"/> |
| 4 a doctor recommended it | <input type="checkbox"/> | <input type="checkbox"/> |
| 5 part of routine while in jail | <input type="checkbox"/> | <input type="checkbox"/> |
| 6 other (specify) _____ | <input type="checkbox"/> | <input type="checkbox"/> |

34a. Have you had any of the following symptoms?

- | | 0-no | 1-yes |
|-----------------------------------|--------------------------|--------------------------|
| 1 redness at the tip of the penis | <input type="checkbox"/> | <input type="checkbox"/> |
| 2 discharge from the penis | <input type="checkbox"/> | <input type="checkbox"/> |
| 3 pain on passing urine | <input type="checkbox"/> | <input type="checkbox"/> |
| 4 swelling of the testicles/balls | <input type="checkbox"/> | <input type="checkbox"/> |
| 5 itching of the genitals | <input type="checkbox"/> | <input type="checkbox"/> |
| 6 sore(s) on the genitals | <input type="checkbox"/> | <input type="checkbox"/> |
| 7 pain during sexual intercourse | <input type="checkbox"/> | <input type="checkbox"/> |
| 8 other (specify): _____ | <input type="checkbox"/> | <input type="checkbox"/> |
| 9 none | <input type="checkbox"/> | <input type="checkbox"/> |

34b. Did you have sexual intercourse without a condom between the first time you noticed your symptoms and the time you saw a doctor?

- | | 0-no | 1-yes |
|---|--------------------------|--------------------------|
| 1 | <input type="checkbox"/> | <input type="checkbox"/> |
| 2 | <input type="checkbox"/> | <input type="checkbox"/> |
| 3 | <input type="checkbox"/> | <input type="checkbox"/> |
| 4 | <input type="checkbox"/> | <input type="checkbox"/> |
| 5 | <input type="checkbox"/> | <input type="checkbox"/> |
| 6 | <input type="checkbox"/> | <input type="checkbox"/> |
| 7 | <input type="checkbox"/> | <input type="checkbox"/> |
| 8 | <input type="checkbox"/> | <input type="checkbox"/> |
| 9 | <input type="checkbox"/> | <input type="checkbox"/> |

35a. In the last year, when you were sick or needed medical attention, who or where did you usually go to?

Check all that apply

- | | 1-yes |
|---------------------------------|--------------------------|
| 1 a family doctor | <input type="checkbox"/> |
| 2 street nurse | <input type="checkbox"/> |
| 3 a drop-in-clinic doctor | <input type="checkbox"/> |
| 4 hospital /emergency/ambulance | <input type="checkbox"/> |
| 5 spiritual healer | <input type="checkbox"/> |
| 6 friend | <input type="checkbox"/> |
| 7 police detox or youth detox | <input type="checkbox"/> |
| 8 jail doctor | <input type="checkbox"/> |
| 9 methadone doctor | <input type="checkbox"/> |
| 10 AIDS doctor | <input type="checkbox"/> |
| 11 another health professional | <input type="checkbox"/> |
| 12 other | <input type="checkbox"/> |
- (specify): _____
- (specify): _____

35b. In your last visit, did you receive help or medical attention from a doctor, GP, nurse, street youth worker or clinic regarding an STD?

0 no

1 yes

36a. Have you ever been told you had an STD?

0 no

1 yes →

36b. Have you ever had an STD like ...

	0-no	1=yes
1 gonorrhea	<input type="checkbox"/>	<input type="checkbox"/>
2 herpes	<input type="checkbox"/>	<input type="checkbox"/>
3 chlamydia	<input type="checkbox"/>	<input type="checkbox"/>
4 syphilis	<input type="checkbox"/>	<input type="checkbox"/>
5 genital warts/condylomas	<input type="checkbox"/>	<input type="checkbox"/>
6 HIV/AIDS	<input type="checkbox"/>	<input type="checkbox"/>
7 other STD (specify): _____	<input type="checkbox"/>	<input type="checkbox"/>
8 an unknown STD	<input type="checkbox"/>	<input type="checkbox"/>
9 hepatitis B	<input type="checkbox"/>	<input type="checkbox"/>
10 hepatitis C	<input type="checkbox"/>	<input type="checkbox"/>
11 hepatitis other (specify): _____	<input type="checkbox"/>	<input type="checkbox"/>

→ 36c. After having an STD, did you do anything different to protect yourself from getting another?

0 no

1 yes

→ 36d. Are you still doing this?

0 no

1 yes

→ 36e. Did you inform your sexual partner at the time or past partners that you had this STD?

1 no, did not want to tell anyone

2 no, did not inform anyone, could not find them

3 yes, I tried to get a hold of some of my past partner(s)

4 yes, informed all my past partner(s)

37. In terms of risk of getting an STD, do you believe you are ...

0 at no risk at all

1 at low risk

2 medium risk

3 high risk

38a. Have you ever been vaccinated for Hepatitis B?

no

yes → 38b. When? (specify) _____

39a. Do you think you do have an STD?

no

yes

don't know

39b. Do you think you have Hepatitis B?

no

yes

don't know

40. Would you inform any of your sexual partners from the last three months about having an STD and or Hepatitis B, if you where informed that you had it?

no

yes

don't know

41a. Have you been treated for an STD in the last three months?

no

yes 41b. Which STD have your been treated for?

(specify) _____

42a. Is there anything that prevents you from getting medical services that you need?

no

yes 42b. What are they? (specify) _____

Thank you for taking part in the study.

Section Eight

Follow up questionnaire - to be asked of youth when they return for their results. Please inform youth about their results and then proceed with the remaining questions.

1. Are you surprised you have an STD &/or Hepatitis B?

- no
 yes
 refused

2. How many sex partners have you had sex (anal, vaginal or oral) with whom you used condoms *always* (every single time) over the last three months?

(specify the number) _____

3. How many sex partners have you had sex (anal, vaginal or oral) with whom you have never used condoms over the last three months?

(specify the number) _____

4. How many of your sex partners in the last three months could you find so that you could tell them you have an STD &/or Hepatitis B, if you wanted to?

(specify the number) _____

5. How many of your sex partners in the last three months could you NOT find to tell them you have an STD &/or Hepatitis B, if you wanted to?

(specify the number) _____

6. Will you be informing any of sexual partner(s) from the last three months that you do have an STD &/or Hepatitis B?

- no
 yes
 don't know

Thank you for taking part in the study.

Additional Services Requested ? Please specify _____

Appendix D
Enhanced STD Surveillance in Canadian Street Youth
Protocol Manual

**ENHANCED STD SURVEILLANCE
IN CANADIAN STREET YOUTH
PROTOCOL**

**STD Research Unit
Division of STD Prevention & Control
Bureau of HIV/ AIDS, STD & TB
LCDC, Health Canada**

1.0 Study Summary

The elimination of gonorrhea and a significant reduction in chlamydia are recognized as achievable in Canada by the year 2000^{1,2}. The incidences of both gonorrhea and chlamydia have declined by 27% and 66% since 1991, respectively, so that current levels of infection throughout the Canadian population are very low³. However, the overall rates are influenced by very high rates in certain vulnerable segments of the population such as in Canadian First Nations people and in groups such as street youth. If the national goals are to be achieved, continual surveillance of rates in these high risk populations is essential. Further to this, the collection of information on sexually transmitted disease (STD) risk factors is necessary to develop more appropriate, focussed prevention programs.

Rates of STD in youth between the ages of 14 to 24 years represent the largest proportion of all reported STD^{4,5}. Even less information is available on street youth, who are marginalized and have little interaction with the Canadian health care system. Studies that focus on Canadian street youth are rare and lack the information leading to the understanding of how to reduce STD experienced by this population. Street youth are 2.3 and 2.5 times (for males and females respectively) more likely to self report STD than non-street-involved youth within the same age category⁶. Of greatest concern are the street youth, since it is shown that many deny they are at any risk at all⁷. The existence of high rates of STD in street youth has been indicated in other published studies on self-reported histories, the inaccuracies and biases of which are well known and documented⁸. To our knowledge, published Canadian studies to date have not measured actual prevalence rates in this group, much less assessed changes in rates over time. Also, additional knowledge of the phenomena that propel the high rates within street youth in Canada is lacking.

A pilot project launched in October of 1998 investigated the feasibility of studying this hard to reach population. The objective of the pilot study was to test the strength of the data collection instrument in terms of the quality of responses obtained, participation rates and internal validity.

In phase two, street youth presenting themselves in "Drop-In Centres" within one of five cities across Canada will take part in the surveillance system consisting of two interviewer-administered questionnaires. The first questionnaire comprises questions on demographics (date of birth, place of birth, highest level of education) lifestyle, sexual practices, including age at first intercourse, number of sexual partners and sexual preferences, attitudes and knowledge of risk behaviours and family history. In addition to collection of urine samples, a blood sample will also be requested to test for hepatitis B. The remaining blood will be stored for future serological tests, such as genital herpes, HIV, hepatitis C, HPV and possibly HTLV and hepatitis G. To our knowledge, this will be the first study to provide an accurate diagnosed prevalence of STD in street youth at a national level. In addition, storage of blood allows for testing of emerging blood-borne sexually transmitted diseases, such as HTLV, and hepatitis G, allowing for the unique opportunity to determine prevalence on these STD that are not reportable in all provinces.

Subjects will be encouraged to return to the interview site to obtain their laboratory results. If a respondent tests positive for chlamydia and/or gonorrhea, he or she will be treated with one gram dose of azithromycin and/or cefixime, administered at the interview site. Individuals with positive tests will be managed according to public health regulation and guidelines currently in use in each province. The second questionnaire administered to youth returning for results will address issues surrounding barriers to partner notification.

2.0 Background

Although street youth are a priority for STD prevention programs, partly because they link the general population to high rates of STD, reliable data on STD prevalence trends, characteristics and behaviour of high-risk youth are scarce ^{9,10}.

Investigation into STD, more specifically *C. trachomatis*, *N. gonorrhoea* and *hepatitis B*, in Canadian youth is important for three major reasons. Street youth reported a cumulative incidence of STD (22%) - twice as high as that of youth in school ¹¹. Secondly, the lack of accurate data on STD trends over time precludes the evaluation of current prevention initiatives, and hinders the formation of future strategies for reducing STD. For example, were the STD trends in street youth found to be increasing, while the rates in the remainder of the population decreased, this would present a strong argument for more resources and more effective prevention programs to be established. Third, street youth frequently report other risk behaviours such as exchanging sex for food and shelter, which differentiates them from other youth within the same age group. As a result, this subgroup is at high risk for contracting STD from unprotected sexual activity and frequent partner exchange. Yet, if more is known about the determinants of risk within this group, prevention programs and treatment facilities could be set up to address the risk determinants, and thus reduce the risk behaviour and the STD rates.

A review of literature from 1984 to 1997 on street-involved youth found many studies lack the theoretical framework or conceptual model to guide their investigations. The literature has clearly indicated that programs designed to prevent the transmission of STD among this population should address all the needs these youth face; including food, shelter, drug treatment, medical care and reproductive and mental health services ⁹. Family violence has been shown to be a contributing factor to youth leaving home at an early age. Much literature has demonstrated that family violence is a predictor for not using condoms on a regular basis as well as for involvement in commercial sex industry ^{9,12,13}. Though studies have defined commercial sex workers as a high risk group for contracting and transmitting STD, the differences between youth involved in prostitution and those not involved in prostitution is unclear. Commercial sex work may be very important in defining street youth's perception of risk, as are the determinants which lead them into prostitution in the first place. However, in reviewing the literature, factors influencing street youths' lives (such as depression, suicide, accesses to health care, drug treatment as well as family violence) were not taken into consideration when designing the studies. Therefore, relevant questions were missing from data collection instruments.

Studies have proved that programs aimed at youth do convey information which increases knowledge about STD. However, it is clear that knowledge does not lead to a decline in risk behaviour in this population or awareness of risk status ^{12,14}. As a result, studies aimed at identifying ways to decrease the STD rate in youth need to determine and monitor what are the motivating factors for this population to protect themselves from STD and from contributing to the further spread of infection. To contribute meaningfully to the knowledge of street involved youth, questions should focus on the difference between the level of understanding youth have about STD and how they define their own risk status in relation to other factors affecting their lives:

Lastly, once street youth are diagnosed with a STD, treatment of the STD is essential. However, the problem of reinfection is a valid concern as youth who come forward and are being treated, may be reinfected by their partners. To break the cycle of transmission, it is necessary to treat their partners. However, little data is available to document the barriers to partner notification in this population.

This review has clearly demonstrated the need for an enhanced, sentinel surveillance system which will provide basic data to determine trends in the areas of STD, risk behaviours, and determinants of risk behaviour in Canadian Street Youth. According to the definition of surveillance below (section 4.0) this is the information required to reduce the high rates of STD in this population.

3.0 Goals

Through data collection and analysis, the sentinel surveillance program will:

Provide information on the sexual health and sexual behaviours of Canadian street youth which is essential for developing appropriate and effective disease prevention programs.

3.1 Objectives:

Objectives by which to reach the goal:

- A. To determine the prevalence rates and trends of STD in Canadian Street Youth
- B. To identify and monitor determinants of Canadian youth leaving home and becoming street-involved. (For example, family violence, drug use of parent and child.)
- C. To describe the socioeconomic and demographic characteristics, and the risk behaviour of Canadian street youth.
- D. To describe the attitudes and perceptions of street youth concerning safer sex, risk behaviour, and the consequences of unprotected sex and determine if the trend changes over time.
- E. To assess barriers to STD diagnosis, treatment, and partner notification.
- F. To develop a statistical correction factor to allow for pooling of results obtained from commercially available urine tests for chlamydia, gonorrhoea.
- G. To collect and store sera for additional serological tests at a later date. The intended blood tests may include HIV, genital herpes, HPV, HTLV, and HGV.

4.0 Study Design

In order to address the above goals and objectives, a national, multi-centre cross-sectional surveillance system is proposed which is to be repeated within the same time period for five consecutive years. The first proposed data collection period will begin in January 1999, with subsequent data collection for the remaining four years contingent on budget approval. This methodology is consistent with the requirements of a sentinel surveillance system, as cited below.

Public health surveillance is "the ongoing and systematic collection, analysis and interpretation of outcome-specific data, closely integrated with the timely dissemination of these data to those responsible for preventing and controlling disease or injury"¹⁵. Surveillance information is used for planning, implementing and evaluating public health interventions. Surveillance data, therefore, are used to both assess the need for intervention as well to determine the type of intervention needed. While traditional surveillance activities focussed primarily on disease events, more sophisticated surveillance systems incorporate determinants of the disease such as the Behavioural Risk Factor Surveillance System in the United States¹⁵.

4.1 Prevention of Bias

In addition to the requirement of continuous assessment, surveillance systems also require data which is representative of the whole population of interest. Studies on street youth have identified the knowledge gap that exists due to the lack of representative, valid data ^{10,16,17}. Representative surveys (despite the fact that they are repeated, and provide trends over time) such as the National Population Health Survey or the National Longitudinal Survey of Children and Youth do not capture street-involved youth. Their sampling schemes do not allow for the opportunity to interview participants outside of the school system or who do not have a permanent address. The challenge is to obtain representative data on high risk youth who are not part of the probability sampling frame.

Representative data on high risk groups are more difficult to obtain because their lifestyles exclude them from sampling frames used to obtain probability samples ⁹. Samples for surveys in this population are usually drawn from homeless shelters or clinics ^{17,18}. Obtaining meaningful data from interviews with youth requires special sensitivity since factors within this group are distinctively different in terms of attitudes and survival strategies ⁹. Snowball sampling has been shown to be the best way to survey hard to reach populations ¹⁹. A form of snowball sampling will be used where participants are asked to inform other youth within their social network that the study is being conducted. By using word of mouth as the advertising for the study, recruitment will reach youth that may not have intended to participate due to fear or not knowing about the study. In addition, street involved youth who adopt false identities or who may be on the run from city to city, have an opportunity to hear of the study and participate.

It could be argued that the use of sentinel sites, instead of sampling street youth from random selection of large cities across Canada, will lead to a misrepresentation of street youth. However, the nature of surveillance is to provide a broad estimate of the prevalence of disease in the population, rather than to achieve absolute accuracy. Also, the use of sentinel sites as indicators of the situation in the general population is a standard technique in public health surveillance. ¹⁵

In order to minimise sampling bias within sentinel sites, at least three drop-in centres in each city will be approached to participate in the study. It has been documented that one data site within each city will only capture a subsample of the street youth because youth who are on the streets for different reasons do not visit the same clinics ⁹. The number of participants recruited by each site will be proportionate to the daily number of youth using the drop-in centre. Data collection over the proposed five years will be in effect at different times of the year, in order to address biases in seasonal attendance at drop-in centres and other patterns of movement of street youth. However, in order to address consistency of the sample, the data collection period will overlap for a brief period of time, from year to year that the surveillance system is in effect.

There will be a short questionnaire requesting demographic information of those street-involved youth who do not wish to participate in the study. This will provide data for the comparison between respondents and non-respondents to determine the extent of self-selection bias. Another type of selection bias may be introduced by limiting the study sample to only street-involved youth presenting to the selected drop in centres. In order to address this and to gain an understanding of how many street youth may be missed, participants will be asked how many street youth they know of who do not visit drop-in centres.

Prevalence of chlamydia and gonococcal infections in street youth will be established by urine testing by amplification techniques. As the provinces will be testing the samples using different commercial laboratory tests and different test methods, differences in prevalence of STD across Canada may be attributed at least in part to the performance of the tests, rather than reflecting real differences. In order to minimise the artifact of differences in laboratory testing, duplicates of a 50% random sample of the total number of samples gathered by each centre (n=120), will be stored, batched and sent to the Federal laboratories in Winnipeg to be retested. This is not a mechanism to ensure quality assurance; merely a mechanism by which to create standardised measures for test sensitivities and specificities. This standardisation is essential if we are to pool results in order to obtain one prevalence rate for Canadian street youth, and to correctly interpret regional differences in prevalence. The samples will be shipped in approved biohazard safety containers, recommended by the test manufacturers of the test, to the gonorrhoea and chlamydia laboratories in Winnipeg, where staff will be responsible for the testing of duplicate samples. The test used will be the Roche Amplicor[®] which is the only polymerase chain reaction test currently approved in Canada. Dual testing for both gonorrhoea and chlamydia will be performed simultaneously according to the manufacturers' instructions.

Subsequent to testing, true and false positives and true and false negatives will be calculated for each site. These parameters will be used to assess the prevalence in different sites across Canada to produce an adjusted prevalence for Canadian street youth, if necessary.

The proposed surveillance system enhances generalisability of results by addressing biases introduced by self-selection, time (seasonality), space (geography), laboratory confirmed diagnosis, and selection of participants by snowball sampling.

4.2 Eligibility Criteria and Recruitment

Participants will be:

1. 15-24 years of age (14 years of age for those provinces which allow for youth of this age to be involved in research studies)
2. able to understand spoken French or English
3. able to understand and recognize the purpose of the study

In addition, they will also:

4. be frequenting an organization dedicated to street-involved people at time of recruitment.

Or in the last six months,

5. have used the services of one of the above agencies.

or

6. have run away from home or other place of residence for three days or more

or

7. been thrown out of home for three days or more

or

8. been without a fixed address for three days or more²⁰.

Youth who meet the age criteria but who have not been out of home or other place of residence for three days or more, will not be included in the study.

In order to enhance recruitment of street involved youth, fast food vouchers will be given to all participants. The value of the fast food voucher will be fixed amount across each of the sites.

5.0 Implementation

The first year of the surveillance system will be conducted at at least three "drop-in centres" within each of the following major cities in Canada; Vancouver, Edmonton, Winnipeg, Toronto and Halifax. Subsequent years will allow for other cities within Canada to participate in data collection.

Research nurses experienced in working with street-involved youth will administer the questionnaires and provide necessary referrals to youth who request counselling regarding the issues raised in the questionnaires. Documentation regarding interpretation of questions on the questionnaires will be provided to each research nurse. Opportunity will be given, through a teleconference, for all research nurses involved in data and specimen collection, to raise questions and gain understanding of the all questions as asked in the questionnaire. This will ensure the interpretation of all questions are consistent across data collection sites. In addition, collection of urine and blood specimens from each youth who agree to take part in the laboratory component of the study, will be requested.

Those who do not wish to participate in the study will be given the option of returning in a day or two if they change their minds. Those who do not consent to participate will be asked a few questions, such as the closest intersection to where they "hang out," length of time on the street, main reason for leaving home, and why they did not wish to take part in the study. Refusal to answer any questions will be respected and the number of non-respondents will be noted.

A questionnaire on demographic characteristics, risk behaviours and family history will be interviewer administered to those consenting to participate. Subjects who agree to participate in the lab portion of the study will be asked for a urine sample and a blood sample, with the option of declining to be tested for hepatitis B. The urine sample will be used to test for chlamydia and gonorrhea. Standard PCR testing methods will be used. All specimens collected from each of the three data collection sites within a city will be sent to one local laboratory which will perform standard, commercially available tests for STD in urine and blood. For urine samples, the time of the previous void will also be recorded. A blood sample will be used to test for hepatitis B with surface and core antibody tests being completed. Remaining sera will be stored to be tested at a later date for possibly HIV, genital herpes, HPV, HTLV and HGV. Each data collection site will have the option of not participating in the collection of blood samples from the youth. This would result in the site taking part in the urine collection only to determine the prevalence rates for chlamydia and gonorrhea.

Information linking the patient's name (this may be a nickname the subject chooses for themselves and provides to the research nurse) and study identification number will be kept at the drop-in centre for the purpose of linking each subject returning to the interview site for their laboratory results. As treatment will be given to all subjects with laboratory confirmed chlamydia and/or gonorrhea, the link between the laboratory results and individual is vital. All positive cases of chlamydia and gonorrhea will be reported to the public health board.

Participants will be encouraged and informed of the importance of their return to the data collection site for their laboratory results regarding the testing for STD. In addition, within the questionnaire, each subject will be asked about their intent regarding partner notification (if they are positive on any STD they tested for) as well as if they intend to return for their results at all. If results from the laboratory tests indicate positive results of chlamydia and/or gonorrhoea, azithromycin and/or cefixime will be administered at the data collection site. Subjects who return for their laboratory results will be asked to participate in an interviewer administered questionnaire taking five to seven minutes of their time. This questionnaire will address the reasons for returning for laboratory results and if the respondent is positive for chlamydia and gonorrhoea, questions regarding partner notification will also be asked. The responses will be compared to responses in the initial questionnaire regarding their intent regarding partner notification prior to knowing their laboratory results.

5.1 Questionnaires

There will be two questionnaires administered to youth agreeing to participate in the enhanced surveillance project. The first questionnaire will precede the collection of urine and blood specimens. It will consist of a core set of questions on demographics, including age, gender, the street names of the closest intersection where they 'hang out' most often, income and level of education, health, sexual behaviours, family history, lifestyle behaviours, including age at first intercourse, number of sexual partners, sexual preferences, condom use, intentions regarding returning for laboratory results and partner notification, and knowledge of STD.

The second questionnaire will be interviewer administered and a request of all subjects who return to the interview site for their laboratory results, will be made. The questions address the reasons for the returning for their test result(s). For those testing positive, questions relating to partner notification will be asked.

Issues surrounding street-involved youth which are not covered by the core set of questions in the data collection instrument but are of interest to individual researchers at each of the prospective cities, will be addressed by adding modules of questions to the base questionnaire. The questions contained in the modules will be standardised across all sites wishing to use them, so as to allow comparability of data across participating centres.

5.2 Statistical analyses

The following list of hypothesis has been generated as the initial step to examine issues relating to street involved youth and address all factors that influence their lives. Individual researchers at each of the prospective sites will be encouraged to publish the data from their site as soon as data entry is complete. Publications regarding multiple sites will be drafted by the research unit within the Division of STD Prevention and Control with the opportunity for individual researchers from the provinces to review the articles.

5.3 Hypotheses

1. To determine the prevalence and trends of STD (gonorrhoea and chlamydia) and other infectious diseases (hepatitis B) in the street youth population in urban centres across Canada. It is

hypothesized that the prevalence of STD in this population will be 11% with a 95% confidence interval of (.09, .12) based on findings in the pilot study.

2. To assess whether family violence, perceived wellness, mental wellness, suicide intent/attempts and participation in the sex trade, are associated with high risk behaviour and/or disease status (testing positive or negative for an STD). Youth who experience family violence and their perceived wellness, depression factors, suicide intent/attempts and participation in the sex trade, affect their level of protection against an STD. In addition to this, it is believed that these factors will be found to explain much of the variance in the logistic model with outcome being regular condom use.
3. To describe and monitor the proportion of youth experiencing family violence and/or neglect before leaving home. Through univariate statistical methods determine the proportion of youth who have defined family violence and/or neglect as being the principal factor for leaving home. Confidence limits will be calculated around the proportions. The first year of data collection will be viewed as baseline data and other years data collected will be compared to baseline data.
4. To describe and monitor the proportion of youth involved in the sex trade which includes sex for money, sex for drugs and sex for survival. Confidence intervals will be calculated and values will be compared to baseline data in year one.
5. To assess the acceptability of blood and urine testing to street youth, and the proportion who return for results. It is hypothesized that youth who agree to participate in the study will also agree to give blood and urine. It is expected that nearly 90% of all youth will participate in providing specimens.
6. To collect information on real and perceived barriers to partner notification. It is hypothesized that there exist numerous barriers to partner notification and that nearly 90% of youth fear repercussions from other youth they associate with if they are found to have an STD.
7. To determine the prevalence and trends of STD, (chlamydia gonorrhea and hepatitis B immediately and HIV, genital herpes, HPV, HTLV and HGV at a later date from stored blood), in the street youth population in urban centres across Canada. Blood samples will be stored at provincial laboratories. The expected prevalence rates of STD in this population cannot be estimated since surveillance on these STD have not been done previously.

5.4 Sample Size Estimation:

The above hypotheses were used to generate the sample size of 1,440 street-involved youth in from all five cities from the time period of January 7th, 1999 to July 5th, 1999. In terms of subject accrual, the recruitment goal will be approximately 240 youth per site over a 6-month data collection period. The sample size was based on an 11% prevalence rate demonstrated in the pilot study. The 95% confidence intervals, assuming a prevalence of 11% are (.0922;.1277). The sample size of 1,440 subjects will allow us to detect an odds ratio of 1.5 or 50% increase in probability associated with a positive chlamydia test compared with a negative one, assuming a power of $\alpha=.05$ and $\beta=.10$ in a logistic regression model. Also, the sample size will provide enough power to detect a significant drop of 50% in STD rates in street youth over time.

6.0 Analysis

Once the data are forwarded to the Division of STD Prevention and Control, they will be entered, cleaned and analysed under the supervision of staff in the STD Research Unit. This procedure will ensure consistent data entry and analysis. The complete electronic data set will be returned to each province for their use.

A two-tailed alpha level of 0.05 will be used to test for statistical significance. The data will be entered in Microsoft Access and analysed using SAS V6.2.

Differences between data collection sites will be evaluated initially. Variables within the questionnaire will be identified as primary or secondary risk factors in relation to the outcomes under study, prior to the analysis of data. Once this hierarchy is established, univariate analysis of the primary and then secondary variables in relation to the outcome variables will be done. Logistic regression models will be built with the variables in the primary and secondary list that are significantly related to the outcome under study.

7.0 Ethics

Ethical approval will be obtained by each site prior to data collection. Since each province has different ethical standards, each researcher within each province will submit the proposal for ethical approval to the appropriate organisations.

Participants will be informed by a research nurse in simple, clear language with no jargon of the purpose of the study and how the information will be used. Details about the study will be shared with the participants including that there are two components; a questionnaire and urine and blood specimen collection. Verbal consent will be requested of all participants. All participants will be informed that providing urine and blood samples are optional. The results will be kept confidential and that laboratory results for hepatitis B will be provided. Any other tests done with the remaining blood will be anonymous and unlinked and the youth will not be tracked to have the results of other serological results provided to them. Referrals for counselling and treatment regarding the issues raised in the questionnaires will be extended to each participant requesting it or displaying signs to the research nurse as urgently requiring attention. Each participant will be encouraged to return to the data collection site obtain their results. The option of providing one of the two requesting specimens, can also be exercised. Participants with positive laboratory results for chlamydia and/or gonorrhea, will be treated with azithromycin and/or cefixime, administered by the research nurse at the time results are given to the participants.

Those participants who do not agree to give a urine and/or blood but still wish to participate will be only asked to complete the questionnaire (approximately 10 to 15 minutes). If youth refuse to take part, they will be asked to answer a few questions regarding demographic information, (three to four minutes). The participants will further be informed that refusing to participate in the study will not jeopardize the future use of the drop-in centre or any other adjunct services now or at any time in the future.

All participants will be assigned an identification number which will be used on all data collection forms. Individual patients will not be identified and any results will summarize the entire group sampled. Laboratory results (for chlamydia, gonorrhea and HBV) will be obtained by participants presenting their identification numbers or another identifier suggested by the participant at the time of submission of the laboratory specimens. The identifier suggested by the participant will be linked with the identification number on file at the data collection site but will not be used for questionnaire identification.

All data collection forms will be stored in a locked filing cabinet at the respective data collection sites. All questionnaires will be kept in a locked filing cabinet and will only be accessible by the research nurses or by the principal investigator and research coordinator. Under no circumstance will the information be copied, forwarded or circulated to anyone that is not involved in data collection at the site.

While the data are being entered at the STD Research Unit, in the Division of STD Prevention and Control, they will be backed up daily. Backups will be stored in an area separate from the work area, in case of damage to the work area. In order to preserve data security, access to the data will be permitted only by the staff at the Research Unit, which may include a research assistant. The data will be stored on a computer with a password. Access to the office area by Health Protection Branch employees only is controlled. Under no circumstances will any nominal data, either on the questionnaire or on the laboratory test results, be reported on an individual basis.

8.0 Feasibility

By choosing participants from local drop in centres throughout Canada on a representative basis, determining risk factors associated with the predetermined outcomes is feasible. Participants will be both male and female. Specimens will be transported according to recommendations of the manufacturer.

For the participants, the study protocol does not require activity beyond a questionnaire (taking approximately 10 to 15 minutes), returning for laboratory results, treatment if found positive for chlamydia and/or gonorrhoea, taking approximately five minutes as well as the participation of the second interviewer-administered questionnaire (five to seven minutes).

9.0 Time Lines

In conjunction to providing feedback on the core questionnaire to be used nationally, the focus will also be on selection and preparation of the data collection sites. Proportional sample will be based on preliminary investigation by the researcher within each of the five cities, at the three data collection sites, with the opportunity to add more cities in the enhanced surveillance system. Data collection is to start by January, 1999 and continue until July, 1999 for the first year of the project.

10.0 Implementation plan

The proposed budget is contained in appendix B. A suggested implementation schedule as outlined in the draft contract is contained in Appendix C.

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Appendix E

Summary Statistics of Manifest Variables by Sex

Appendix E

Summary Statistics of Manifest Variables by Sex

Variable	Males (N=180)	Females (N=139)	F _(1,318) , p-value*
Self-esteem	36.67	32.45	30.13, p<.0001
Perception of Risk	1.22	1.22	0.00, n.s.
History of Abuse	0.51	0.88	14.12, p<.005
Relationship with Parents	7.34	7.43	0.04, n.s.
Current Illicit Drug Use	4.68	4.37	1.43, n.s.
Current Alcohol Use	4.17	4.14	0.01, n.s.
Use of Used IDU Equipment	0.12	0.07	1.47, n.s.
STD Status, Past and Current	0.33	0.70	18.02, p<.0001
Frequency of Condom Use	3.41	4.69	14.14, p<.005
Number of Recent Sexual Partners	2.99	4.93	5.79, p<.05

*Used the Scheffe Test for mean differences which controls the Type 1 experimentwise error rate.

Appendix F

Summary Statistics of Manifest Variables by Aboriginal Status

Appendix F

Summary Statistics of Manifest Variables by Aboriginal Status

Variable	Aboriginal (N=169)	Non-Aboriginal (N=150)	F _(1,318) , p-value*
Self-esteem	33.73	36.07	8.81, p<.005
Perception of Risk	1.27	1.16	1.05, n.s.
History of Abuse	0.66	0.68	0.05, n.s.
Relationship with Parents	7.62	7.11	1.25, n.s.
Current Illicit Drug Use	4.22	4.91	7.44, p<.01
Current Alcohol Use	3.74	4.62	8.26, p<.05
Use of Used IDU Equipment	0.02	0.18	19.21, p<.0001
STD Status, Past and Current	0.60	0.37	6.87, p<.01
Frequency of Condom Use	3.92	4.02	0.09, n.s.
Number of Recent Sexual Partners	4.67	2.90	4.83, p<.05

*Used the Scheffe Test for mean differences which controls the Type 1 experimentwise error rate.

Appendix G

**Description of the Self-Reported Relationship between Street-Involved Youth
and Their Mothers and Fathers**

Appendix G

Description of the Self-Reported Relationship between Street-Involved Youth and Their Mothers and Fathers

Indicator of Relationship	Relationship with Mother		Relationship with Father	
	# of Youth	% of Applicable Youth	# of Youth	% of Applicable Youth
Has not seen or spoken to parent in the last 3 months	31	9.7%	84	26.3%
Does not have a mother/father	7	2.2%	55	17.2%
Frequency of contact with parent				
Number that have had contact	281	88.1%	180	56.4%
Very irregularly	39	13.9%	51	28.3%
Occasionally, i.e., not every week	39	13.9%	36	20.0%
Regularly, i.e., once or more a week	202	71.9%	93	51.7%
Quality of contact with parent				
Very good	84	29.9%	40	26.7%
Good	99	35.2%	67	37.2%
Average	73	26.0%	35	19.4%
Bad	19	6.8%	18	10.0%
Very Bad	6	2.1%	12	6.7%

Appendix H

Frequency of Regular and Binge Drinking among Winnipeg Street-Involved Youth

Appendix H

Frequency of Regular and Binge Drinking among Winnipeg Street-Involved Youth

Current Alcohol Use Indicator	Number of Youth	% of Applicable Youth
Have you used alcohol in the past 3 months?		
No, I have never used alcohol	11	3.5%
No, I have not used alcohol in the past 3 months	22	6.9%
Yes	284	89.0%
Missing	2	0.6%
How would you classify your alcohol use in the last 3 months?		
Drank less than once per month	63	22.2%
Drank 1-3 times per month	88	31.0%
Drank 1-3 times per week	72	25.4%
Drank 4-6 times per week	34	12.0%
Drank everyday	27	9.5%
During the times that you consumed alcohol in the past 3 months, how often did you binge drink?		
Never	26	9.2%
Binged less than once per month	80	28.2%
Binged 1-3 times per month	67	23.6%
Binged 1-3 times per week	67	23.6%
Binged 4-6 times per week	25	8.8%
Binged everyday	17	6.0%
Missing	2	0.7%

Appendix I

Type and Amount of Non-Injection Drugs Used by Winnipeg Street-Involved Youth

Appendix I

Type and Amount of Non-Injection Drugs Used by Winnipeg Street-Involved Youth

Non-Injection Drug Use Indicator	Number of Youth	% of Applicable Youth
Have you used non-injection drugs in the past 3 months?		
No, I have never used non-injection drugs	4	1.3%
No, I have not used non-injection drugs in the past 3 months	59	18.5%
Yes	255	79.9%
Missing	1	0.3%
Which drug did you take most often in the last 3 months without injecting?		
Marijuana	231	90.6%
Hash/Hash Oil	1	0.4%
Mushrooms	2	0.8%
Cocaine	3	1.2%
Crack	4	1.6%
Crystal Methalyne	2	0.8%
Acid	11	4.3%
Ecstasy	1	0.4%
In a typical week, how often do you take drugs without injecting?		
Use less than once per month	4	1.6%
Use 1-3 times per month	26	10.2%
Use 1-3 times per week	74	29.0%
Use 4-6 times per week	31	12.2%
Use everyday	17	6.7%
Refused to answer	1	0.4%
Don't know	102	40.0%

Appendix J

Type and Amount of Injection Drugs Used by Winnipeg Street-Involved Youth

Appendix J

Type and Amount of Injection Drugs Used by Winnipeg Street-Involved Youth

Injection Drug Use Indicator	Number of Youth	% of Applicable Youth
Have you used injection drugs in the past 3 months?		
No, I have never used injection drugs	254	79.6%
No, I have not used injection drugs in the past 3 months	39	12.2%
Yes	23	7.2%
Missing	3	0.9%
Which drug did you inject most in the last 3 months?		
Cocaine	10	43.5%
Heroin	9	39.1%
PCP	1	4.3%
Mophine	1	4.3%
Others	2	8.7%
In a typical week, how many times do you inject drugs?		
Inject less than once per month	0	0%
Inject 1-3 times per month	4	17.4%
Inject 1-3 times per week	3	13.4%
Inject 4-6 times per week	4	17.4%
Inject everyday	6	26.1
Don't know	6	26.1

Appendix K

Type and Frequency of Recent Sexual Partnering for Male and Female

Winnipeg Street-Involved Youth

Appendix K

Type and Frequency of Recent Sexual Partnering for Male and Female Winnipeg Street-Involved Youth

Sexual Partnering within the Last 3 Months	Females			Males		
	Number of Respondents (%)	Range of Sexual Partners	Mean Number of Sexual Partners	Number of Respondents (%)	Range of Sexual Partners	Mean Number of Sexual Partners
Regular Sexual Partner	102 (73.4%)	1 - 3	X=1.12, std=0.41	93 (51.7%)	1 - 4	X=1.22, std=0.57
Casual Sexual Partner	69 (49.6%)	1 - 10	X=2.51, std=1.86	94 (52.2%)	1 - 20	X=3.28, std=3.58
Client Sexual Partner	30 (21.6%)	1 - 55	X=13.27, std=15.85	9 (5.0%)	2 - 31	X=13.00, std=11.08
Any Type of Sexual Partner	129 (92.8%)	1 - 55	X=5.31, std=9.63	147 (81.7%)	1 - 31	X=3.66, std=5.01

Appendix L

**Frequency of Condom Use for Male and Female Winnipeg Street-Involved Youth
by Type of Sexual Partner**

Appendix L

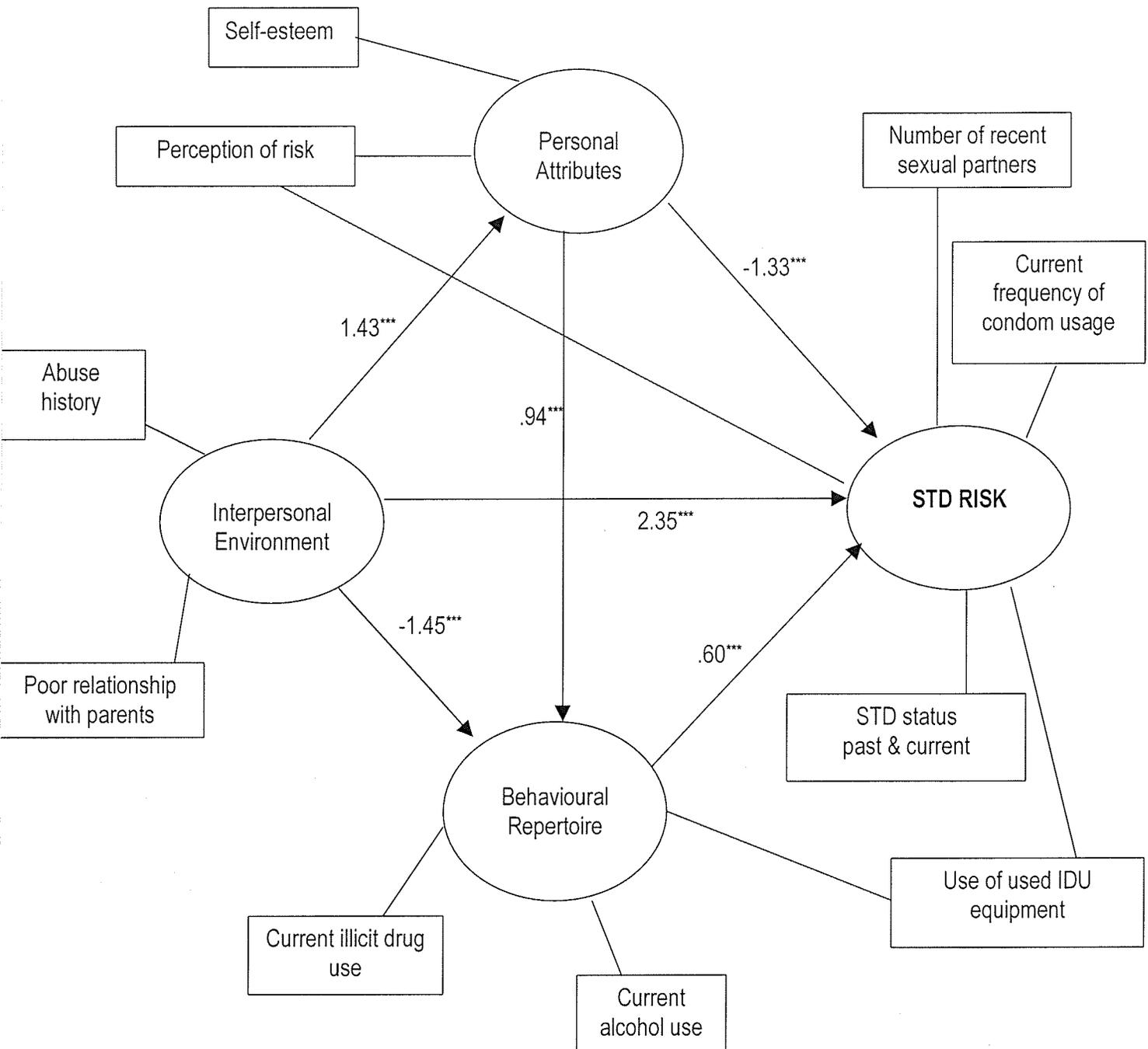
Frequency of Condom Use for Male and Female Winnipeg Street-Involved Youth by Type of Sexual Partner

Type of Recent Sexual Partnering	Females		Males	
	# of Youth	% of Applicable Youth	# of Youth	% of Applicable Youth
Regular Sexual Partner	102	73.4%	93	51.7%
Always used a condom	16	15.7%	30	32.3%
Used a condom most of the time	26	25.5%	19	20.4%
Used a condom half of the time	55	53.9%	32	34.4%
Used a condom sometimes	2	2.0%	1	1.1%
Never used a condom	3	2.9%	1	1.1%
Casual Sexual Partner	69	49.6%	94	52.2%
Always used a condom	22	31.9%	29	30.9%
Used a condom most of the time	9	13.0%	31	33.0%
Used a condom half of the time	35	50.7%	32	34.0%
Used a condom sometimes	3	4.3%	0	0%
Never used a condom	0	0%	2	2.1%
Client Sexual Partner	30	21.6%	9	5.0%
Always used a condom	1	3.3%	1	11.1%
Used a condom sometimes	22	73.3%	7	77.8%
Never used a condom	7	23.3%	1	11.1%
Any Type of Recent Sexual Partner	129	92.8%	147	81.7%
Always used a condom	12	9.3%	28	19.1%
Used a condom most of the time	67	51.9%	81	55.1%
Used a condom half of the time	47	36.4%	32	21.8%
Used a condom sometimes	3	2.2%	5	3.4%
Never used a condom	0	0%	1	0.7%

Appendix M

Structural Model of STD Risk among Male Street-Involved Youth

Appendix M
Structural Model of STD Risk for Male Street-Involved Youth



** $p < .01$; *** $p < .001$

Goodness of Fit Index = .95 (criteria $\geq .90$)

Adjusted Goodness of Fit Index = .91 (criteria $\geq .80$)

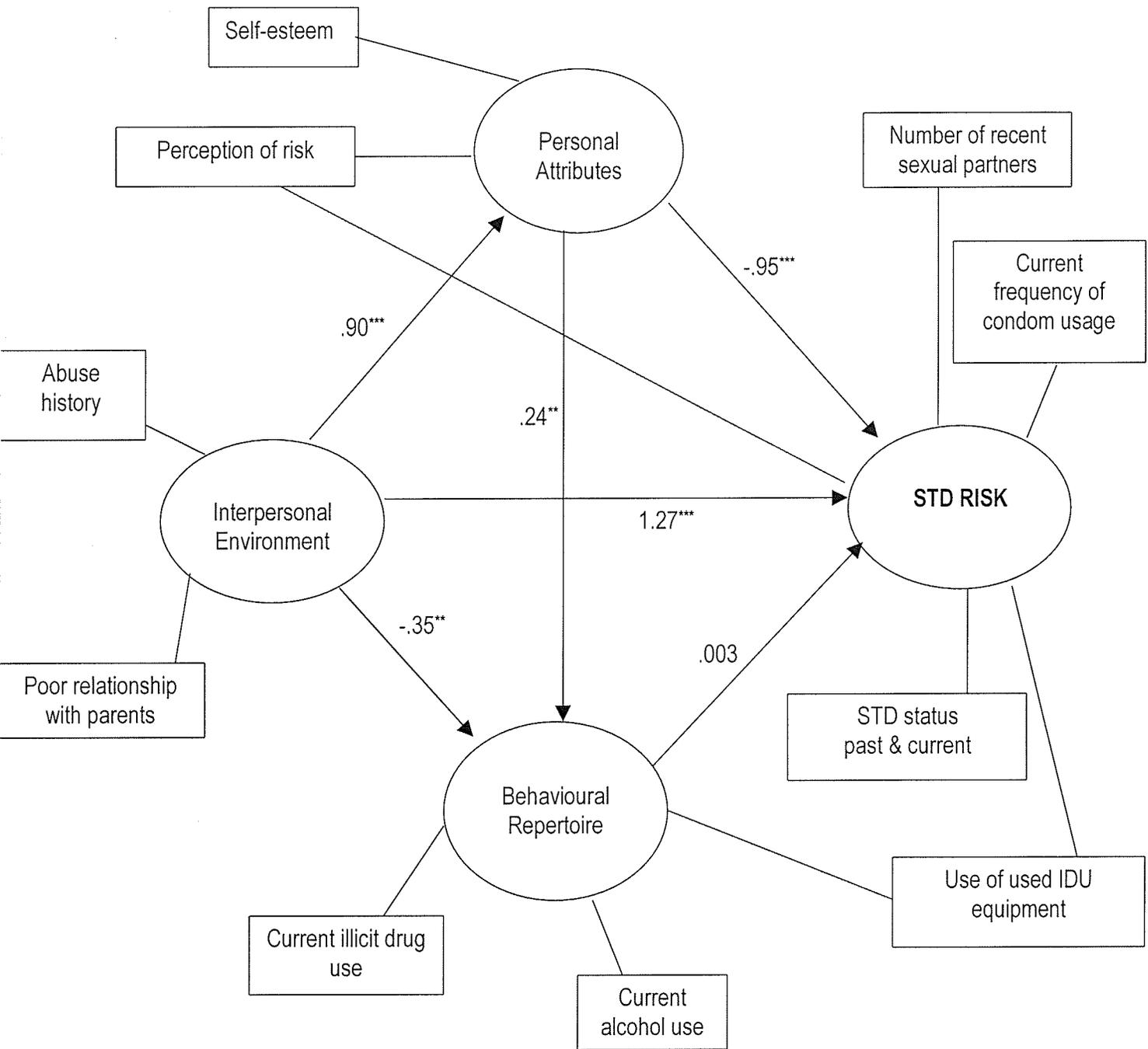
Bentler's Comparative Fit Index = .90 (criteria $\geq .90$)

Root Mean Square Error Approximation = .057 (criteria $\leq .06$)

Appendix N

Structural Model of STD Risk among Female Street-Involved Youth

Appendix N
Structural Model of STD Risk for Female Street-Involved Youth



p<.01; *p<.001

Goodness of Fit Index = .93 (criteria >=.90)

Adjusted Goodness of Fit Index = .87 (criteria >=.80)

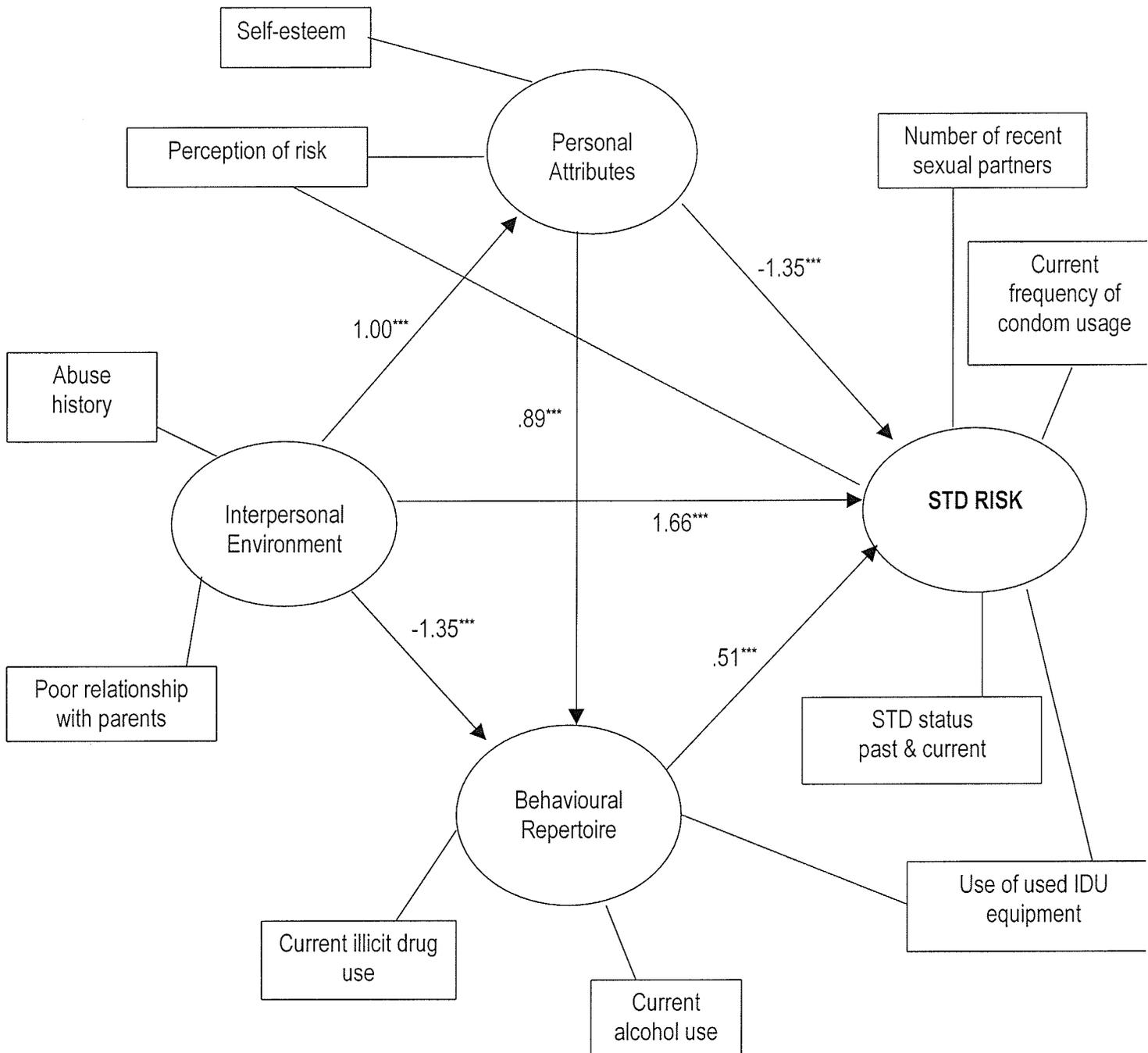
Bentler's Comparative Fit Index = .81 (criteria >=.90)

Root Mean Square Error Approximation = .060 (criteria <=.06)

Appendix O

Structural Model of STD Risk among Non-Aboriginal Street-Involved Youth

Appendix O
Structural Model of STD Risk for Non-Aboriginal Street-Involved Youth



p<.01; *p<.001

Goodness of Fit Index = .94 (criteria >=.90)

Adjusted Goodness of Fit Index = .89 (criteria >=.80)

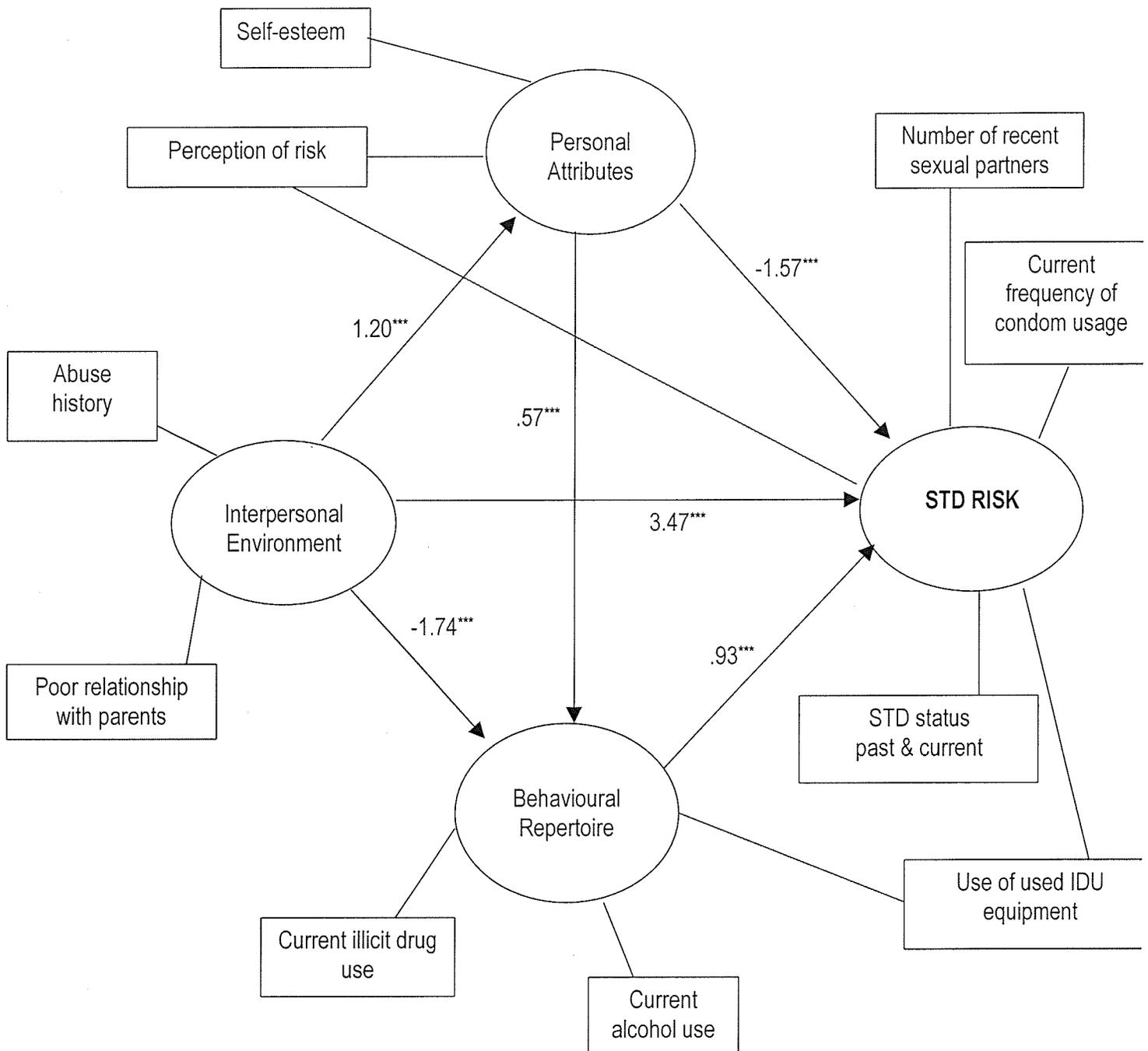
Bentler's Comparative Fit Index = .85 (criteria >=.90)

Root Mean Square Error Approximation = .060 (criteria <=.06)

Appendix P

Structural Model of STD Risk among Aboriginal Street-Involved Youth

Appendix P
Structural Model of STD Risk for Aboriginal Street-Involved Youth



p<.01; *p<.001

Goodness of Fit Index = .95 (criteria >=.90)
 Adjusted Goodness of Fit Index = .91 (criteria >=.80)
 Bentler's Comparative Fit Index = .90 (criteria >=.90)
 Root Mean Square Error Approximation = .052 (criteria <=.06)