

SEXUALLY TRANSMITTED INFECTION RISK MISPERCEPTION AND ITS
PREDICTORS IN UNDERGRADUATES AT UNIVERSITIES IN MARITIME CANADA

by

Laura Keeler

Submitted in partial fulfillment of the requirements for the degree of Master of Science

at

Dalhousie University
Halifax, Nova Scotia
December 2016

DEDICATION

To my folks and my Tristan, whose support of me is constant and patience with me is unwavering. Thank you for filling me with love and with light, and for always understanding.

TABLE OF CONTENTS

LIST OF TABLES.....	v
LIST OF FIGURES.....	vi
ABSTRACT.....	vii
LIST OF ABBREVIATIONS USED.....	viii
ACKNOWLEDGEMENTS.....	ix
CHAPTER 1. INTRODUCTION.....	1
CHAPTER 2. BACKGROUND.....	4
2.1 EXPERIENCES AMONG COLLEGE/UNIVERSITY STUDENTS.....	4
2.1.1 <i>Sexual Behaviour among College/University Students</i>	4
2.1.2 <i>Outcomes Associated with Sexual Risk-Taking</i>	5
2.1.3 <i>University Student Health Services</i>	6
2.2 PERCEPTION OF HEALTH RISKS.....	7
2.2.1 <i>Accuracy of Risk Perception</i>	7
2.2.2 <i>Predicting Risk Perception</i>	8
2.3 COGNITIVE THEORIES AND SEXUAL BEHAVIOUR.....	10
2.3.1 <i>The Health Belief Model</i>	10
2.3.2 <i>The Health Belief Model and Risky Sexual Behaviour</i>	11
2.3.3 <i>The Health Belief Model and Behaviour Change</i>	12
2.4 RESEARCH ON STI RISK MISPERCEPTION AND THE HEALTH BELIEF MODEL.....	15
2.4.1 <i>The Relationship between Perceived STI Risk and Risk-Taking Behaviours</i>	15
2.4.2 <i>Risk Perception and STI testing</i>	17
2.5 LIMITATIONS IN THE LITERATURE.....	18
2.6 MOVING FORWARD IN RESEARCH ON STI RISK PERCEPTION IN UNDERGRADUATE STUDENTS.....	19
2.7 OBJECTIVES.....	20
CHAPTER 3. METHODS.....	21
3.1 RESEARCH DESIGN AND RATIONALE.....	21
3.2 SAMPLE POPULATION AND RECRUITING.....	21

3.2.1 <i>Sample Population</i>	22
3.2.2 <i>Recruitment</i>	20
3.3 SURVEY DEVELOPMENT AND ADMINISTRATION.....	23
3.3.1 <i>The Survey</i>	23
3.3.2 <i>Development of the Survey</i>	23
3.3.3 <i>Survey Administration</i>	23
3.3.4 <i>Survey Response Rate</i>	24
3.3.5 <i>Ethics</i>	24
3.4 VARIABLES OF INTEREST.....	24
3.4.1 <i>Dependent Variables- Objectives 1 and 2</i>	24
3.4.2 <i>Dependent Variable – Objective 3</i>	25
3.4.3 <i>Independent Variables</i>	25
CHAPTER 4. STATISTICAL ANALYSIS.....	31
CHAPTER 5. POWER CALCULATIONS.....	34
CHAPTER 6. RESULTS.....	35
CHAPTER 7. DISCUSSION.....	56
7.1 RESEARCH QUESTION 1.....	56
7.2 RESEARCH QUESTION 2.....	58
7.3 RESEARCH QUESTION 3.....	64
CHAPTER 8. STRENGTHS.....	67
CHAPTER 9. LIMITATIONS.....	68
CHAPTER 10. CONCLUSIONS.....	71
REFERENCES.....	74
APPENDIX A QUESTIONNAIRE CONTENT.....	87
APPENDIX B SURVEY RESPONSE RATE AT THE MARITIME CANADA UNIVERSITIES.....	89
APPENDIX C ITEMS OF STI RISK PERCEPTION.....	90
APPENDIX D ITEMS OF SEXUAL RISK BEHAVIOUR.....	91
APPENDIX E ITEMS OF STI TESTING.....	92
APPENDIX F QUESTIONNAIRE.....	93

LIST OF TABLES

Table 1.	Characteristics of the study population (n=7185).....	42
Table 2.	STI risk perception levels across categories of risk behaviour. Row percentages (95% confidence intervals) shown (n=7185).....	44
Table 3.	Unadjusted odds ratios (95% confidence intervals) for the association between sexual risk behaviour and having high STI risk perception (n=7185).....	45
Table 4.	STI risk perception categories [†] across study population characteristics. Row percentages (95% confidence intervals) shown (n=7185).....	46
Table 5.	Characteristics of study population stratified by sexual risk behaviour and STI risk perception. Column percentages (95% confidence intervals) shown unless otherwise indicated (n=7185).....	48
Table 6.	Among students who are engaging in risky sexual behaviours, factors associated with low STI risk perception (risk misperception). Unadjusted and adjusted odds ratios and 95% confidence intervals shown for individual behaviours and combined behaviours (n=7185).....	50
Table 7.	Among students who are not engaging in risky sexual behaviours, factors associated with high STI risk perception (risk misperception). Unadjusted and adjusted odds ratios and 95% confidence intervals shown for individual behaviours and combined behaviours (n=7185).....	52
Table 8.	Adjusted odds ratios and 95% CIs for the association between combined risk perception/risk behaviour, covariates, and STI testing. Confounders adjusted for in the model noted (n=6612).....	54
Table 9.	Adjusted odds ratios and 95% CIs for the association between condom non-use, covariates, and STI testing. Confounders adjusted for in the model noted (n=6612).....	55
Table 10.	Adjusted odds ratios and 95% CIs for the interaction between condom non-use and STI risk perception on STI testing. Confounders adjusted for in the model noted (n=6612).....	56

LIST OF FIGURES

Figure 1. Health Belief Model Components and Linkages.....14

Figure 2. Sample Population Breakdown.....22

ABSTRACT

Sexually transmitted infections (STIs) remain an on-going public health concern among young adults, as STIs account for over half of all reported cases of notifiable diseases, with the highest rates amongst 15-24 year olds in the Maritime Provinces. Previous research indicates that a large percentage of college and university students engage in unsafe sexual practices, including having multiple partners and unprotected sex. Many young adults do not perceive their sexual behaviour as risky, perpetuating high risk behaviour and avoiding accessing STI testing and treatment.

This study addressed a gap in the literature surrounding the accuracy of self-perceived sexual risk of university students in the Maritime Provinces by describing levels of perceived risk by level of risk behaviour, identifying predictors of STI risk misperception, and determining if combinations of STI risk perception and risk behaviour level are associated with STI testing. Using cross-sectional data collected online from students at eight Maritime universities, we found that among sexually active students aged 17-29, 93% considered themselves at low risk of contracting STIs, yet 43% of students did not use condoms during last intercourse and 38% had more than one sexual partner in the past year. Despite these numbers, we found those who engage in more risky sexual behaviours were more likely to have an accurate perception of their STI risk. Across groups stratified by risk behaviour, associations between covariates and the odds of perceiving low STI risk are not modified to a great extent by actual risk in that certain characteristics are always associated with over or under-estimating risks despite risky sexual behaviours. Ethnicity, sexual orientation, living arrangements, having been subjected to non-consensual sex, marijuana and alcohol usage, peer sexual risk-taking influence, being at risk of depression, and hormonal contraceptive usage all had been identified as being potential correlates to high and low perceptions of being at risk no matter how actual risk had been defined. We also determined that those who engage in less risky sexual behaviours, yet who also perceive their STI risk as low are the least likely to get STI testing, compared to those students who have high STI risk perception and engage in riskier sexual behaviours.

Findings from this study provide a framework for health promotional messages enabling students to take responsibility for their health and helping university officials to make appropriate decisions about sexual health services offered by Maritime universities.

LIST OF ABBREVIATIONS USED

STI	Sexually transmitted infection
HBM	Health Belief Model
CI	Confidence interval
OR	Odds ratio
GPA	Grade point average
HIV	Human immunodeficiency virus
AIDS	Acquired immune deficiency syndrome
HPV	Human papillomavirus
PAP test	Papanicolaou test
PHAC	Public Health Agency of Canada
CES-D	Center for Epidemiological Studies of Depression
Dal	Dalhousie University
AU	Acadia University
SMU	Saint Mary's University
StFX	Saint Francis Xavier University
UNB	University of New Brunswick
UPEI	University of Prince Edward Island
CBU	Cape Breton University
MSVU	Mount Saint Vincent University

ACKNOWLEDGEMENTS

I would like to thank everyone who has encouraged and supported this journey. Notably, my classmates for being ever-willing to lend a hand or an ear, and for the helpful advice throughout my Masters program. I would like to give special thanks to Kevin Wilson, whose brilliant and kind mind has guided me through this process, and to Anna Von Maltzahn, who has taught me what no academic program could.

I would like to express my sincere gratitude to my supervisor and committee, Dr. Donald Langille and Dr. Audrey Steenbeek, Dr. Christy Woolcott, and Dr. Mark Asbridge for their significant contributions to this project. I have truly appreciated their time, their feedback, and their guidance that has helped propel this thesis forward. I would like to add a special thanks to Dr. Donald Langille, who has never stopped rooting for me.

I would also like to thank all faculty members in the Department of Community Health and Epidemiology, especially Tina Bowdrige, whose resourcefulness has helped me navigate through this degree.

Lastly, I would like to thank my family, my partner Tristan, and my pals Kait and Moe for their unfading confidence in me and for their pleasant reminders to always find the balance.

CHAPTER 1. INTRODUCTION

Sexually transmitted infections (STIs) remain an on-going public health concern among Canadian teenagers and young adults. According to the 2010 Report on Sexually Transmitted Infections in Canada by The Public Health Agency of Canada (PHAC), rates of reportable STIs (chlamydia, gonorrhea, and infectious syphilis) have been steadily rising since 1997 despite both clinical and public health interventions.¹ In the Maritime provinces, STIs account for over half of all reported cases of notifiable diseases, with the highest rates amongst 15-24 year olds (numbers similar to national trends).² These rates cited in Public Health Services, however, underestimate the true burden of STIs, as cases are widely underreported.¹ Many STIs do not have recognizable symptoms, which can lead to lack of diagnosis, screening, testing and treatment, as well as decreased risk perception.³ Serious medical and psychological consequences are associated with STIs, which if left undiagnosed or untreated, can lead to severe sequelae.⁴⁻⁷ These occult infections also lead to an economic burden that potentially surpasses that associated with clinically apparent infections,⁸ making it difficult to estimate the true, overall economic burden of STIs and their sequelae. However, recent research suggest that the direct and indirect impact of gonorrhea and chlamydia costs the Canadian healthcare system between \$50 and \$120 million annually.^{9,10}

Being a sexually active youth under 25 years of age – a time when sexual experimentation begins – is a risk factor associated with an increased incidence of STIs.¹¹ While most young adults have positive sexual experiences, risky behaviours are common. Adolescents and young adults have been shown to be at the highest risk for negative sexual health consequences due to this developmental period and the behaviours associated with it.¹² University and college students fit into this category, as research indicates that a large percentage of college and university students engage in unsafe sexual practices, including having multiple partners and unprotected sex.^{13,14} A possible contributing factor to sexual risk-taking among young adults and university students is that many do not perceive their sexual behaviour as risky, denying that they may be at risk of contracting infection and subsequently avoiding diagnosis and treatment.¹⁵ Knowing about young adults' risk perception is important to understanding why

they engage in risky sexual behaviours. Determining whether or not risk perception is a factor that predicts STI testing will help develop prevention and intervention methods to change behaviour.

An objective of this study is to fill the gap that exists in the literature surrounding the accuracy of self-perceived sexual risk of university students in the Maritime Provinces (Nova Scotia, New Brunswick and Prince Edward Island). Prior studies have explored perceived risk of STI among university students; however few studies have tried to identify variables related to the accuracy of risk perception of STIs.¹⁴ Accuracy of risk perception is an important component in the Health Belief Model, which provides a theory that helps to explain health behaviours. This may be especially important in university populations, where risk behaviours are prevalent.^{13,14} Past studies have also been limited by examining certain populations (e.g., clinic patients) or specific outcomes (e.g., human immunodeficiency virus/HIV), leading to discrepancies among study findings. Furthermore, most research has examined young American adults and no prior research done in the context of Canadian university undergraduate populations.

To address the limitations of previous research, the proposed study will: a) include participants from eight universities throughout the Maritime Provinces to address an absence of Canadian data exploring factors that contribute to university students' STI risk perception and if combinations of risk perception and behaviour are associated with STI testing, b) include data on a non-clinic based sample of participants, and c) include questions that address the measurement issue referring to "sexually transmitted infections" as opposed to HIV/STIs, the HIV components of which implies more serious and perhaps higher risk assessment than more common, reportable infections, such as chlamydia.

The overall aims of this study are to: (1) describe the levels of self-perceived risk of contracting STIs among Maritime university students across categories of actual risk as defined by their sexual risk behaviours (2) identify demographic factors, health knowledge factors, and health behaviours related to inaccurate risk perception for both those who are low risk and high risk; and (3) determine if specific combinations of STI risk perception and risky sexual behaviour (i.e., high perception/low risk, high perception/high risk, low perception/low risk and low perception/high risk) are associated with STI testing.

The Undergraduate Student Sexual Health Services Survey will be used to answer these research questions. Cross-sectional data were collected online in 2012 from students enrolled in eight universities throughout the Maritime Provinces. Information was collected about students' perceived risk of contracting STIs as well as their sexual risk behaviours, past STI testing, demographics and personal characteristics.

Perceived risk is a core concept of the Health Belief Model, which has been used to explain health behaviours such as sexual risk-taking and demonstrates how altering one's risk perception can help to facilitate behaviour change. By increasing awareness, and thus perception that risk does exist, students may be motivated to protect themselves through STI testing. Focusing on predictors of inaccurate risk perception and how accuracy of risk perception is associated with STI testing through health promotion and prevention interventions will target a high-risk population and an important public health concern.

CHAPTER 2. BACKGROUND

2.1 FACTORS IMPORTANT TO SEXUAL HEALTH AMONG COLLEGE/UNIVERSITY STUDENTS

Within the past 30 years, university enrolment has increased sharply at the undergraduate level for both full-time and part-time studies.¹⁶ For instance, in 2010, there were 994,000 undergraduate students enrolled in Canadian universities compared to 550,000 students in 1980.¹⁶ The highest rate of university student attendance in the country is in the Atlantic provinces.¹⁷

For most students, university marks a transition period; in Atlantic Canada, approximately 25% of high school graduates continue their studies at a university in one of the four provinces.¹⁷ However, the transition from high school to university can be stressful for many young adults.^{18,19} Leaving home, often for the first time, forming new relationships, and experiencing unfamiliar academic and social responsibilities can be challenging. High-risk behaviours such as binge drinking^{20,21} and risky sexual behaviours²² can be at least partially attributed to this demanding transition period within the college experience.^{18,21}

2.1.1 Sexual Behaviour among College/University Students

Young adults have consistently been identified as the cohort with the highest risk for negative health outcomes associated with sexual risk-taking behaviours,²³ as sexual experimentation is common among young adults and university students. While common and expected among young adults, the age of first sexual intercourse for Canadians is usually between 16-and 18-years.²⁴ Thus, by the time young adults begin university, most have already had sexual intercourse at least once and most continue to be sexually active.²⁵

Sexual risk behaviours include early age of first sexual encounter, inadequate contraception methods, increased numbers of sexual partners, and sexual contact with unknown partners.²⁶ Undergraduate students tend to have sexual encounters with multiple partners,²⁷ and they practice oral sex,^{28,29} vaginal intercourse,²⁸ and anal sex.³⁰

By the end of their university years, approximately 80% of students are sexually active. Many students have casual partners and multiple partners,^{31,32} and only 40% of students report using condoms consistently.³³ In 2012, a health and health-related behaviours survey looked at

6170 Minnesota college and university students. The researchers found that, among sexually active students, 52% used a condom during their last vaginal intercourse, 22.6% used a condom during their last anal intercourse, and 8.8% used a condom during their last oral sex experience.³⁴ At the national level, trends differ slightly, with 42.6% of 18 to 24 year old males and 36.7% of 18 to 24 year old females using a condom during their last intercourse,³⁴ which would suggest a difference between populations studied. Furthermore, researchers have found a positive association between university residence hall parties (where many university students reside) and risk-taking behaviour,³⁵ and alcohol consumption,^{31,32,36} as well as a significant influence from peers' sexual attitudes and behaviours contributing to young adults' own risky behaviour.^{37,38} It is unsurprising that reported rates of STIs are the highest among those aged 15 to 24 in Canada.

2.1.2 Outcomes Associated with Sexual Risk-Taking

Poor health outcomes and negative consequences – both physical and emotional - can result from risky sexual behaviours. Sexual contact with an unknown (casual) partner and having many such casual sexual relationships are experiences that are common among young adults and can lead to negative health consequences for physical health, negative relationship outcomes, and decreased psychological well-being.³⁹ Previous studies demonstrate that feelings such as regret, guilt, shame, and anger are emotional effects associated with engaging in casual sexual experiences.^{40,41} There is also evidence that these feelings can persist over time, leaving individuals at risk for depression.^{32,39}

Physical consequences such as acquisition of STIs and unplanned pregnancies through unexpected and casual sexual encounters, sexual intercourse with multiple partners, and unprotected sexual intercourse can also lead to further negative health implications.⁴²⁻⁴⁴ Unplanned pregnancy, a further physical consequence of engaging in risky sexual behaviour, can have detrimental consequences, such as increased use of abortion and neurobehavioral effects on the fetus (fetal alcohol spectrum disorders if binge drinking is involved).⁴⁵⁻⁴⁷ The adverse outcomes of unplanned pregnancies are highest among women 18-25 years of age,⁴⁸ as young mothers are at greater risk for mental health issues and partner violence, putting financial and social strain on individuals, families, and communities.⁴⁹ With respect to STIs, acquiring an infection without proper treatment and management can lead to short and long-term medical and

psychological consequences.⁴ Pelvic inflammatory disease, infertility, ectopic pregnancy,⁵ and enhanced rates of HIV acquisition and transmission are some potential negative outcomes associated with STIs.^{6,7}

2.1.3 University Student Health Services

University health and health promotion services should be readily available for students' use to reduce negative health outcomes and promote healthy sexual practices. While most colleges and universities provide health services such as health education, outreach, and student-led programs, as well as traditional reproductive health services,⁵⁰ there is a lack of knowledge about how well these health services meet the sexual health needs of students – especially Canadian university health services. While university and college health services are important resources for students, recent research from the United States has shown that the majority (93%) of universities and colleges surveyed provided some type of STI testing to students, but that only 24% offered free STI testing on campus and provided free condoms to students.^{51,52} In another American health services survey of 52 institutions, 40% indicated they did not have formal sexual health services for students.⁵³

Research has been conducted to try to understand sexual health resources from students' perspective so as to better meet their needs. In a qualitative study from the US, researchers found that “one size fits all” does not apply in terms of college sexual health resources.⁵⁴ It was determined that each institution should communicate with students to learn about their values and perspectives in order to adapt their resources to satisfy and best support their students.⁵⁴ Another American study suggested other organizations such as student unions, student residences, and offices other than health clinics should provide sexual health services to make resources available to reach all students creatively and meaningfully.⁵² Given the potential negative outcomes associated with sexual risk behaviours, understanding students' perspectives regarding sexual health and sexual health resources is important to informing campus strategies more effectively and meeting the health needs of students.⁵⁴

2.2 PERCEPTION OF HEALTH RISKS

Research has shown that most young adults do not realize the health risks related to their risky sexual behaviour, despite various negative health outcomes. Studies have demonstrated that college students consistently underestimate their risk of contracting STIs. For example, in a qualitative study, Downing and colleagues found that only about half of their sample of 71 college students (aged 18 to 24) from an American university were concerned with contracting a STI from penetrative intercourse during casual sex.⁴³ Although the researchers gained important insight into why students perceive their risk the way they do through interviews, they concluded that larger samples of more diverse populations and contexts are crucial to a better representation of college students' STI risk perception.⁴³ Similarly, analysis of data from the National Longitudinal Study of Adolescent Health reported that nearly 90% of 18-26 year olds (n=11,821) did not consider themselves at risk of infection. Of those who had tested positive for a STI (10% of the sample), 67% did not consider themselves to be at risk of infection.⁵⁵ In addition, low perceived STI risk was observed despite no condom use when two separate cohorts of university-aged adults and sexually active female students were studied.^{3,56} Regardless of whether or not young adults are diagnosed with an STI, many do not recognize their actual risk and even when negative health outcomes are obvious, they are still challenged with the acceptance of risk.

While the consequences surrounding STI risk misperception have been recognized in the literature, further study of factors contributing to students' risk perception is mentioned as an area that requires more investigation.¹⁴

2.2.1 Accuracy of Risk Perception

What drives the association between an individual's perception of risk and their actual sexual behaviour is not well understood; the differences across populations and severity of the kinds of infection asked in survey-collected data has led to inconsistent conclusions. While some research has found that most university students underestimate their risk of contracting an STI, regardless of the nature of their sexual behaviour,⁵⁷ other research has shown contradictory results when examining risk perception of HIV. A meta-analysis (26 cross-sectional studies containing 15,440 participants) examining the correlation between perceived risk and sexual risk behaviour, found that individuals who practice risky sexual activity (engaging in sexual activity

with an unknown partner and condom non-use) were more likely to perceive themselves at risk for HIV compared to people who engage in fewer risk behaviours. The authors concluded that estimating vulnerability to HIV infection is reflective of risk and precautionary sexual behaviours.⁵⁸ Congruently, Ford and colleagues found that individuals who had an increased risk of STIs/HIV due to their sexual behaviours (having multiple partners, having a previous diagnosis of an STI, and condom non-use) accurately perceived higher levels of risk.⁵⁵ The survey was conducted on a nationally representative sample of 18-26-year-olds and on a subsample of those who had tested positive for STIs to examine relationships between perceived risk and selected characteristics in both groups. These discrepancies in the literature between accurate and inaccurate assessment of STI risk could reflect increased risk perception due to the nature and severity of HIV compared to other reportable STIs or the different contexts and/or populations used across studies.

2.2.2 Predicting Risk Perception

Decisions about sex are often made in the heat of the moment (instead of with rational and careful deliberation), which is consistent with the research describing the impact of emotional responses on decision making and judgement.⁵⁸ A consistent finding in the literature on the psychology of sexual behaviour is that decisions are influenced by an individual's emotional response to sexuality, interfering with appropriate risk assessments.⁵⁸ Rationalizing risk-taking behaviour using social and psychological constructs has been suggested as a reason for the mismatch between actual risk and perceived risk. Kershaw and colleagues assessed such constructs associated with accurate and inaccurate risk perception among 411 urban female adolescents.¹⁴ They found that among participants considered as being at high risk (measured by having 2-4 sexual behaviour risk factors) of contracting an STI, those who underestimated their risk had longer partnership duration and had less STI risk knowledge compared to those in the high risk category who accurately perceived their risk of contracting an STI. Similarly, among participants considered at slight risk (measured by having one sexual behaviour risk factor), those who underestimated their risk had significantly longer partnership duration than those who accurately perceived their risk in the same behavioural category.¹⁴ The results showed that, when assessing risk, female adolescents used the context of their sexual relationship – females who

engaged in unprotected sex felt they were at low risk if they were with a long-term partner, suggesting that as romantic relationships evolve, risk perception may decrease over time (even if risky behaviour remains constant). However, the authors noted several limitations of the study. The sample used in this study comprised of female adolescents recruited from sexual health clinics. Clinic-based sampling may yield participants who are more sexually active than a random sample of female adolescents, meaning results derived from clinic populations could be specific to those who are highly sexualized. The single-item question of determining perceived risk and categorization of participant risk may not be completely accurate; the actual risk of slight-risk participants depends on their partners. The authors did not have objective evidence of partner risk, and could not determine whether or not partners of participants were STI-free and remained monogamous during the duration of the relationship. This would have classified participants as having little risk; however, the authors reasoned that taking the conservative approach was best because other research suggests individuals often underestimate the sexual risk of their partners.¹⁴

Various other studies have produced similar results. Wolfers and colleagues sampled – in two waves – over 2000 16-25 year old students. They discovered that students considered STIs to be very severe, and that perceptions of susceptibility are not related to risk behaviour.⁵⁹ They also found that having a low level of knowledge regarding sexual risk as well as little knowledge of symptoms of STIs contributed to risk misperception.⁵⁹ Wildsmith and colleagues, too, found a disconnect between STI risk behaviour and perception of risk when evaluating longitudinal adolescent health data.¹⁵ The National Longitudinal Study of Adolescent Health surveyed 14332 young adults aged 18 to 26 to get a representative sample for measuring the sexual health and well-being of American young adults. They found that incidence of STIs was higher in those in a committed relationship and living with their partners compared to respondents who were not in a relationship; 18% of those who were living with their romantic partners (cohabiting) and 16% of those who were in a romantic relationship but not living with their partners (dating) either tested positive for or had received an STI diagnosis in the past year, compared with 13% of those respondents who were not in a relationship and 11% who were married.¹⁵ The authors mentioned the results could reflect participants' misperception of low risk associated with a single partner

and that this disparity could be due to higher levels of screening for those involved in relationships.¹⁵

2.3 COGNITIVE THEORIES AND SEXUAL BEHAVIOUR

It is important to identify the variables that underlie young adults' STI risk perceptions and decisions to practice risky sexual behaviour to guide the development of health promotion strategies. How behavioural change occurs has been an area of interest to clinicians and other health professionals. However, understanding the principles underlying behaviour change has been considered difficult due to varying contexts between populations and cultures. The variability of fundamental constructs related to how individuals can change their behaviours has contributed to researchers developing theories around the topic.⁵⁷ The association between sexual behaviours and perception of risks associated with them has been shown to have a reciprocal relationship;⁵⁸ if risk perception can be increased, then the health behaviour associated with the risk may change.⁵⁸ This means that people who believe they are at risk may begin to engage in preventive actions because of that belief and, then, having engaged in preventive behaviours, should decide that they are at less risk than they were previously.⁵⁸ Being aware that one's current behaviours are risky is the first step towards behaviour change and adopting safer sexual practices.⁶² Preferably, positive health behaviour choices are based upon an accurate perception of the risks and benefits; therefore, risk perception could also have an important and direct effect on the interpretation of STI prevention messages.^{62,63}

There are well-researched theoretical models that explain the discrepancy between knowledge and behaviour and how risk perception can elicit behaviour change. Such models stress the significance of improving the accuracy of risk perceptions, as this could be a catalyst to change risky sexual behaviour in young adults. For example, perceived benefits of condom use were found to be related to predictable increases in condom use⁶⁴ and beliefs about the negative consequences of condom use regarding sexual pleasure have also been associated with decreased consistency and probability of use.⁶⁵

2.3.1 The Health Belief Model

The Health Belief Model (HBM) is a conceptual framework for understanding why individuals do or do not engage in health-related actions.⁶⁶ A model developed in the 1950s, it

originally served the purpose of attempting to understand compliance with medical regimens⁶⁷ and resistance to disease prevention and screening tests for early detection of asymptomatic disease.⁶⁸ The HBM originated out of social and behavioural psychology and uses two constructs which behaviour is dependent upon: how much value an individual places on a goal and judgement by that individual of the likelihood that a given action will achieve that goal.^{66,69} In the context of health-related behaviour, these two constructs translate into the desire to avoid illness and believing a health action will prevent illness.⁶⁶

The HBM is composed of six dimensions; perceived susceptibility, perceived severity, perceived benefits, perceived barriers, self-efficacy, and cues to action.⁶⁶ Individuals consider their perception of the risk – or likelihood - of acquiring a condition, as well as the seriousness – or consequences - of contracting a condition or leaving it untreated. Perceived susceptibility and severity, in combination, serve as an individual's perceived threat to a condition. Whether this perception leads to changes in behaviour – even if an individual perceives they are susceptible to a health condition – is influenced by the individual's beliefs regarding the perceived benefits of actions to reduce the threat of the condition. Perceived barriers – or potential negative aspects – of a health action may act as hindrance to undertaking recommended behaviours, wherein an individual will weigh the action's expected benefits with its perceived barriers. Individuals must also feel competent (self-efficacious) to overcome perceived barriers to take action. Strategies to activate readiness (cues to action) are also important to change individual behaviours. The susceptibility and severity of a condition provide a stimulus to act and the perception of benefits provide a strategy of action.⁶⁷

These primary concepts predict why people take action to prevent, to screen for, or to control illness conditions; they have helped shed light on decision-making and risk-taking, and strategies to prevent unintended consequences of risk-taking.^{3,55,70,71}

2.3.2 The Health Belief Model and Risky Sexual Behaviour

The HBM has examined individuals' preventive health behaviours and has been used to explain and predict health behaviours such as sexual risk-taking.^{43,55,70} Since the model demonstrates how one's perception can elicit behaviour change, it has also been used to help develop sexual health promotion strategies.³

Research has examined the capacity of the HBM to predict whether young adults will use protection during sexual intercourse and how healthy sexual practices can be adopted.^{43,72,73} For example, Strunin and Hingson found that, in a study of 585 sexually active young adults aged 16 to 19 in Massachusetts, only 15% reported changing their sexual behaviour due to concern over contracting Acquired immune deficiency syndrome (AIDS).⁷⁴ Other research has shown that young adults were more likely to report always using condoms if they felt susceptible to AIDS⁷⁵ and although most women reported that having a fear of AIDS does, in fact, influence them using contraceptives, fewer actually asked their partner to use a condom.⁷⁶

Components of the HBM have not been fully examined when gaining insight into the health beliefs of certain populations, such as university students engaging in risky sexual behaviours,¹⁰² as previous research has typically investigated predictive components of the HBM (such as perceived risk, and predicting whether or not young adults practice safe sexual behaviours).^{72,73,103,104} The differences among studies include sampling populations and which constructs of the HBM were included, with multiple studies mentioning that more work is needed to look at the HBM throughout different settings and populations.

2.33 The Health Belief Model and Behaviour Change

The HBM's multidimensional and adaptable approach to decision-making in carrying out a health behaviour or not makes it applicable in diverse and complex contexts surrounding contraceptive behaviour.^{67,84,85} The model posits that once individuals are empowered with health information and motivation to change, it is expected they will comply with preventive or curative behaviours.⁵⁸ The assumption is that changing behaviour is dependent upon risk perception, which is affected by many factors.⁸⁶

The HBM considers knowledge and awareness about risky sexual behaviours as extremely important in shaping young adults' perceived risk of that health behaviour. Individuals with high levels of awareness and knowledge of STIs have a more fair and accurate assessment of their risks compared to those who have low levels of awareness and knowledge of STIs.⁸⁶ STI knowledge has been shown to be a form of self-empowerment that may influence an individual's risk perception and create awareness for sexual behavioural change.⁸⁷ Although there may be differences between individuals and across contexts in terms of risk perception and levels of

susceptibility, the HBM acknowledges the effects of diverse demographic, sociological, and structural variables that may influence such differences and preventive behaviour.^{86,88}

There have been mixed findings in the literature surrounding the HBM and university student's behaviour. This lack of specificity of findings can be contributed to the model's dependence on quantitative survey data and researchers' limited understanding and availability of information of university students' own perceptions and why they participate in risky sexual behaviour.^{43,102} The HBM also does not take into consideration factors that influence the accuracy of risk perception.¹⁴ Research that does take accuracy of risk perceptions into account has seen reductions in risk behaviours in those who received an intervention that included a component aimed at increasing the accuracy of individuals' perceived risk for STIs (compared to a group who did not receive an intervention);^{70,105} however truly comprehending determinants of university students' perceptions is required for effective interventions.¹⁴

Risk perception is important. The HBM states that individuals consider perceived risk of contracting a condition. It emphasizes that if they perceive they are at risk and if they feel they can do something about that risk, they can take action to avoid that risk. This means that increasing accuracy of risk perception is equally as important; by identifying factors that are potentially responsible and contribute to why an individual perceives their risk a certain way, these factors can be the focus of health promotional messages. By using students' perceived STI risk we can try to target factors that are recognizable and meaningful to individuals and can, as per the HBM, elicit behaviour change.

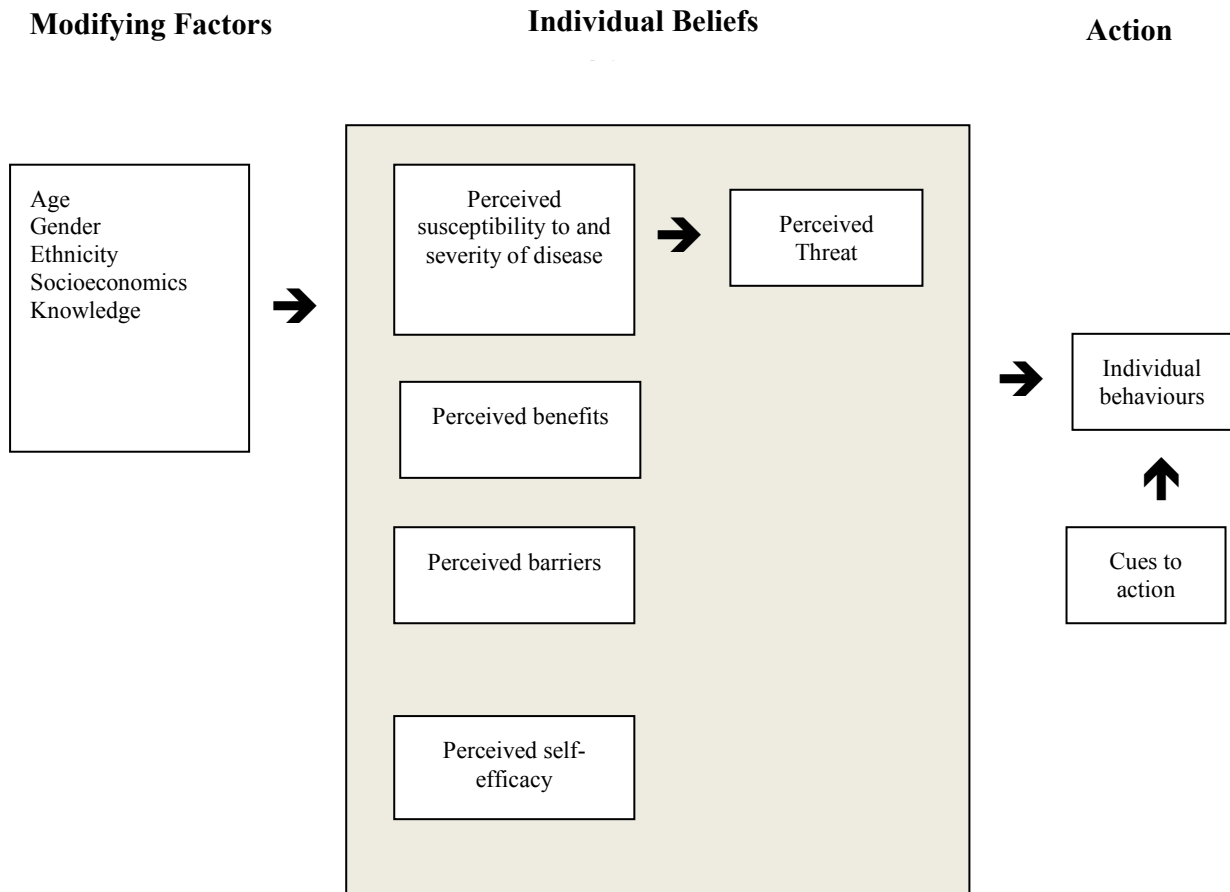


Figure 1: Health Belief Model Components and Linkages

2.4 RESEARCH ON STI RISK MISPERCEPTION

Obtaining the best evidence to evaluate what predicts misperception of risk of contracting a STI and whether accurate risk perception predicts STI testing in university students in the Maritime Provinces is important. University students are at high risk of contracting STIs due to their sexual risk-taking resulting from lack of awareness regarding their risk.^{23-30,43,55,56} Knowledge of factors related to risk perception is an area that is poorly understood and differs across contexts. While the current literature has investigated risk perception and misperception in general, few studies have examined the association between perceived risk and actual risk and the variables related to this misperception in the university population – and no studies have examined this relationship at Canadian universities.

2.4.1 *The Relationship between Perceived STI Risk and Risk-Taking Behaviours*

Multiple studies have documented no relationship between self-perceived HIV risk and reported HIV risk-taking behaviours,⁸⁹⁻⁹² whereas others have documented an association between perceived risk and behaviour,⁹³⁻⁹⁵ leading to no clear conclusion as to how well individuals can act appropriately with respect to their self-assessed STI risk. Differences across studies, including variations in methodology and how self-perceived risk and actual risk were assessed have impacted study results and authors' interpretations of findings.⁹⁶ Taking such limitations into consideration, an American study examined the relationship between self-perceived and reported HIV risk among lower-risk HIV individuals.⁹⁶ Both males and females inaccurately self-perceived their risk for having an HIV infection based on their reported HIV risk-taking behaviours. Underlying reasons for discrepancy between self-perceived and reported HIV risk have been documented in other studies; researchers have hypothesized that optimistic bias (a belief that one is less at risk for a negative outcome when compared to others), denial and distancing (refusing to accept an event or circumstance and refusing to think about negative thoughts or facts), and downward comparison (comparing oneself to another group or person to dissociate from perceived similarities) explain the incongruence.^{58,95,96} Factors such as HIV/AIDS knowledge,^{90,95,97} self-esteem,^{95,97} self-efficacy,^{91,98} religiosity,⁹⁵ strength of support systems,^{97,99} and previous negative test results impact risk misperception.¹⁰⁰

Further studies have also documented the relationship between STI risk misperception and sexual behaviours. An American study investigating STI risk misperception in adolescent females found that what contributed to the discrepancy between sexual behaviour and STI risk perception differed across level of sexual risk, but included factors such as partnership duration, perceived pleasures, and risk knowledge.¹⁴ This study demonstrated that females put emphasis on the context of their sexual relationship when evaluating risk and long-term partners outweighed potential risk of an STI when having unprotected sex.¹⁴ However, this study used a clinic-based sample of females who may be more sexually active than a random sample of females. Other research has suggested that homogeneous populations like clinic-based samples do not allow for valid associations to be detected between risk perception and sexual risk behaviour due to limited variance in perceived STI susceptibility.¹⁰¹

In a study in which researchers avoided these measurement and variance issues, similar results were found. The study looked at the relationship between sexual risk behaviour and perceived risk for contracting an STI using a sample of 1192 female US Marine Corps members.¹⁰¹ Analyzing the relationship between five different measures of sexual risk behaviour and three measures of perceived risk for STIs in the sample of females, their findings were consistent with prior research, as the sample of females perceived themselves largely invulnerable to STIs. With the exception of condom non-use, however, perceived risk increased as risk behaviour increased. The authors found that among those with greater STI knowledge, condom nonusers perceived themselves at lower risk of getting an STI than occasional condom users, and among women with the greatest STI knowledge, condom nonusers perceived themselves at lower risk of getting an STI compared to consistent condom users. The authors concluded that demographic factors, contextual factors, sexual risk behaviours, as well as unmeasured factors and complex judgements are involved when assessing perceived risk and that the study's findings were not generalizable to all young adult women due to the study's homogenous population.¹⁰¹

Although HIV is covered under the umbrella term of STIs, researchers critique conflated measures of behavioural risk and perceived risk about HIV, plus its associated burdens of social stigma and more serious consequences than with more common and less serious STIs.¹⁰¹ For

example, an individual may perceive their risk of an STI such as chlamydia differently from their risk of HIV, making the discrepancy between sexual risk behaviours and STI risk perception greater for more common STIs. A German study asked students aged 12-20 to rate the risk of peers' being infected with HIV, HPV (human papilloma virus), or chlamydia and found that the risk of being infected with the less common HIV was perceived as being higher than that of being infected with the more common HPV or chlamydia due to the fact that students were more aware of HIV than the other STIs.¹²³

The majority of literature cited has examined young American adults or college students, as well as behaviours within a certain population or using a specific outcome (for example, HIV). There has been very little research examining the accuracy of STI risk perception and the factors that relate to this misperception in the Canadian university population. The lack of information of what contributes to a major public health problem presents a gap in the literature. Determining if university students have a discrepancy between their perceived STI risk and their actual risk and factors related to this misperception occurs is important to university health clinics, for the health of university students, and for shaping broader Canadian public health efforts to minimize sexual risk-taking and related harms.

2.4.2 Risk Perception and STI testing

Few studies have examined the determinants of STI testing among young people with high-risk sexual behaviour,⁵⁹ despite the rise in STIs within this age category and the risk behaviour associated with this demographic. It has been noted that few studies report interventions to promote testing for STIs,⁵⁹ instead focusing on sexual health interventions aimed at decreasing sexual risk behaviour by promoting abstinence, contraceptives, or condom use,^{26,105} when effective prevention of STI additionally relies on early case detection and treatment.⁵⁹

A study examining risk perceptions in relation to STI testing among lower-educated adolescents to develop interventions to promote STI testing found many factors which relate to lack of STI testing.⁵⁹ The study found that students at high risk of contracting an STI had lower intentions to get tested before and after sexual intercourse without a condom than participants with no risk of contracting an STI. High risk participants more frequently reported fear of testing compared to low-risk participants: they reported expecting to experience stress while waiting for

STI test results, fear of receiving a positive test result, and the belief that an STI test is painful and awkward.⁵⁹ High-risk participants also more frequently reported “no physical complaints” and thinking they did not engage in risk behaviour as reasons not to get tested compared to those at low-risk.

Other research has looked at variables predicting STI protection; a self-administered survey was used to assess rates of HPV vaccination and whether knowledge and risk perceptions regarding HPV were associated with reported use of HPV vaccine among 406 American women aged 18 to 26 years.¹³¹ The study found that predictors of the vaccine use included age group, race, and higher knowledge of HPV (compared to those who did not receive the vaccine).

Conflicting results have been seen in the literature surrounding STI testing with young adults. A study examining demographic, risk behaviour, and HIV serostatus collected at a rapid HIV testing program in Philadelphia found that the program successfully provided HIV testing to many underserved African Americans who underestimated their HIV risk.¹³² The authors also found that most individuals (72%) testing in this program reported having previously tested for HIV. The survey did not ask where or when individuals had previously been tested; however, the results suggest that populations at high risk for contracting HIV are taking advantage of public HIV testing programs due to the high numbers of repeat testing and repeat testers’ reduced odds of testing HIV-positive.¹³² This contradicts other research findings showing that high-risk individuals are less likely to get tested.¹³² These differences among study findings could be indicative of contextual dissimilarities and differences of disease outcome and population.

2.5 LIMITATIONS IN THE LITERATURE

Past research examining the relationship between STI risk misperception and sexual risk behaviours and factors contributing to the misperception has been limited by:

1. The use of clinic-based samples, as these cases represent more severe, rather than a broader range of participants, which could restrict the generalizability of results and limit variance of perceived STI susceptibility, especially within the university student population.

2. Applying STI risk questions to HIV, which may carry more weight with respect to risk perception and may affect perception of risk compared to other STIs. Perceived risk of HIV may be different compared to more prevalent but less serious infections.
3. The lack of data examining perception of STI risk and variables associated with its accuracy among university students in Canada. Factors associated with the discrepancy between sexual behaviour and risk perception could be context-specific; therefore, recognizing what contributes to risk misperception on Maritime campuses will be beneficial to the health of the students in this area.

2.5 MOVING FORWARD IN RESEARCH ON STI RISK PERCEPTION IN UNDERGRADUATE STUDENTS

Misperception of STI risk may be a significant barrier to preventing the occurrence of infections in young adults and students through appropriate behaviour modification including STI testing. This is particularly relevant in the Atlantic Provinces, where there are more university students per capita than any other region in the country.¹⁰⁶ In this study, we will identify variables related to misperception of risk of STIs to understand how those who accurately perceive their risk differ from those who misperceive their risk as well as determine whether or not greater STI risk perception and risky sexual behaviour together predict STI testing. There is currently a gap in the literature examining accuracy of perceived risk, including within Canada and the Maritime Provinces. Using information collected through an online survey, unique variables relating to student sexual health, sexual behaviours, demographics, and personal characteristics will be examined. Having multiple variables and unique factors relating to the student population, as well as contexts that students are a part of, will allow for a thorough examination of the accuracy of risk perception and enough information to use components of the health belief model as a strategy for behaviour change and health promotion messages.

The proposed research addresses the limitations of past research by:

1. Including a large sample of students in the Maritime Provinces;

2. Using the term “sexually transmitted infections” in the survey items (as opposed to STIs/HIV used in previous research), as keeping the terms separated will also separate different risk perceptions associated with severity of consequences of infection; and,
3. Using data from undergraduate students attending eight universities in Maritime Canada

2.7 OBJECTIVES

The overall research questions to be addressed in the proposed study of students in eight universities across the Maritime provinces are:

1. What are the levels of the students’ perceived risk of contracting a STI across categories of actual risk defined by their risky sexual behaviours?
2. What demographic factors, health and behavioural factors, and health knowledge factors are related to inaccurate risk perception for both those who are low and high risk?
3. Are specific combinations of STI risk perception and risky sexual behaviour (i.e., high perception/low risk, high perception/high risk, low perception/low risk and low perception/high risk) associated with STI testing?

By emphasizing prevention messages and strategies to improve university students’ sexual health, we can target an important population as well as a persistent and serious regional (and national) public health concern.

CHAPTER 3. METHODS

3.1 RESEARCH DESIGN AND RATIONALE

The research design was a cross-sectional survey of undergraduate students during the fall of the 2012 academic year from eight Maritime universities: Dalhousie University, St. Mary's University (SMU), Mount Saint Vincent University (MSVU), Acadia University, St. Francis Xavier University (StFX), University of New Brunswick (UNB), University of Prince Edward Island (UPEI), and Cape Breton University (CBU). This cross-sectional survey allowed for a descriptive “snapshot” of how students perceive their STI risk.

All undergraduate students from these universities were invited to participate and were asked to provide information about their sexual health behaviours, other personal and demographic factors, their use of health services, and health promotion needs at their university. The survey was designed to answer questions related to barriers to health services access and students' sexual healthcare needs, to ultimately improve health services related to sexual health.

3.2 SAMPLING POPULATION AND RECRUITING

3.2.1 Sample Population

The target population for the proposed research was all undergraduate students attending the eight English speaking universities offering a range of undergraduate programs throughout Maritime Canada. The sampling frame consisted of undergraduate students. Although the survey excluded francophone schools and smaller universities, the student populations at the universities sampled were a general representation of all Maritime Canadian university undergraduate students, as students from different sized universities in different cities and provinces were sampled. The study population was limited to males and females between the ages of 17 to 29, who had ever had heterosexual vaginal intercourse, and who completed the survey items on STI risk behaviours used for STI risk categories. The age bracket of 17 to 29 years captures the group that is at the highest risk of STIs; no data on non-heterosexual vaginal intercourse was collected. There were 10,361 students who participated in the original survey, and 7,185 were included in the present study (Figure 2).

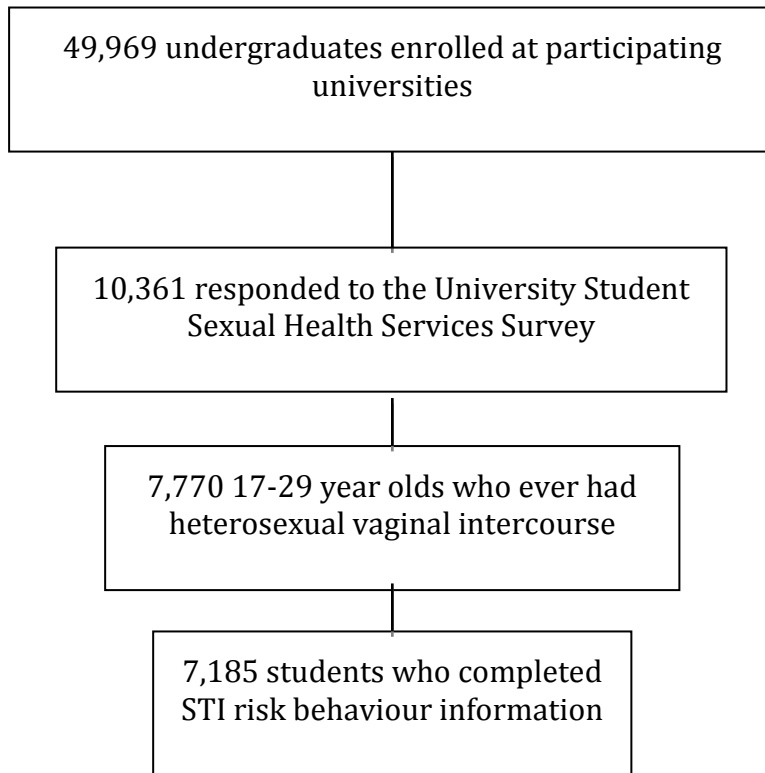


Figure 2: Sample Population Breakdown

3.2.1 Recruitment

The researchers collected data in 2012 (September to November) using an online tool. At each participating university, servers including email addresses of all current undergraduate students were used as the sampling frame. The survey represented a convenience sample, as all undergraduate students were contacted via email to participate in the study, but not all participated.

3.3 SURVEY DEVELOPMENT AND ADMINISTRATION

3.3.1 The Survey

The online survey used 44 multiple choice items including categories of general demographics, health and sexual health knowledge, health behaviours, and the use of university health services (See Appendix A). It took 20-25 minutes to complete. Survey items included a range of validated instruments and new items added in response to feedback given after pre-testing of the survey (see next section for details). Items included questions on sex, ethnicity, grade point average (GPA), year of program, living location, sexual risk behaviours, perceptions on health, social support, as well as barriers to and satisfaction with university health services. The participants in the survey were anonymous, as the survey items did not include any information that could lead to identification.

3.3.2 Development of the Survey

With grant funding from the Nova Scotia Health Research Foundation in 2009-2010, researchers developed the survey content based on information collected from focus groups of undergraduate students at Acadia and Dalhousie University (220 undergraduate students were included in the pilot testing to give feedback and improve the survey). The survey items were developed by a team of expert researchers using the research literature along with instruments that had previously been validated. Included in the survey were validated measures with internal consistency and/or test-retest reliability.¹⁰⁹ New survey items that were added after feedback from focus groups did not include validated measurements.

3.3.3 Survey Administration

Using Opinio, Dalhousie University's online survey software, the survey was administered using the modified Dillman approach, a method used to obtain a high response rate in surveys.¹⁰⁷ The Dillman approach proposes that the likelihood of obtaining questionnaire responses is greatest if the survey includes interesting questions that respondents would see as useful and easy to answer, where the benefits of responding will outweigh the costs of responding.¹⁰⁷ Opinio is password-protected, meets ethical standards of electronic security, and is stored on Dalhousie's server. The survey was opened online to students at the eight participating universities in the fall of 2012 and closed at the end of November. In keeping with

the Dillman method, each university contacted their students through website postings and twice through emails from email lists, which included a description of the survey and provided a link for participation. Online consent, which met ethical expectations set by the Tri-Council Policy Statement Edition 2 (TCPS2), was collected through a consent form before students began the survey. Students' responses were limited to one survey per participant browser to avoid students re-taking the survey. Incentives such as being entered in a draw anonymously to win an iPad encouraged potential participants to complete the survey were used.

3.3.4 Survey Response Rate

The overall response rate for the eight universities was 20.4%. Dalhousie University and Acadia University had the highest response rates, with 35.8% and 29.4% of undergraduate students responding, respectively. The University of Prince Edward Island had the lowest response rate with only 12.5% of undergraduate students responding to the survey. See Appendix B.

3.3.5 Ethics

Ethical approval for the Undergraduate Student Sexual Health Services Survey was granted by the Research Ethics Board of each of the participating universities. The review boards addressed ethical issues that included informed consent, risks and benefits of participating, and the anonymity and confidentiality of participants. For this thesis, ethical approval was obtained through Dalhousie University Research Ethics Board.

3.4 VARIABLES OF INTEREST

3.4.1. Dependent Variables – Objectives 1 and 2

To address our research questions, we included multiple dependent variables. One main variable of interest in this study is students' self-perceived risk of contracting a STI. The variable was measured by using a 4-point Likert-type scale (See Appendix C). Students were asked, "*With your present sexual lifestyle, how much at risk do you personally feel of becoming infected with a sexually transmitted infection (STI)?*" Possible responses were "*Not at all at risk*" "*Not very much at risk*" "*Quite a lot at risk*" and, "*Greatly at risk*". This question was considered a "new question" designed for this survey; therefore no retest was performed and no Cohen's

Kappa score was computed. Responses were categorized into two groups: “*Quite a lot at risk*” and “*Greatly at risk*” were categorized as “high self-perceived risk”, and “*Not at all at risk*” or “*Not very much at risk*” were categorized together as “low self-perceived risk”. In prior studies, self-perceived risk has been measured by a single item and has been organized into similar categories.^{14,108}

A second main variable of interest in this study was students’ actual risk based on their sexual risk behaviours (See Appendix D). Students were asked about their condom use and number of sexual partners (“*Did you or your partner use a condom the last time you had heterosexual vaginal intercourse?*” and, “*In the past 12 months, with how many people have you had heterosexual vaginal intercourse?*”). We used these behaviours separately and combined as “high” and “low” sexual behaviours. Students were considered as having high sexual risk if they reported no condom use at last intercourse and if they reported multiple (>1) partners for vaginal sex within the past year. They were considered as having low sexual risk if neither of these behaviours was observed. Measures of these risk behaviours have test-retest reliability in student populations as measured by Cohen’s Kappa of 0.92 for use of condom during last intercourse and 0.91 for number of people with whom they had vaginal intercourse with during the past 12 months.¹⁰⁹

3.4.2 Dependent Variable – Objective 3

The dependent variable for this study objective was STI testing reported by students to determine which independent variables, including STI risk misperception determine STI testing (See Appendix E). The variable was also used in Objective 2 as an independent variable to determine if it was a predictor of STI risk misperception. Students were asked, “*Have you ever seen a health professional in order to obtain the following services?*” with “*STI testing*” as a category and “*Yes*” and “*No*” being possible answers. Sexual health services sought was a new question designed for this survey; therefore, no retest was performed.

3.4.3 Independent Variables

The survey included variables that have been found to be related in the literature to STI risk perception, sexual behaviour, and risk misperception.^{14,57,86,101} We determined which of the following variables were predictors of STI risk misperception and confounded the association

between STI testing and STI risk misperception within the university student population throughout the Maritimes (See Appendix F).

Demographics:

Academic Year of Study: While sexual experimentation occurs at different stages for individuals throughout their lives, risky sexual behaviours and consequences such as STIs are most common among young adults under 25 years of age,^{11,12} especially so in college and university environments.^{13,14} Knowing which year of study, compared to strictly age alone, of undergraduate programs is associated with greater risk misperception of STIs and STI testing could help develop more targeted health promotion strategies on university campuses. Students were asked, “*What year of undergraduate program are you in?*” and could answer “*First*” “*Second*” “*Third*” “*Fourth*” or “*other*”. First year students were used as the referent category.

Ethnicity/Race: Research has shown differences in STI risk perception across races and ethnic groups.^{62,86} Moreover, socio-cultural norms and practices have been identified as major determinants of risky sexual behaviour.¹¹⁰ In the present study, ethnicity was measured by asking students, “*What ethnic/racial background do you consider yourself to be?*” with answer options “*White (Caucasian)*” “*African descent*” “*Aboriginal*” “*Asian*” “*Middle Eastern*” or “*Other*” for students to check all that applied. For data analysis purposes, the above options were collapsed into two categories: “*White only*” and “*Other*”. “*Other*” was used as the referent category.

Students’ GPA: Several studies demonstrate that academic engagement and performance markers such as GPA are correlated with risky sexual behaviours.^{111,112} Students were asked, “*What was the last GPA you received on your University record? If you are in your first year of university, please provide the average grade of your last high school year instead*” with space to provide the appropriate GPA. Each university’s GPA scale was then converted into a percentage value. Since first year students had the option of using their numeric percentage high school grades as an answer to this question, responses were dichotomized at an above and below average GPA with at or above average used as the referent category.

Living Partners/Arrangements: Students were asked the question, “*Who do you live with?*” with answers including “*I live alone*” “*I live with one or both of my parent(s)*” “*I live with my*

partner (i.e., sexual or romantic partner, spouse, or girlfriend/boyfriend)” “*I live with a roommate(s) (not a sexual or romantic partner)*”. Students were also asked about their living arrangements (“*What are your living arrangements?*” with responses being “*I live off-campus*” and “*I live on campus in student residence/housing*”). Research has shown STI risk misperception is related to living with a romantic/sexual partner¹⁵ as well as living on-campus in residence hall buildings has been correlated with sexual risk-taking behaviours.³⁵ This variable was represented by a categorical variable of five types of living arrangements: student residence, one or both parents, roommate, romantic partner, and alone (the referent category).

Importance of Religion: Religiosity has been noted as a factor that impacts self-perceived risk, reported risk, and congruency between self-perceived risk and reported sexual risk, plus sexual risk-taking behaviours.^{95,96} Students were asked, “*How important would you say religion is to you?*” with responses including “*Not important at all*” “*Not very important*” “*Fairly important*” “*Very important*”. The item was coded on a scale from 1 to 4 and was dichotomized into two categories for data analysis (“*Not at all or not very important*” and “*Fairly or very important*”, the referent category).

Sex: Previous research has shown that both males and females do not demonstrate consistent congruence between self-perceived STI risk and reported STI risk behaviours.⁹⁶ Studies have also revealed relevant differences between males and females in terms of risky sexual behaviours.^{23,113,114} Students were asked, “*What is your sex?*” with responses “*Male*” “*Female*” “*Transgender*” or “*Other*”. For data analysis purposes, categories of “male” and “female” (referent category) were used, as too few participants responded “transgender” and “other”.

Sexual Orientation: Previous research has demonstrated risk misperception between sexual risk behaviour and perceived risk in bisexuals.¹¹⁵ Research has also shown that gay, lesbian, and bisexual youth are more likely to engage in multiple sexual risk behaviours than their heterosexual peers.¹²⁴ Students were asked their sexual orientation with responses, “*100% heterosexual*”, “*mostly heterosexual*”, “*bisexual*”, “*mostly homosexual*”, and “*100% homosexual*”. The variables were coded one through five and were kept as a categorical variable with 100% homosexual as the referent category.

University Attended: Which university students attend could be an important variable in determining why the STI risk misperception is occurring. The university's culture could play a major role in risky sexual behaviour. Universities were labeled by number labeling to protect school anonymity.

Health & Knowledge:

Perceived Peer Attitudes, Beliefs, and Behaviours Scale: Prior literature has shown significant associations between perceptions of peer's sexual attitudes and behaviours with sexual risk-taking among young adults.^{55,56,114} The scale used in the study was based on Ratliff-Crain's¹¹⁶ scale, originally documented in Winslow, Franzini, and Hwang's¹¹⁷ ten statements regarding perceptions of friends HIV-risk attitudes or behaviours. This scale indicates the extent to which peers are seen as being unconcerned about safer sex practices and avoiding safer practices.¹¹⁶ Five of the original statements were reworded to be more relevant to peer beliefs. Each of the ten statements was scored on a scale ranging from 1 ("Strongly disagree") to 5 ("Strongly agree"). For the present study, 9 of the 10 items were asked and were used to calculate a total score to create a continuous variable. The total scores (ranging from 9 to 45) for each scale were found by adding up the numbers checked for each statement, with high scores indicating a greater perception that one's peers have more permissive attitudes towards sexual risk-taking (Cronbach's $\alpha=0.78$).

Sexual Health Knowledge Scale: The literature shows conflicting evidence about the relationship between risk knowledge and perceived risk, with some studies demonstrating that no relationship exists between AIDS risk knowledge and perceived risk,¹¹⁸ where other research has reported that STI knowledge influenced accuracy of risk perception.^{14,59} As STI risk perception varies across contexts and populations, determining if sexual health knowledge contributes to STI risk misperception in Maritime university students is an important variable to consider. A 12-item true-false scale was used to measure students' general knowledge about sexual health (e.g. "*Women with chlamydia always have symptoms*"). Students' responses were scored as being correct or incorrect and summed to create a continuous variable (correct answer = 1, wrong answer or "don't know" = 0), with high scores equating to more sexual health knowledge. Possible correct answers range from 0 to 12 (Cronbach's $\alpha=0.79$).

Depression Scale: Depression and risk of depression are associated with negative health and behavioural outcomes. Research has shown that depression can influence adolescents' chances of risky sexual behaviour;¹¹⁹ young adults who present with symptoms of depression are more likely to take part in risky sexual intercourse.¹²⁷ Previous studies have also found that risky sexual behaviour, such as having multiple partners, can increase the risk of depression in both males and females.¹²⁸ Students were asked to answer how frequently certain depression symptoms have occurred in the past week. This item was measured using the 12-item version of the Center for Epidemiologic Studies Depression Scale (CES-D).¹²⁹ The scale ranges in scores from 0-36, where a score of 12 or more indicates moderate to high risk of depression (Cronbach's $\alpha=0.79$).¹³⁰ For data analysis, three categories of depressive symptoms were used: minimal (total score of 0 to 11; the referent category), somewhat elevated (total score of 12 to 20), and very elevated (total score 21 to 36).

Health Behaviours:

Risk Behaviours: Behavioural characteristics including age at onset of sexual activity, alcohol and drug dependence, contraceptive use, forced sex, and promiscuity are associated with a student's choice to be tested for STIs.¹³⁹ Research shows that marijuana¹¹⁹ and alcohol use,^{13,27,32,64} especially binge drinking, are associated with risky sexual behaviours. Some researchers have also argued that alcohol use can make it difficult for an individual to perceive risk in social situations due to cognitive impairment,¹²⁵ and sensation seeking has been shown to be related to alcohol-related activities through perceived benefits and risks.¹²⁶ Marijuana use was measured by one item, asking students, "*During the past 30 days, how many times did you use marijuana?*" with answers ranging from 0 to 40 or more times. Four categories were created: past month non-marijuana users (0 times per month), infrequent marijuana users (one or two times per month), frequent marijuana users (three to 19 times per month), and very frequent marijuana users (≥ 20 times per month). Alcohol use/binge drinking was measured by one item, asking students "*During the past 30 days, on how many days did you have 5 or more drinks of alcohol in a row, that is, within a couple of hours?*" with answers ranging from 0 to 20 or more days. Episodic heavy alcohol use has been previously defined as the consumption of five or more drinks in one sitting (i.e. binge drinking) more than once per month.¹³⁵ We categorized alcohol

consumption into three categories: non-binge drinkers (0 episodes of binge drinking in the past month), infrequent bingers (1 episode of binge drinking), and frequent bingers (>1 episode of binge drinking). The referent category for both behaviours was non-binge drinkers and non-marijuana users.

Forced Sex: This item was measured by asking students, “*Since you have been at university, have you ever been forced to have sex of any type against your will?*” with a dichotomous answer choice of yes/no. Although the researchers piloted this item in their pre-test pilot study, it was a new item, and therefore no test-retest on this item was performed and no Cohen’s kappa score was computed. Those that had never had forced sex while at university were used as the referent category.

Contraceptive Use: Students were asked, “*Which of the following forms of contraception did you and/or your partner use the last time you had heterosexual vaginal intercourse?*” with possible responses being “*contraceptive pill*”, “*intrauterine device (IUD)*”, “*Depo-Provera (the needle)*”, and “*contraceptive patch*”. Hormonal contraception requires a physician visit; therefore female students would have seen a health professional about their sexual health, which may be associated with more accurate STI risk perception and more frequent STI testing. A dichotomous variable was created using hormonal contraceptive as the referent category.

CHAPTER 4. STATISTICAL ANALYSIS

Stata Version 13 was used for analyses. Due to some variables in the dataset having varying levels of missing data, multiple imputation was used to estimate missing responses. Multiple imputation uses regression models based on complete data to determine potential responses per respondent for each missing item. Some respondents did not provide enough information for reliable imputation to occur, and therefore all variables could not be completely imputed. All analyses were stratified by five imputation data sets. Variables that produced different counts across datasets included academic year of study, students' GPA, religion, sex, perceived peer attitudes, belief, and behaviours scale, and risk of depression. All analyses were weighted based on age and biological sex at each of the eight universities to provide the most representative estimates of true population parameters. To consider context and environment, we used Stata's Cluster Robust Standard Errors Correction function. This function serves to acknowledge the differences between universities, by taking into account for the fact that students within a university are more likely to behave similarly in that specific context than overall between universities. For the purpose of this analysis, the data set was limited to sexually active students aged 17 to 29 years.

Research Question 1 (describing levels of perceived risk by level of risk behaviour)

To address the first research question, we cross-tabulated the levels of risk perception and risk behaviour reporting the frequency and proportion of students by the separate and combined categories that were created. The university students' accuracy of self-perceived risk was determined by describing the categories with mismatched perceived risk and risk behaviour (low perceived risk/high risk behaviour and high perceived risk/low risk behaviour); these were students who perceived themselves as having a risk of contracting an STI that did not match their actual sexual behaviour. We also regressed (logistic models) the risk behaviour on STI risk perception levels to determine whether or not an association existed between the two variables and to see the direction of such an association.

Research Question 2 (identifying factors associated with STI risk misperception)

When addressing the second research question of determining which variables were related to inaccurate STI risk perception, students were separated into risk behaviour categories: condom use (yes/no) and >1 partner (yes/no). Within each group, the predictors of STI risk misperception were determined. First, a series of unadjusted logistic regression analyses was carried out to determine which of the independent variables listed above had a univariate association with risk misperception.

Since we were looking for any predictors from a set of variables, backwards elimination was used to remove variables one-by-one in order of least statistically significant p-values in the multivariable logistic regression models. Likelihood ratio tests were used to compare nested models before and after removing variables for statistical significance (i.e. investigating a difference in -2 Log Likelihoods) until a parsimonious model was reached in which all remaining variables were independently associated with risk misperception with a p-value less than 0.05. To control for inherent differences between males and females, sex was forced into the adjusted models.

We also conducted a sensitivity analysis, where both risk behaviours were combined into two categories. Students were divided into two groups (low risk and high risk behaviour) and predictors of STI risk misperception were determined.

Research Question 3 (determining if combinations of STI risk perception and risk behaviour level are associated with STI testing)

To address the third research question of determining if a variable representing the four possible combinations of STI risk perception level and risk behaviour level was related to STI testing after adjusting for other factors, multiple logistic regression models were used. Modeling focused on obtaining the adjusted odds ratio (OR) for the association between combined risk perception/risk behaviour and STI testing. The model included the combined composite categorical perception/behaviour variable as an independent variable and any covariates that altered the OR for perception/behaviour variable and STI testing association by more than 10% with high risk behaviour/high risk perception as the referent category.

We also conducted a supplementary analysis, where, rather than using the composite perception/behaviour variable as an independent variable, the contributing items making up risk behaviour (condom use and number of partner) and risk perception were used separately as potential predictors. If the relationship between STI testing and each risk behaviour and risk perception yielded significant results, the significance of the interaction between each risk behaviour and risk perception on STI testing was examined.

CHAPTER 5. POWER CALCULATIONS

All universities were analyzed together. Based on a study by Cragg et al.¹³⁸ using the same data set, the overall sample size is 7346 sexually active students between the ages of 17-29. Of this sample, 1207 students were considered to have high risk sexual behaviour. The high risk group is considerably smaller than the low risk group (N = 6133), and thus comparisons within that group provide the most conservative estimate of power for the current study. Using accurate STI risk perception as the independent variable (exposure) and STI testing as the dependent (outcome) variable allows us to determine the least detectable odds ratio above 1.0 for this sample size. In Cragg's study the ratio of unexposed (lower STI risk perception) to exposed (higher STI risk perception) was 5:1 in the high risk group¹³⁸ and 58% overall had ever been tested for STIs.¹³⁸ Assuming that 51.5% of those with less recognition of their STI risk have ever been tested for STIs, and that 62.5% of those who have more recognition of such risk have ever been tested, an OR of 1.57 or greater can be detected for the association of higher risk perception with ever having had an STI test, with a power of 80% and a significance level of 0.05, given the fixed sample size of 1207.

CHAPTER 6. RESULTS

Table 1 provides a description of sexually active Atlantic Canadian students aged 17-29 (n=7185) using unweighted frequencies and weighted percent across categorical variables. The majority of the sample was female (58.7%), Caucasian (91.2%), and lived off campus (79.0%). Most students were completely heterosexual (70.4%), were equally likely to be non-binge drinkers within the past month (41.7%), or frequent binge drinkers within the past month (43.0%), were non-users of marijuana (68.4%), and were at a “minimal” risk of depression (66.1%). At last intercourse, 43.2% of the 7185 sexually active students reported not using a condom, 37.9% reported having more than 1 partner in the past 12 months, and 16.4% reported both of these behaviours. These students were thus classified as having high sexual risk behaviour. Most (83.6%) sexually active students were classified as having low sexual risk behaviour, as defined by condom use at last intercourse or having 0-1 partners in the last 12 months. In terms of self-perception of sexual health risk, overall 1% of sexually active students perceived themselves as “greatly at risk”, 5.8% perceived themselves as “quite a lot at risk”, 41.9% perceived themselves as “not very much at risk”, and 51.2% thought they were “not at all at risk”. Thus, 93.2% of students were classified as having low STI risk perception (“not very much at risk” and “not at all at risk” categories combined) and 6.8% of students as having high STI risk perception (“greatly at risk” and “quite a lot of risk” categories combined). Students who had never accessed STI testing made up 61.5% of the population and those who had used (or their partners had used) hormonal contraception made up 70.0% of the population.

The first study objective, which involves describing the levels of student’s perceived risk of contracting an STI across categories of actual risk defined by their risky sexual behaviours, is presented in Tables 2 through 5. Table 2 addresses the first part of this objective by cross-tabulating the levels of STI risk perception with sexual risk behaviours. In our sample, 52.8% of condom non-users perceived themselves to be “not at all” at risk, and 38.7% perceived themselves to be “not very much” at risk of contracting an STI. Less than one percent (0.5%) of condom users considered themselves to be “greatly at risk” and 5.0% considered themselves to be “quite a lot at risk” of contracting an STI. Of those students who had more than one sexual partner in the last year, 58.1% considered themselves to be “not very much at risk”, and 27.1%

considered themselves to be “not at all at risk” of contracting STIs. Less than one percent (0.4%) of students who had 0-1 partners in the past year considered themselves to be “greatly at risk” and 1.6% considered themselves to be “quite a lot at risk” of contracting an STI. Of those students who engaged in both risk behaviours (condom non-use and more than 1 partner), 28.8% considered themselves to be “not at all at risk” and 52.6% considered themselves to be “not very much at risk”. Less than two percent (1.6%) of those students who did not engage in risky sexual behaviours (condom use and 0-1 partners) considered themselves to be “quite a lot at risk” and 0.2% considered themselves to be “greatly at risk” of contracting an STI.

Table 3 addresses objective 1 by showing the association between combinations of sexual risk behaviour (condom nonuse + >1 sexual partner, condom use + 0-1 sexual partners, condom non-use + 0-1 sexual partners, and condom use + >1 sexual partner) and having high STI risk perception (“greatly at risk” + “quite a lot at risk”). The unadjusted odds ratios of high STI perception by categories of risk behaviours are shown. The odds of having high STI risk perception was significantly associated with two combinations of sexual risk behaviour: those students who used condoms at last intercourse who also had more than one sexual partner in the past year (condom use + >1 sexual partner) were more likely to perceive their risk as high and those who did not use condoms at last intercourse who also had more than one sexual partner in the past year (condom nonuse + >1 sexual partner) were even more likely to perceive their risk as high.

Table 4 addresses objective 1 by providing a weighted descriptive breakdown of how the population perceived their risk of contracting an STI, across all categorical covariables. Each variable shows a similar trend of STI risk perception with all reporting high percentages of perception of having low risk. In total, 93.1% of students reported being at low risk of contracting STIs (“not very much at risk” or “not at all at risk”) and 6.8% reported being at higher risk of contracting STIs (“quite a lot at risk” or “greatly at risk”). The chi-square p-value compared the difference in low and high STI risk perception across variable categories. Significant differences were found across nearly all variables.

Table 5 addresses objective 2 by providing a weighted descriptive breakdown of demographic, behavioural and psychosocial characteristics of each of the four subgroups created

by dichotomizing risk behaviour and risk perception. Students classified in the categories of risk misperception (low STI risk/high sexual risk behaviour and high STI risk perception/low sexual risk behaviour) made up 13.3% and 3.8% of the total population, respectively.

Students who perceived themselves to be at low STI risk despite practicing risky sexual behaviours (risk misperception) were mostly female, mostly Caucasian and heterosexual, more often did not consider religion to be of importance, and lived with roommates or off campus. They were more likely not to have had non-consensual sex, to be frequent binge drinkers and non-users of marijuana, were at minimal risk of depression, and had accessed STI testing. Those categorized as having high STI risk perception/low sexual risk behaviour had demographic, behavioural, and psychosocial characteristics similar to those in the low risk misperception group, although they were more likely to be male, less likely to be Caucasian, and less likely to be heterosexual. Conversely, students whose low risk perception matched their low risk behaviour (low STI risk perception/low sexual risk) were mostly Caucasian and female, did not consider religion important, lived off campus or with roommates, were mostly non-bingers of alcohol and non-users of marijuana, more likely to be tested for STIs, and were at minimal risk of depression. Those whose high risk perception matched their risk behaviour (high STI risk perception/high sexual risk) had similar characteristics to the previous group, although most were frequent bingers of alcohol and had never been tested for STIs.

Tables 6 and 7 address the study's second objective of determining what demographic factors, health and behavioural factors, and health knowledge factors are related to inaccurate risk perception for both those at low and high sexual risk. If unadjusted models revealed an association between covariables and low STI risk perception with associations at a p-value <0.2, they were included in multivariable models to allow for direct comparisons between sexual behaviour and risk misperception. The adjusted models show the most parsimonious models where all bolded values represent independent associations with risk misperception with a p-value less than 0.05.

Table 6 presents, among those engaging in risky sexual behaviours (both individual and combined risk behaviours), which factors were associated with risk misperception (perceiving themselves to be at low STI risk). The adjusted model shows that among students who did not

use condoms at last intercourse, there were significant associations between being Caucasian, being 100% heterosexual, living with a romantic partner as opposed to living alone, with having increased odds of having STI risk misperception (low risk perception). Being a frequent binger of alcohol, having non-consensual sex, having an increased perception of peer sexual risk taking, and not using hormonal contraceptives were significantly associated with decreased odds of misperceiving STI risk (low risk perception). Among students who had more than one sexual partner in the past year, we found significant associations between being Caucasian, being 100% heterosexual, living with a romantic partner, and living on campus and having increased odds of misperceiving STI risk. We also found that, among those same students, having non-consensual sex, being a frequent alcohol binger, using marijuana frequently, having a somewhat or very elevated risk of depression, and having increased perception of peer sexual risk taking were significantly associated with decreased odds of having STI misperception. When we combined both risk behaviours, we found significant associations between being Caucasian, being 100% heterosexual, and living with a romantic partner and having increased odds of having STI risk misperception. We also found that when we combined risk behaviours, being a frequent binger, having an increased perception of peer sexual risk taking, having non-consensual sex, and not using hormonal contraceptives were significantly associated with decreased odds of having STI risk misperception.

Table 7 presents, among those students who did not engage in risky sexual behaviours (among both separated and combined risk categories), which factors determine risk misperception (perceiving themselves to be at high STI risk). The adjusted model shows that among students who used condoms at last intercourse, there were significant associations between attending a specific university in the Maritimes, having non-consensual sex, being a frequent binger of alcohol, being a frequent marijuana user, having increased perception of peer sexual risk-taking with increased odds of STI risk misperception, and having a somewhat or very elevated risk of depression. Among those same students, being Caucasian and living with a romantic partner were significantly associated with decreased odds of STI risk misperception. Among students who had 0-1 sexual partners in the past year, there were significant associations between having non-consensual sex, frequently using marijuana, and having a very elevated risk

of depression with increased odds of STI risk misperception. Being Caucasian and living with a romantic partner were significantly associated with decreased odds of STI risk misperception among the same group of low risk students. When we combined less risky sexual behaviours, we found significant associations between having non-consensual sex, being a frequent alcohol binger, being a frequent marijuana user, having increased perception of peer sexual risk-taking, having a very elevated risk of depression, having a somewhat or very elevated risk of depression, and not using hormonal contraceptives with increased odds of STI risk misperception. We also found when combining less risky behaviours that living with a romantic partner, and being Caucasian were significantly associated with decreased odds of STI risk misperception.

Tables 8 through 10 address the study's third objective of determining what specific combinations of STI risk perception and risky sexual behaviour are associated with accessing STI testing. Table 8 presents the association between the four possible combinations of STI risk perception/risk behaviour level and STI testing. There were 2620 (36.5%) students in the sample who had ever accessed STI testing. In terms of regression analysis, having low STI risk perception and engaging in low risky sexual behaviours was significantly associated with having decreased odds of having accessed STI testing [0.37 (95% CI: 0.26,0.52)] when compared with those with both high risk perception and high risk behaviour. Having non-consensual sex, and having increased sexual health knowledge confounded the relationship, altering the OR for the association between the composite risk/perception variable and STI testing by more than 10%. The odds of having accessed STI testing in both students with high perception/low risk behaviour and low perception/low risk behaviour did not show significant findings compared to students with high perception and high risk behaviour.

Table 9 addresses the second component of our third question, where a supplementary analysis was done with the separate contributing items of risk behaviour and risk perception was used separately as potential predictors of accessing STI testing. The table shows that condom non-use during last intercourse, having more than one sexual partner in the last 12 months, and having higher STI risk perception was associated with increased odds of accessing STI testing (compared to using a condom, having 0-1 partners in the last 12 months, and having lower STI risk perception). Living in a student residence, having increased sexual health knowledge, and

having had non-consensual sex were found to confound the relationship, altering the association by more than 10%.

Due to the significant relationships between accessing STI testing and both risk behaviours as well as risk perception, we also examined the significance of the interaction between each risk behaviour and risk perception on accessing STI testing. The interaction between multiple partners in the past year and high risk perception was not significant; however the interaction between condom non-use and high risk perception was. Table 10 shows this significant interaction effect. For those students who used condoms during last intercourse and who had a high STI risk perception (versus those who used condoms and had low risk perception), the odds of accessing STI testing was 2.49. For those students who did not use condoms during last intercourse and who had low STI risk perception (versus those who used condoms and had low STI risk perception), the odds of accessing STI testing was 1.75. For those students who did not use condoms at last intercourse and who had high STI risk perception (versus those who used condoms with low risk perception), the odds ratio of accessing STI testing was 2.49.

Table 1. Characteristics of the study population (n=7185)

Characteristic	Unweighted Frequency	Weighted Percent (95% Confidence Interval)
Sex	7185	
Male	1981	41.3 (39.9-42.6)
Female	5204	58.7 (57.3-60.1)
University Year	7185	
First year	1792	22.6 (21.5-23.7)
Second year	1591	22.0 (20.9-23.1)
Third year	1565	22.0 (20.9-21.1)
Fourth year	1654	23.8 (22.7-24.9)
Other	583	9.7 (8.8-10.6)
Ethnicity	7170	
Caucasian	6595	91.2 (90.4-91.9)
Other	575	8.8 (8.0-9.6)
Religion	7185	
Not important	5445	75.1 (73.9-76.3)
Important	1740	24.9 (23.7-26.0)
GPA	7185	
Above average	3712	50.9 (49.6-52.2)
Below average	3473	49.1 (47.8-50.4)
Living Partners	7178	
One or both parents	1565	22.4 (21.4-23.5)
Alone	1331	17.8 (16.8-18.7)
Roommate(s)	3173	43.4 (42.1-44.7)
Romantic partner	1109	16.4 (15.4-17.5)
Living Arrangements	7169	
Off campus	5520	79.0 (78.0-80.0)
Student residence	1649	21.0 (20.0-22.0)
Sexual Orientation	7183	
100% heterosexual	4902	70.4 (69.2-71.5)
Not 100% heterosexual	2281	29.6 (28.5-30.8)
University	7185	
1	3222	31.5 (31.2-31.8)
2	687	8.5 (8.1-9.0)
3	367	6.1 (5.7-6.5)
4	440	5.5 (5.3-5.8)
5	678	14.9 (14.6-15.2)
6	537	9.6 (9.2-10.0)
7	878	16.8 (16.4-17.3)
8	376	7.0 (6.7-7.3)
Binge Alcohol Use	7176	
Non-Bingers	2981	41.7 (40.4-43.1)
Infrequent Bingers	1085	15.2 (14.3-16.2)
Frequent Bingers	3110	43.0 (41.7-44.3)
Marijuana Use	7153	
Non-Users	4872	68.4 (67.1-69.6)
Infrequent Users	988	13.0 (12.2-13.9)
Frequent Users	859	11.7 (10.9-12.6)
Very Frequent Users	434	6.9 (6.2-7.6)

Characteristic	Unweighted Frequency	Weighted Percent (95% Confidence Interval)
At-Risk of Depression	7185	
Minimal	4746	66.9 (55.7-68.1)
Somewhat Elevated	1872	25.3 (24.1-26.4)
Very Elevated	567	7.8 (7.1-8.5)
Had Non-Consensual Sex	7178	
No	6760	94.5 (93.8-95.1)
Yes	418	5.5 (4.9-6.1)
Hormonal Contraception Use	7185	
No	2011	30.0 (28.7-31.2)
Yes	5174	70.0 (68.8-71.3)

Main Variables	Unweighted Frequency	Weighted Percent (95% Confidence Interval)
Vaginal Intercourse with >1 partner (past year)	7185	
No	4407	62.1 (60.8-63.3)
Yes	2778	37.9 (36.7-39.2)
Condom Non-use	7185	
No	4069	56.8 (55.5-58.1)
Yes	3116	43.2 (41.9-44.5)
Combinations of Risk Behaviours	7185	
Condom use + 0-1 partners	2492	35.3 (34.0-36.6)
Condom use + >1 partner	1577	21.5 (20.5-22.6)
Condom nonuse + 0-1 partners	1915	26.8 (25.6-28.0)
Condom nonuse + >1 partner	1201	16.4 (15.4-17.4)
STI Risk Perception	7185	
Not at all at risk	3687	51.2 (49.9-52.6)
Not very much at risk	3022	41.9 (40.6-43.2)
Quite a lot at risk	407	5.8 (5.2-6.5)
Greatly at risk	69	1.0 (0.76-1.32)
Accessed STI Testing	6612	
No	3992	61.5 (60.1-62.8)
Yes	2620	38.5 (37.2-39.9)

Table 2. STI risk perception levels across categories of risk behaviour. Row percentages (95% confidence intervals) shown. (n=7185)

Risk Behaviours	Perceived STI Risk			
	Greatly (n=69)	Quite A lot (n=407)	Not Very Much (n=3022)	Not At All (n=3687)
Condom non-use				
No	0.5 (0.4-0.9)	5.0 (4.3-5.9)	44.3 (42.6-46.1)	50.1 (48.3-51.8)
Yes	1.6 (1.1-2.2)	6.9 (5.9-8.0)	38.7 (36.7-40.7)	52.8 (50.8-54.8)
>1 Partner				
No	0.4 (0.2-0.8)	1.6 (1.2-3.3)	32.0 (30.4-33.6)	66.0 (64.4-67.6)
Yes	2.0 (1.4-2.7)	12.8 (11.4-14.2)	58.1 (56.0-60.2)	27.1 (25.3-29.0)
Behaviour Combinations				
Condom use + 0-1 partners	0.2 (0.06-0.4)	1.6 (1.1-2.4)	33.4 (31.3-35.5)	64.8 (62.7-67.0)
Condom use + >1 partner	1.2 (0.7-2.1)	10.6 (9.0-12.4)	62.3 (59.4-64.9)	25.9 (23.6-28.4)
Condom nonuse + 0-1 partners	0.8 (0.4-1.6)	1.6 (1.0-2.5)	30.2 (27.9-32.6)	67.5 (65.0-70.0)
Condom nonuse + >1 partner	2.9 (2.0-4.3)	15.6 (13.4-18.4)	52.6 (49.4-55.9)	28.8 (26.0-31.7)

Table 3. Unadjusted odds ratios (95% confidence intervals) for the association between sexual risk behaviour and having high STI risk perception† (n=7185).

Combination of Risk Behaviours	OR (95% CI)
Condom use + 0-1 partners	1.0
Condom non-use + 0-1 partners	1.34 (0.77,2.32)
Condom use + >1 partner	7.45(4.86,11.42)***
Condom non-use + >1partner	12.70 (8.30,19.42)***

† Perceiving STI risk level as “greatly at risk” or “quite a lot at risk”

***p<0.001

Table 4. STI risk perception categories[†] across study population characteristics. Row percentages (95% confidence intervals) shown (n=7185).

Characteristic	Perceived STI Risk	
	High (n=476)	Low (n=6709)
Total	6.8 (6.2-7.6)	93.1 (92.4-93.8)
Sex		
Male	7.4 (6.2-8.8)	92.6 (91.2-93.8)
Female	6.4 (5.8-7.2)	93.5 (92.8-94.2)
University Attending		
1	7.0 (6.2-8.0)	92.9 (92.0-93.8)
2	6.2 (4.6-8.4)	93.8 (91.6-95.4)
3	7.0 (4.2-11.5)	93.0 (88.5-95.8)
4	4.6 (2.9-7.0)	95.4 (93.0-97.1)
5	7.0 (5.3-9.4)	93.0 (90.6-94.7)
6	8.8 (6.5-11.9)	91.2 (88.1-93.5)
7	6.5 (4.9-8.7)	93.4 (91.3-95.1)
8	5.9 (3.7-9.3)	94.1 (90.7-96.3)
Year of Study*		
First	5.5 (4.4-6.9)	94.5 (93.1-95.6)
Second	6.5 (5.2-8.1)	93.5 (91.9-94.8)
Third	6.8 (5.5-8.4)	93.2 (91.6-94.5)
Fourth	8.6 (7.2-10.3)	91.4 (89.7-92.8)
Other (>Fourth)	6.6 (4.6-9.3)	93.4 (90.7-95.4)
GPA*		
Below Average	7.9 (6.9-8.9)	92.1 (91.0-93.1)
Above Average	5.9 (5.1-6.8)	94.1 (93.2-94.9)
Ethnicity*		
Caucasian	6.5 (5.8-7.2)	93.5 (92.8-94.2)
Not Caucasian	10.8 (8.0-14.3)	89.2 (85.7-92.0)
Sexual Orientation*		
100% Heterosexual	5.9 (5.1-6.7)	94.1 (93.3-94.9)
Not 100% Heterosexual	9.2 (7.9-10.7)	90.8 (89.3-92.1)
Religion*		
Important	5.2 (4.1-6.6)	94.8 (93.4-95.8)
Not Important	7.4 (6.6-8.2)	92.6 (91.8-93.4)
Living Partners*		
Alone	6.9 (5.5-8.7)	93.1 (91.3-94.5)
Roommate(s)	9.9 (8.8-11.2)	90.0 (88.8-91.2)
Romantic Partner	1.2 (0.6-2.4)	98.8 (97.6-99.4)
Parent(s)	4.9 (3.8-6.4)	95.0 (93.6-96.2)
Living Arrangements		
Off campus	7.2 (6.4-8.0)	92.8 (92.0-93.6)
Student residence	5.8 (4.6-7.2)	94.2 (92.8-95.4)
Had Non-Consensual Sex*		
Yes	17.8 (14.0-22.3)	82.2 (77.7-86.0)
No	6.2 (5.6-6.9)	93.8 (93.1-94.4)
Binge Alcohol Use*		
Non-Bingers	3.9 (3.2-4.8)	96.1 (95.5-96.8)
Infrequent Bingers	4.8 (3.5-6.7)	95.2 (93.3-96.5)
Frequent Bingers	10.3 (9.2-11.6)	89.7 (88.4-90.8)

	Perceived STI Risk	
	High	Low
Marijuana Use*		
Non-Users	4.9 (4.2-5.7)	95.1 (94.3-95.8)
Infrequent Users	7.4 (5.9-9.4)	92.6 (90.6-94.1)
Frequent Users	12.9 (10.6-15.8)	97.0 (84.2-89.4)
Very Frequent Users	14.6 (11.2-18.9)	85.4 (81.1-88.8)
At-Risk of Depression*		
Minimal	5.6 (4.9-6.5)	94.4 (93.5-95.1)
Somewhat Elevated	8.7 (7.3-10.3)	91.3 (89.7-92.7)
Very Elevated	11.4 (8.6-14.8)	88.6 (85.2-91.4)
Accessed STI Testing*		
No	4.2 (3.6-5.0)	95.8 (95.0-96.4)
Yes	1.6 (9.3-12.0)	89.4 (88.0-90.7)
Hormonal Contraceptive Use*		
No	8.8 (7.4-10.2)	91.2 (89.8-92.6)
Yes	6.0 (5.3-6.8)	94.0 (91.2-94.7)

† Perceiving high STI risk level as “greatly at risk” or “quite a lot at risk” and perceiving low STI risk as “not at all at risk” or “not very much at risk”

*Chi-squared p-value (<0.05) is comparing the differences in STI risk perception across all variable categories

Table 5. Characteristics of study population stratified by sexual risk behaviour and STI risk perception. Column percentages (95% confidence intervals) shown unless otherwise indicated (n=7185).

	Low STI Risk Perception/High Sexual Risk Behaviour (n=980)	High STI Risk Perception/Low Sexual Risk Behaviour (n=255)	Low STI Risk Perception/Low Sexual Risk Behaviour (n=5729)	High STI Risk Perception/High Sexual Risk Behaviour (n=221)
Total	13.3 (12.5-14.3)	3.8 (3.3-4.4)	79.8 (78.7-80.8)	3.0 (2.6-3.5)
Sex (male)	40.0 (36.4-43.8)	48.4 (44.4-58.6)	41.2 (39.4-42.7)	40.0 (32.4-48.1)
University Attending				
1	31.9 (29.2-34.8)	30.3 (25.1-36.1)	31.3 (30.6-31.9)	34.9 (28.9-41.6)
2	10.3 (8.5-12.3)	7.4 (4.9-11.1)	8.3 (7.7-8.9)	8.2 (5.2-12.6)
3	5.3 (3.8-7.3)	9.6 (5.5-6.6)	6.2 (5.7-6.8)	2.1 (0.9-4.9)
4	6.1 (4.8-7.6)	3.5 (1.8-6.6)	5.6 (5.3-6.0)	3.9 (2.1-7.0)
5	15.2 (12.6-18.1)	14.7 (10.1-20.9)	14.8 (14.2-15.5)	16.2 (10.8-23.6)
6	10.0 (8.0-12.6)	12.9 (8.9-18.5)	9.3 (8.7-9.9)	11.6 (7.2-18.2)
7	15.2 (12.6-18.2)	16.7 (11.7-23.3)	17.2 (16.5-17.9)	15.4 (10.3-22.3)
8	6.0 (4.5-8.0)	4.6 (2.4-8.7)	7.2 (6.8-7.7)	7.8 (4.2-13.9)
Year of Study				
First	21.2 (18.5-24.1)	19.5 (14.5-25.7)	23.2 (22.0-24.4)	16.4 (11.9-22.2)
Second	25.7 (22.8-28.9)	18.9 (14.0-25.1)	21.4 (20.2-22.7)	23.6 (17.7-30.7)
Third	20.8 (18.0-24.0)	21.7 (16.6-27.8)	22.2 (20.9-23.4)	22.5 (16.8-29.4)
Fourth	24.0 (20.9-27.4)	31.5 (25.3-38.4)	23.3 (22.0-24.6)	27.1 (21.0-34.2)
Other (>Fourth)	8.3 (6.5-10.5)	8.4 (5.2-13.3)	9.9 (8.9-11.0)	10.4 (6.3-16.7)
Below Average GPA	51.9 (48.3-55.5)	53.4 (46.3-60.3)	48.3 (46.8-49.8)	57.7 (50.2-64.8)
Caucasian	93.4 (91.5-94.9)	84.8 (78.5-89.4)	91.3 (90.4-92.1)	88.0 (81.2-92.5)
Not Heterosexual	30.9 (27.8-34.3)	38.2 (31.7-45.2)	28.5 (27.2-29.8)	41.8 (35.7-49.4)
Religion Not Important	80.2 (77.1-83.0)	79.5 (74.3-84.5)	73.8 (72.4-75.1)	82.9 (76.2-88.0)
Living Partners				
Alone	17.8 (15.3-20.7)	19.5 (14.4-25.8)	17.7 (16.6-18.8)	15.8 (11.5-21.4)
Roommate(s)	52.0 (48.4-55.6)	61.4 (54.2-68.0)	40.3 (38.9-41.7)	65.1 (57.6-71.9)
Romantic Partner	9.1 (7.0-11.8)	4.3 (2.0-9.1)	18.8 (17.8-20.0)	1.2 (0.4-3.8)
Parent(s)	21.0 (18.3-24.1)	14.8 (10.5-20.6)	23.2 (22.0-24.4)	17.8 (12.4-24.9)
Living Arrangements				
Off Campus	79.6 (76.6-82.4)	80.6 (74.7-85.5)	78.6 (77.5-79.8)	84.6 (79.0-88.9)
Student Residence	20.4 (17.6-23.4)	19.4 (14.5-25.3)	21.4 (20.2-22.5)	15.4 (11.1-21.0)
Had Non-Consensual Sex	8.4 (6.4-10.9)	13.2 (9.4-18.3)	4.3 (3.7-4.9)	15.6 (11.1-21.6)
Binge Alcohol Use				
Non-Bingers	24.3 (21.4-27.4)	28.4 (22.5-35.3)	46.2 (44.7-47.7)	18.2 (12.9-25.1)
Infrequent Bingers	15.5 (12.0-18.3)	13.7 (9.2-20.0)	15.5 (14.5-16.7)	7.1 (4.4-11.2)
Frequent Bingers	60.2 (56.7-63.7)	57.8 (50.7-64.7)	38.2 (36.8-39.7)	74.7 (67.5-80.7)
Marijuana Use				
Non-Users	54.6 (51.0-58.1)	49.4 (42.4-56.4)	72.4 (71.0-73.7)	48.8 (41.3-56.3)
Infrequent Users	17.4 (14.9-20.1)	14.3 (10.5-19.3)	12.2 (11.3-13.1)	13.8 (9.7-19.2)
Frequent Users	17.3 (14.8-20.1)	20.1 (15.1-26.3)	9.9 (9.0-10.8)	24.6 (18.9-31.5)
Very Frequent Users	10.7 (8.7-13.2)	16.2 (11.5-22.3)	5.6 (4.9-6.4)	12.8 (8.4-18.9)
Perceived Peer Sexual Risk-Taking mean	23.1 (22.7-23.6)	23.2 (22.4-24.0)	20.5 (20.3-20.6)	25.2 (24.3-26.0)
Sexual Health Knowledge Score mean	8.36 (7.68-8.38)	8.03 (7.68-8.38)	7.98 (7.91-8.06)	8.43 (8.03-8.83)
At-Risk of Depression				
Minimal	64.3 (60.8-67.6)	55.3 (48.3-62.2)	68.5 (67.0-69.8)	54.9 (47.4-62.2)

	Low STI Risk Perception/High Sexual Risk Behaviour	High STI Risk Perception/Low Sexual Risk Behaviour	Low STI Risk Perception/Low Sexual Risk Behaviour	High STI Risk Perception/High Sexual Risk Behaviour
Somewhat Elevated	26.1 (23.2-29.1)	31.6 (25.6-38.3)	24.5 (23.3-25.8)	32.4 (25.7-39.8)
Very Elevated	9.6 (7.6-12.2)	13.1 (8.7-19.0)	7.0 (6.3-7.8)	12.7 (8.8-18.1)
Accessed STI Testing				
No	37.6 (30.3-45.5)	40.2 (33.3-47.5)	45.8 (42.0-49.5)	65.9 (64.4-67.3)
Yes	62.4 (54.5-69.7)	59.8 (52.5-66.7)	54.2 (50.5-57.9)	34.1 (32.7-35.6)

Table 6. Among students who are engaging in risky sexual behaviours, factors associated with low STI risk perception (risk misperception). Unadjusted and adjusted odds ratios and 95% confidence intervals shown for individual behaviours and combined behaviours (n=7185).

Factor	Among Condom Non-Users		Among Students with > 1 Sexual Partner		Among Students with Both Risk Behaviours (Condom Non-Users with > 1 Sexual Partner)	
	Unadjusted OR	Adjusted OR	Unadjusted OR	Adjusted OR	Unadjusted OR	Adjusted OR
Sex (male)	0.75 (0.55,1.02)	1.05 (0.71,1.55)	1.09 (0.84, 1.41)	1.32 (1.00,1.75)*	1.01 (0.69,1.45)	1.39 (0.89,2.17)
University Attending						
1	1.0	†	1.0	†	1.0	†
2	1.32 (0.79,2.19)		1.09 (0.74,1.63)		1.37 (0.79,2.38)	
3	1.79 (0.61,5.25)		1.12 (0.62,2.04)		2.79 (1.04,7.52)*	
4	1.49 (0.83,2.66)*		1.80 (1.02,3.16)*		1.70 (0.86,3.38)	
5	1.03 (0.64,1.66)		0.88 (0.59,1.29)		1.03 (0.60,1.77)	
6	0.92 (0.53,1.60)		0.85 (0.57,1.27)		0.95 (0.51,1.75)	
7	1.03 (0.66,1.62)		1.09 (0.74,1.60)		1.08 (0.62,1.85)	
8	1.03 (0.53, 1.97)		0.82 (0.46,1.46)		0.85 (0.39, 1.82)	
Year of Study						
First	1.0	†	1.0	†	1.0	†
Second	0.69 (0.43,1.11)		0.92 (0.64,1.34)		0.85 (0.51,1.42)	
Third	0.74 (0.47,1.18)		0.70 (0.49,1.01)		0.73 (0.43,1.21)	
Fourth	0.66 (0.43,1.03)		0.64 (0.45,0.91)*		0.68 (0.42,1.12)	
Other (>Fourth)	0.86 (0.46,1.59)		0.59 (0.36,0.96)*		0.60 (0.30,1.19)	
Below Average GPA	0.68 (0.50,0.92)*	†	0.92 (0.71,1.19)	†	0.80 (0.57,1.12)	†
Caucasian	1.96 (1.22,3.16)**	2.50 (1.47,4.21)**	1.44 (0.93,2.21)	1.83 (1.15,2.93)*	1.92 (1.06,3.45)*	2.45 (1.29,4.65)**
100% Heterosexual	1.61 (1.19,2.17)**	1.85 (1.30,2.62)**	1.53 (1.20,1.95)**	1.37 (1.04,1.81)*	1.60 (1.14,2.25)**	1.86 (1.23,2.80)**
Religion Not Important	0.66 (0.44,0.99)*	†	0.81 (0.90, 1.67)	†	0.84 (0.53,1.32)	†
Living Partners						
Alone	1.0	1.0	1.0	1.0	1.0	1.0
Roommate(s)	0.60 (0.41,0.87)**	0.67 (0.44,1.09)	0.67 (0.50,0.92)*	0.74 (0.54,1.03)	0.71 (0.46,1.09)	0.77 (0.49,1.20)
Romantic Partner	6.77(2.84,16.12)***	6.77(2.67,17.19)***	2.28 (0.86,6.05)	3.79 (1.31,11.02)*	6.61(1.91,22.87)**	10.02(2.50,40.20)**
Parent(s)	1.22 (0.74,2.00)	1.17 (0.70,1.97)	1.00 (0.66,1.52)	1.03 (0.67,1.58)	1.05 (0.60,1.84)	1.07 (0.59,1.92)
Living Arrangements						
Off Campus	1.0	†	1.0	1.0	1.0	†
Student Residence	1.17 (0.80,1.70)		1.50 (1.12,2.00)**	1.63 (1.18,2.25)**	1.60 (0.14,2.25)**	
Had Non-Consensual Sex	0.33 (0.22,0.50)***	0.42 (0.26,0.67)**	0.42 (0.29,0.59)***	0.50 (0.34,0.72)***	0.49 (0.30,0.50)**	0.56 (0.32,0.96)*
Binge Alcohol Use						
Non-Bingers	1.0	1.0	1.0	1.0	1.0	1.0
Infrequent Bingers	1.01 (0.57,1.78)	1.05 (0.59,1.84)	1.01 (0.63,1.63)	0.98 (0.60,1.59)	1.64 (0.86,3.12)	1.48 (0.78,2.79)

Factor	Among Condom Non-Users		Among Students with > 1 Sexual Partner		Among Students with Both Risk Behaviours (Condom Non-Users with > 1 Sexual Partner)	
	Unadjusted OR	Adjusted OR	Unadjusted OR	Adjusted OR	Unadjusted OR	Adjusted OR
Frequent Bingers	0.36 (0.25,0.52)***	0.51 (0.34, 0.77)**	0.58 (0.42,0.79)**	0.69 (0.50,0.92)*	0.61 (0.39,0.95)	0.58 (0.37,0.92)*
Marijuana Use						
Non-Users	1.0	†	1.0	1.0	1.0	†
Infrequent Users	0.87 (0.57,1.34)		0.85 (0.62,1.17)	0.96 (0.69,1.32)	1.12 (0.71,1.79)	
Frequent Users	0.47 (0.32,0.68)***		0.48 (0.35,0.65)***	0.59 (0.43,0.81)**	0.63 (0.41,0.95)	
Very Frequent Users	0.43 (0.27,0.68)***		0.50 (0.34,0.74)**	0.63 (0.42,0.95)*	0.75 (0.43,1.30)	
Perceived Peer Sexual Risk-Taking Score	0.92 (0.90,0.94)***	0.93 (0.90,0.96)***	0.94 (0.92,0.96)***	0.94 (0.92,0.96)***	0.95 (0.92,0.97)***	0.94 (0.91,0.97)***
Sexual Health Knowledge Score	0.98 (0.92,1.05)	†	0.97 (0.91,1.03)	†	0.99 (0.91,1.07)	†
At-Risk of Depression						
Minimal	1.0	†	1.0	1.0	1.0	†
Somewhat Elevated	0.68 (0.48,0.94)		0.56 (0.42,0.73)***	0.64 (0.48,0.85)**	0.66 (0.45,0.97)*	
Very Elevated	0.47 (0.29,0.75)**		0.54 (0.37,0.79)**	0.64 (0.42,0.97)*	0.64 (0.38,1.07)	
No Hormonal Contraceptive Use	0.54 (0.39,0.74)***	0.62 (0.44,0.88)**	0.72 (0.56,0.92)*	†	0.53 (0.37,0.97)**	0.60 (0.41,0.90)*

**p<0.01

***p<0.001

Bolded values = p<0.2

† This factor was not retained in the final model for this analysis because it was not independently associated with risk misperception.

Table 7. Among students who are not engaging in risky sexual behaviours, factors associated with high STI risk perception (risk misperception). Unadjusted and adjusted odds ratios and 95% confidence intervals shown for individual behaviours and combined behaviours (n=7185).

Factor	Among Condom Users		Among Students with 0-1 Sexual Partners		Among Students with Neither Risky Behaviour (Condom Users with 0-1 Partners)	
	Unadjusted OR	Adjusted OR	Unadjusted OR	Adjusted OR	Unadjusted OR	Adjusted OR
Sex (male)	1.05 (0.76, 1.45)	0.86 (0.58,1.17)	2.04 (1.16,3.58)*	1.85 (0.97,3.22)	1.35 (1.01,1.78)*	1.03 (0.75,1.46)
University Attending				†		†
1	1.0	1.0	1.0		1.0	
2	1.03 (0.62,1.70)	0.95 (0.56,1.61)	0.50 (0.19,1.32)		0.92 (0.57,1.49)	
3	1.51 (0.77,2.96)	2.35 (1.09,5.07)*	1.93 (0.58,6.46)		1.59 (0.83,3.04)	
4	0.45 (0.19,1.05)	0.58 (0.24,1.39)	1.25 (0.50,3.14)		0.64 (0.32,1.29)	
5	1.04 (0.64,1.70)	1.20 (0.72,1.99)	0.76 (0.30,1.90)		1.02 (0.65,1.62)	
6	1.53 (0.96,2.49)	1.31 (0.79,2.16)	1.05 (0.37,2.95)		1.44 (0.91,2.28)	
7	0.88 (0.54,1.46)	0.98 (0.58,1.66)	1.29 (0.61,2.73)		1.00 (0.64,1.56)	
8	0.66 (0.30,1.47)	0.94 (0.41,2.16)	0.46 (0.14,1.54)		0.67 (0.22,1.34)	
Year of Study						
First	1.0	†	1.0	†	1.0	†
Second	0.96 (0.60,1.55)		1.21 (0.47,3.10)		1.06 (0.66,1.68)	
Third	1.14 (0.71,1.83)		1.16 (0.46,2.89)		1.17 (0.75,1.82)	
Fourth	1.62 (1.03,2.55)*		2.24 (0.97,5.16)		1.62 (1.06,2.48)*	
Other (>Fourth)	1.20 (0.63,2.29)		0.25 (0.05,1.25)		1.00 (0.55,1.85)	
Below Average GPA	1.22 (0.87,1.72)	†	2.66 (1.33,5.34)**	†	1.31 (0.92,1.83)	†
Caucasian	0.63 (0.38,1.04)	0.53 (0.32,0.91)*	0.25 (0.14,0.50)***	0.26 (0.13,0.53)***	0.53 (0.34,0.82)**	0.50 (0.32,0.79)**
100% Heterosexual	0.62 (0.44,0.85)**	†	0.90 (0.49,1.64)	†	0.64 (0.49,0.86)**	†
Religion Not Important	1.33 (0.92,1.92)	†	1.52 (0.80,2.86)	†	1.39 (0.98,1.96)	†
Living Partners						
Alone	1.0	1.0	1.0	1.0	1.0	1.0
Roommate(s)	1.30 (0.86,1.97)	1.14 (0.75,1.74)	1.02 (0.48,2.09)	1.17 (0.54,2.52)	1.38 (0.94,2.03)	1.34 (0.90,1.99)
Romantic Partner	0.16 (0.04,0.61)**	0.19 (0.05,0.69)**	0.23 (0.07,0.75)*	0.24 (0.07,0.81)*	0.21 (0.09,0.49)***	0.23 (0.09,0.57)**
Parent(s)	0.59 (0.34,1.01)	0.55 (0.29,1.03)	0.38 (0.16,0.92)*	0.45 (0.19,1.09)	0.58 (0.35,0.96)*	0.64 (0.38,1.04)
Living Arrangements						
Off Campus	1.0	†	1.0	†	1.0	†
Student Residence	0.83 (0.58,1.21)		0.61 (0.31,1.20)		0.88 (0.62,1.25)	
Had Non-Consensual Sex	3.33 (2.11,5.27)***	2.67 (1.64,4.37)***	2.47 (1.00,6.12)	3.27 (1.29,8.33)*	3.41 (2.26,5.14)***	2.87 (1.89,4.36)***

Factor	Among Condom Users		Among Students with 0-1 Sexual Partners		Among Students with Neither Risky Behaviour (Condom Users with 0-1 Partners)	
	Unadjusted OR	Adjusted OR	Unadjusted OR	Adjusted OR	Unadjusted OR	Adjusted OR
Binge Alcohol Use						
Non-Bingers	1.0	1.0	1.0	†	1.0	1.0
Infrequent Bingers	1.54 (0.87,2.73)	1.18 (0.65,2.14)	0.86 (0.35,2.11)		1.43 (0.86,2.39)	1.21 (0.68,1.97)
Frequent Bingers	2.82 (1.97,4.03)***	1.64 (1.13,2.40)**	0.80 (0.43,1.49)		2.46 (1.77,3.41)***	1.51 (1.08,2.11)*
Marijuana Use						
Non-Users	1.0	1.0	1.0	1.0	1.0	1.0
Infrequent Users	2.06 (1.37,3.11)**	1.52 (1.00,2.33)	0.51 (0.17,1.54)	0.47 (0.16,1.35)	1.73 (1.17,2.55)**	1.20 (0.81,1.78)
Frequent Users	3.75 (2.48,5.67)***	2.61 (1.68,4.06)***	0.75 (0.28,1.98)	0.70 (0.26,1.91)	2.97 (2.02,4.38)***	1.98 (1.31,2.95)**
Very Frequent Users	4.57 (2.73,7.62)***	3.37 (1.96,5.78)***	3.15 (1.42,6.97)**	3.33 (1.41,7.86)**	4.26 (2.74,6.64)***	3.16 (1.98,4.99)***
Perceived Peer Sexual Risk-Taking Score	1.08 (1.05,1.10)***	1.06 (1.03,1.09)***	1.07 (1.02,1.11)**	†	1.08 (1.05,1.10)***	1.05 (1.02,1.08)***
Sexual Health Knowledge Score	1.03 (0.96,1.10)	†	0.95 (0.85,1.06)	†	1.01 (0.95,1.07)	†
At-Risk of Depression						
Minimal	1.0	1.0	1.0	1.0	1.0	1.0
Somewhat Elevated	1.70 (1.22,2.40)**	1.45 (1.02,2.05)*	1.06 (0.56,1.99)	1.04 (0.56,1.91)	1.59 (1.17,2.18)**	1.32 (0.95,1.82)
Very Elevated	1.99 (1.21,3.28)**	1.90 (1.05,3.08)*	3.70 (1.54,8.90)**	3.84(1.42,10.23)**	2.29 (1.42,3.70)**	2.00 (1.17,3.44)*
No Hormonal Contraceptive Use	1.42 (1.04,1.95)*	†	1.68 (0.93,3.03)	†	1.70 (1.27,2.28)***	1.41 (1.03,1.92)*

*p<0.05

**p<0.01

***p<0.001

Bolded values = p<0.2

† This factor was not retained in the final model for this analysis because it was not independently associated with risk misperception.

Table 8. Adjusted odds ratios and 95% CIs for the association between combined risk perception/risk behaviour, covariates, and STI testing. Confounders adjusted for in the model noted (n=6612).

	Accessed STI Testing (n=2620)	
Risk Perception/Risk Behaviour		
High/High	126/201 (62.7%)	1.0
High/Low	142/234 (60.7%)	0.93 (0.59,1.46)
Low/High	477/889 (53.6%)	0.76 (0.53,1.10)
Low/Low	1875/5288 (35.4%)	0.37 (0.26,0.52)***

† adjusted for having been subjected to non-consensual sex and increased sexual health knowledge score

***p<0.001

Table 9. Adjusted odds ratios and 95% CIs for the association between condom non-use, covariates, and STI testing. Confounders adjusted for in the model noted (n=6612).

	Accessed STI Testing
Condom Non-Use	
No	1.0
Yes	1.69 (1.49,1.91)***
>1 Sexual Partner	
No	1.0
Yes	1.79 (1.57,2.04)***
STI Risk Perception	
Low	1.0
High	1.86 (1.43,2.42)***

† adjusted for living in student residence, increased sexual health knowledge score, and having been subjected to non-consensual sex
 ***p<0.001

Table 10. Adjusted odds ratios and 95% CIs for the interaction between condom non-use and STI risk perception on STI testing. Confounders adjusted for in the model noted (n=6612).

	Accessed STI Testing
Condom Use - Low Risk Perception	1.0
Condom Use - High Risk Perception	2.49 (1.71,3.62)***
Condom Non Use - Low Risk Perception	1.75 (1.54,1.99)***
Condom Non Use - High Risk Perception	2.49 (1.78,3.50)***
0-1 Sexual Partners	1.0
>1 Sexual Partner	1.79 (1.57,2.04)***

† adjusted for living in student residence, increased sexual health knowledge score, and having been subjected to non-consensual sex

***p<0.001

CHAPTER 7. DISCUSSION

This study aimed to fill a gap in the literature concerning the accuracy of self-perceived sexual risk for STIs of university students in the Maritime Provinces. The purpose was to determine the levels of self-perceived risk of contracting STIs among students across categories of actual risk (defined by their sexual behaviours), identify factors related to risk misperception, and determine if STI risk perception and sexual behaviours were associated with STI testing. Prior studies have explored perceived risk of STI among university students; however, few studies have tried to identify variables related to the accuracy of risk perception of STIs¹⁴, important to the HBM. Among previous studies in this area, few have collected information on a broad range of important covariates, nor have they examined populations of university students, or examined this issue in Maritime Canada.

Our results showed that those who engage in more risky sexual behaviours were more likely to have an accurate perception of their STI risk. Across groups stratified by risk behaviour, associations between covariates and the odds of perceiving low STI risk are not modified to a great extent by actual risk in that certain characteristics are always associated with over or under-estimating risks despite risky sexual behaviours. Ethnicity, sexual orientation, living arrangements, having been subjected to non-consensual sex, marijuana and alcohol usage, peer sexual risk-taking influence, and hormonal contraceptive usage all had been identified as being potential correlates to STI risk misperception no matter how actual risk had been defined. Since certain characteristics are always associated with over or under-estimating risks regardless of risk behaviour, targeting health promotional messages and interventions to those that consistently underestimate their risk when they are at risk is necessary to reduce negative consequences of sexual risk-taking behaviours.

Research Question 1 (perceived risk by level of risk behaviour)

We found that within our sample of 7185 sexually active undergraduate Maritime university students (aged 17-29), 43% did not use a condom during their last vaginal intercourse and 38% had more than one sexual partner within the last 12 months. Seventeen percent engaged in both of these risk behaviours. This proportion of condom non-use is comparable to American national trends, where a survey found 42.6% and 36.7% of males and females aged 18-24 reported having not used condoms during their last intercourse.³⁴ The proportion of those with more than one partner is greater than observed in the literature, with an American study which

surveyed 411 urban-residing adolescent females finding that 33% reported having two or more sexual partners within the past year.¹⁴ PHAC outlines the individual's responsibility to decrease risky sexual behaviour by suggesting limiting sexual relations to long-term monogamous partners, and by using condoms;¹ however, young adults aged 15 to 24 are the cohort with the highest risk for negative health outcomes associated with risky sexual behaviours and reported rates of STIs are highest in this age group. Over- or underestimating the risk related to their sexual behaviours could be an important contributor to such statistics.

In our sample, we found that, generally, students' sexual risk behaviours were related to their perceived risk of contracting an STI. We found that 93% of sexually active students reported their STI risk as low; however, students engaging in riskier sexual behaviours were more likely to have high STI risk perception compared to students engaging in less risky behaviours. Among students who did not use condoms at last intercourse and who had more than one sexual partner in the past year, most considered their STI risk as low; 52.6% considered themselves "not very much at risk" and 28.8% considered themselves "not at all at risk". Among students who did not engage in either risky sexual behaviour, less than 2% considered their STI risk as high ("greatly at risk" or "quite a lot at risk"). Other studies have found misperceptions of sexual risk compared to sexual behaviours, although the proportions differ slightly. An American study exploring the relationship between sexual risk behaviour and perceived HIV risk found that 51% of female adolescents underestimated their sexual risk, and 5% overestimated their risk.¹⁰¹ A study conducted among Dutch vocational college students found that 45% of participants with high risk behaviour (inconsistent condom use during the past 12 months) underestimated their risk of contracting STIs and 12% of participants with low STI risk (consistent condom use over the past 12 months) overestimated their risk of contracting STIs.⁵⁹ The percentage of 'over estimators', the authors note, could be because participants were referencing previous sexual relationships or due to their engaging in other sexual behaviours and being unsure of the associated risks involved, which were not captured in the study. As the literature shows that individuals will perceive their risk differently by considering the severity of consequences,^{55,57,58} the discrepancy between our results and these studies could be due to how the risk perception of STIs compared to risk perception of HIV. The discrepancy could also be due to the influence of an individual's demographic context, e.g., peers, friends, or family

members, and an individual's past experiences – all factors we consider when examining what predicts STI risk misperception in our second objective.

The high proportion of students who perceived their STI risk as low is interesting, given that the entire population had ever engaged in heterosexual vaginal intercourse. In other words, the entire sample was operating at some level of risk, as they were all sexually active students who thought that despite their behaviours, they were not at risk of contracting an STI. Previous research has hypothesized ideas like the optimistic bias and denial and distancing as contributors to low STI risk perception despite risky behaviours.^{58,95,96} Believing that one is at less risk for a negative health outcome compared to others and refusing to accept that negative consequences can happen are key characteristics of these hypotheses. If an individual refuses to believe they are susceptible to a condition or are not threatened by the consequences of a negative behaviour, their behaviour will not change.^{66,67} This might be particularly important in the case of STIs, where individuals are often not aware of infection due to the asymptomatic nature of many such STIs, and about which their peers are unlikely to mention their having such a diagnosis – even though infection is fairly prevalent, there may be a lack of awareness, which poses a real threat. An individual's self-perceived threat of being affected by a condition is a component of the HBM and is an important factor in changing behaviour.⁶⁶ In our sample, this lack of threat perception could be a contributor to why STI risk perception is systemically low.

Research Question 2 (identifying predictors of STI risk misperception)

Since STI risk misperception has the potential to lead to sexual health consequences and complications for university students, it should be addressed as an issue to be reduced on campus. Having knowledge of the proportion of students who inaccurately judge their risk of contracting an STI, and the proportion who have accessed STI testing, can help university health clinics and health promotional centres recognize that STI risk misperception is common in university settings.

Identifying characteristics that are associated with young adults' STI risk perceptions and decisions to practice risky sexual behaviour are important, and help to guide and develop targeted interventions and health promotion strategies. The HBM provides a framework for describing how risk perception can elicit behaviour change. It stresses the significance of the perception of risk; the consequences of that risk perception can act as a catalyst to change risky sexual behaviour in young adults.⁶⁶ Understanding determinants of university students' risk

perceptions is required for effective interventions¹⁴ to increase the accuracy of risk perception. This could be achieved by focusing health promotional messages on factors that contribute to an individual perceiving their risk a certain way, such as demographic factors, health status, knowledge, and health behaviours. Targeted interventions like these could influence beliefs regarding the benefits of actions to reduce the threat of a condition.

As per the HBM, recognizing risk of acquiring a condition is a step towards ultimately eliciting behaviour change. Targeting factors that are associated with risk misperception and that are recognizable and meaningful to individuals could be a method of changing students' risky sexual behaviour. While few studies have described predictors of risk misperception, the literature states that it is important for health behaviour change.^{14,86,87} In our sample, we identified several characteristics from each low and high STI risk behaviour category related to inaccurate STI risk perception. In general, we found several student-related factors that were associated with high or low risk perception regardless of risk behaviour. In other words, students with certain characteristics underestimate or overestimate their risk no matter how they behave.

Among students at high risk (students who did not use condoms during last intercourse, who had more than one sexual partner in the past year, or students who engaged in both these behaviours), factors related to perceiving their STI risk as low included being male, being Caucasian, being 100% heterosexual, and living with a romantic partner or on campus.

These results are comparable to characteristics that past studies have identified as important in the relationship between sexual behaviour and risk perception; however, the few studies looking for predictors of STI risk misperception used a combination variable of condom non-use and number of sexual partners or other risk factors.^{14,62,86} Two African studies looking for predictors of STI risk misperception that classified high risk behaviour with a combined variable found that non-Caucasians (who made up over 75% of the sample) were significantly more likely to engage in risky sexual practices and misperceive their STI risk.^{62,86} The authors note that cultural belief and practice may influence the relationship between risk perception and sexual behaviour and race. In our sample, we found that Caucasian Maritime University students (who made up over 90% of our sample) who engaged in risky sexual behaviours were actually more likely to misperceive their STI risk compared to non-Caucasians. In the category of high risk behaviour and low risk perception, less than 10% were non-Caucasians; yet, ethnic and

diverse cultural backgrounds could still have influence over risk perception compared to their Caucasian counterparts.

An American study classified female adolescents into categories of no risk, slight risk, and high risk by using information on condom use in the past year, number of sexual partners, and partner risk.¹⁴ Their results suggested that female adolescents did use the context of their sexual relationship when assessing risk; those females who engaged in risky sexual behaviours felt they were at low risk if they were with a long-term partner. Our results showed that among students engaging in risky sexual behaviours, living with a romantic partner had a similar effect on risk assessment; students who lived with their partners and practiced risky sexual behaviour were more likely to misperceive their risk than those living alone. This supports past research that suggests perceived risk might decrease over time as a relationship progresses even if risk behaviour remains constant.¹⁴ The association between relationship status and risk perception may be based on assumptions of the monogamous and committed nature of steady relationships.^{14,140-143} Unfortunately, we did not capture the length of the romantic relationship of students in our sample, which prevented us from examining this factor in relation to risk misperception. Considering this, risk misperception may not actually be occurring in this context. For example, those involved in long-term relationships may choose not to use condoms as their relationship matures. Also, the length of time we used to capture number of partners was one year. If an individual had two partners within that year – one long-term partner ending at the year-mark and another long-term partner beginning soon thereafter, that individual may still not consider their STI risk as high.

We also found that among students who had more than one sexual partner, the odds of misperceiving STI risk increased if students lived on campus (compared to those who lived off campus). The literature has shown the association between living on campus and sexual risk-taking behaviours.³⁵ In our sample, while we did not look at the relationship between risk behaviours and living on campus, the relationship between risk misperception and living on campus did not yield a significant association (neither with risk misperception amongst condom non-users nor with using both risk behaviours). Students who live on campus are surrounded by their peers in similar situations and are exposed to the same social events; if having multiple partners is the norm amongst students who live on campus, then those students are probably more likely to misperceive their risk. Also, these students could be using condoms, which could

decrease their STI risk perception even if they have multiple sexual partners, skewing their risk assessment.

We found that among students who had more than one sexual partner in the past year, the odds of misperceiving STI risk were higher in male students than female students (yet not amongst condom non-users or when both risk behaviours were combined). A population-based cross-sectional study among 1028 sexually experienced boys and girls aged 15-20 years in Norway found that more girls than boys underestimated their personal risk of chlamydia infection compared to their actual risk.¹⁴⁰ Sexual behaviours for assessing risk were condom use, relationship with the most recent sexual partner, and age of first intercourse.¹⁴⁰ The study also took urine samples from all participants to test for chlamydia and found that more girls than boys who considered themselves to have no or low chlamydia risk had the infection.¹⁴⁰ While this could be attributed to the infection's potential for being more asymptomatic in females (so that males were more likely to have been treated and thus have gotten rid of infection), the study did find that the prevalence of infection was higher in sexually experienced girls than boys. A Swedish study on HPV and sexual habits had a contrary finding in STI risk perception between males and females, noting that females were more likely than males to have accurate STI risk perception, after adjusting for number of temporary partners, relationship status, and age.¹⁴¹ In our sample, an approximately equal proportion of males and females had more than one partner in the past year; however, more males than females reported condom use during last intercourse. Males who had multiple partners in the past year and misperceived their risk could have been using condoms, yet that variable was not controlled for in the separated risk behaviour model. Using condoms during intercourse could have more weight for males than females when assessing STI risk, even when engaging in a separate risky sexual behaviour (having multiple sexual partners in the past year). This could be why when stratifying on condom non-use and on the composite variable (condom non-use and multiple partners) we did not observe any significant findings in either males or females.

Among students at high risk (students who did not use condoms during last intercourse, who had more than one sexual partner in the past year, or students who engaged in both these behaviours) health behaviours related to decreased odds of perceiving their STI risk as low included frequently bingeing on alcohol, frequently using marijuana, previously having been subjected to non-consensual sex, and not using hormonal contraceptives. Risk perception has

potential to be underestimated once an individual is under the influence of alcohol in social situations,¹²⁵ and with alcohol use^{13,27,32,65} and marijuana use¹¹⁹ being noted in the literature as having an association with risky sexual behaviours. While these studies focused on risk perception under the influence, our results showed something different when looking at risk perception after having been under the influence; students engaging in risky sexual behaviours were less likely to misperceive their STI risk if they were engaging in other risky behaviours. This could suggest that in our sample, students who consume alcohol excessively and use marijuana frequently have a heightened awareness of their STI risk, as they are choosing to engage in other risky health behaviours. If those students who binge drink and frequently use marijuana engage in more extreme risky sexual behaviours, they could be less likely to ignore and deny their risk.

We hypothesized that awareness of STI risk would be increased and more accurate STI risk would be perceived if students used hormonal contraceptives, as the use of hormonal contraception requires female students to see a healthcare professional about their sexual health, and males to be aware of their partners' use of hormonal contraceptives. The results show that among condom non-users, not using hormonal contraceptives was associated with having a more accurate perception of risk, compared to those who do use hormonal contraceptives. This could mean that not taking any precautionary measures makes students more aware of their risky actions and STI risk. Ott and colleagues found that among adolescents with one main sexual partner, the odds of using hormonal contraception and not using condoms were highest amongst those with low estimation of STI risk.¹⁴⁴ The finding that students who did not use hormonal contraceptives had more accurate STI risk perception could reflect students' relationship status, where students who do not have main partners are less likely to use hormonal contraception. These results also suggest that using birth control might be considered adequate protection against contracting STIs, or as Ott and colleagues suggest, the risk of becoming pregnant might override the risk of contracting STIs,¹⁴⁴ which prevents an accurate assessment of real risk amongst students who used hormonal contraceptives in our sample.

Among students at high risk (students who did not use condoms during last intercourse, or who had more than one sexual partner in the past year, or students who engaged in both these behaviours) health and knowledge factors related to having decreased odds of perceiving their risk as low included increased perception of peers' sexual risk taking (i.e. having a greater

perception that one's peers have more permissive attitudes towards sexual risk-taking) and having an elevated risk of depression.

Among students who engaged in risky sexual behaviours in the present study, the perception that peers had more permissive attitudes towards sexual risk taking was associated with lower odds of underestimating their own risk. This means that peer influences do not shape an individual's risk assessment negatively among those who are engaging in risk behaviours already. Studies have shown that perceptions of peer's sexual attitudes and behaviours predict sexual risk-taking among young adults,^{55,56} as university students' social support network is generally more focused on their peer network than family.⁵⁵ While peers could still have an influence on risk-taking in some capacity, the characteristic of having increased perception of peer sexual risk-taking seems to be associated with always overestimating risk, as those who did not engage in risky sexual behaviours also perceived their risk as high.

We also identified students who overestimated their STI risk who were the same type of students as those who were less likely to underestimate their risk when engaging in riskier sexual behaviours. We identified predictors of STI risk misperception among those who engaged in less risky sexual behaviour (condom users and those who had 0-1 partners sexual partners in the past year), yet who thought they were at high risk of contracting an infection. From a health promotional lens, these individuals are less likely to experience the potential negative health consequences of engaging in risky sexual behaviour, and perpetuate the cycle of not being accountable for their sexual health by not seeking appropriate health services. These individuals; however, by overestimating STI risk, could act contrary to their counterparts who engage in more risky sexual behaviour and frequent sexual health services by being inaccurately hyper-concerned about STI risk, putting strain on university sexual health clinics. Past research has also noted that this group of over-estimators may suffer from anxiety and distress, by constantly believing they are at risk of getting infection.¹⁴⁵

Our results indicate that students who have used condoms and have had 0-1 partners in the past year are more likely to misperceive their STI risk (i.e. overestimate their STI risk by perceiving themselves at high STI risk) if they had ever been subjected to non-consensual sex, if they had not used hormonal contraceptives, if they had frequently binged on alcohol, were frequent marijuana users, were at risk of depression, and perceived their peers to have more permissive attitudes toward sexual risk taking. Students who engaged in less risky behaviours

were more likely to have decreased odds of misperceiving risk (i.e. less likely to perceive STI risk as high) if they were Caucasian, and if they lived with a romantic partner. These results need to be interpreted with caution, as all students included in the study were sexually active, and therefore, at some level of risk. The way we have defined 'low risk' could be excluding other factors that were not assessed that could place students at higher sexual risk. There are also student characteristics that are always associated with over or under-estimating risk perception, regardless of students' behaviours or how behaviour is defined. For example, students who have been subjected to forced sex could perpetually believe they are at high risk due to the trauma of that experience.

In examination of predictors of inaccurate risk perception for our second objective, we found that some characteristics were associated with high or low risk perception regardless of risk behaviour. Some predictors, like having increased perception of peers' sexual risk taking, bingeing on alcohol, using marijuana frequently, not using hormonal contraceptives, or having been subjected to forced sex, could be related to high risk perception. Students with these characteristics were more likely to have accurate risk perception when at risk and inaccurate risk perception when not at risk. Other characteristics such as being Caucasian, being heterosexual, and living with a romantic partner were always related to low risk misperception, as these students had inaccurate risk perception when at risk, and accurate risk perception when not at risk. These student-related factors that are always related to high or low risk perception no matter how they behave sexually need to be considered when moving forward with how we approach targeting students with health promotional campaigns.

Research Question 3 (determining if combinations of STI risk perception and risk behaviour level are associated with STI testing)

We also sought to find whether the different combinations of STI risk perception levels and risk behaviour levels were related to STI testing to determine which group is accessing this service. We found that more than 60% of sexually active Maritime university students had never been tested for STIs and over 35% of those students who engaged in risky sexual behaviours, yet who perceived themselves at low STI risk had never accessed STI testing.

The literature has shown mixed-results when attempting to uncover barriers and motivators for STI testing; some studies have shown that high-risk behaviour participants have lower intentions to get tested for STI compared to their low-risk behaviour counterparts,⁵⁹ while

others studies have found that individuals at high risk of contracting HIV are more likely to take advantage of testing programs.¹³²

Our findings show that students who engaged in less risky behaviour and also perceived their STI risk to be low were less likely to have accessed STI testing. The Public Health Agency of Canada recommends that all individuals less than age 25 who are sexually active be tested.¹ Despite this recommendation, our findings indicate those who are not at great risk of becoming infected and who are aware of their low risk are the least likely to be tested, perhaps because they feel they do not need to be tested. Or, perhaps, they are asked about their sexual risk by their provider who does not feel testing is needed. Our results show that this association is confounded by having increased sexual health knowledge, and having been subjected to non-consensual sex. Other studies using similar populations have found that higher sexual health knowledge may be a facilitator of STI testing in undergraduate students, with students at greater risk of STIs having more sexual health knowledge and being more likely to perceive themselves as at risk and therefore more likely to access testing with an accurate risk assessment.^{59,138} Our results show that those at low risk with appropriate risk assessment (low sexual risk and low STI risk perception) are less likely to access testing when they have greater knowledge. Previous studies have also identified college students who have been subjected to forced sex often experience higher levels of distress associated when seeking help.¹⁴⁶⁻¹⁴⁸ In our sample, not accessing STI testing could have been mediated by similar attitudes and feelings associated with help-seeking, such as fear, stigma, or shame¹⁴⁶⁻¹⁴⁸ if a student had been subjected to non-consensual sex.

When we examined each of the two risk behaviours separately with risk perception in relations to STI testing, condom non-users, those students who had more than one partner in the past year, and those who considered themselves at high risk of getting STIs, were significantly more likely to have accessed STI testing. These associations were confounded by living on campus in student residences, having increased sexual health knowledge, and having been subjected to non-consensual sex.

It is noteworthy and promising that students engaging in high-risk sexual behaviours and students who have high STI risk perception are more likely to access STI testing. When we examined the interaction between each risk behaviour and risk perception on STI testing, condom non-use and STI risk perception modified the association to accessing STI testing. Condom non-users with high STI risk perception and condom users with high STI risk

perception were more likely than condom users with low STI risk perception to access STI testing. This finding suggests that STI risk perception among students could play a major role in taking action to reduce the possibility of infection.

Our results show that behaviour and risk assessment both play a role in taking preventative and health-awareness actions. Yet, the majority of students in our sample had never accessed STI testing. Those who had accessed testing were more likely have engaged in riskier sexual behaviours and have higher risk perception. This result should be interpreted with caution, as most of our sample perceived themselves as having low STI risk. We could be observing reverse causation in our results, where risk-perceivers could be more concerned with other consequences of risky behaviour (for example, pregnancy) than contracting an infection or could use being tested for STIs as a justification of risky behaviour. It could also be that once a student is tested for STIs and receives a negative result, the student perceived his or her risk to be low. The interaction that students have with health-care professionals where an accurate STI risk assessment is miscommunicated or lost in the interaction could also be an explanation for these results. For example, when a health clinic takes a student's sexual health history about number of past partners and condom non-use, the health professional may realize and report about risky sexual behaviour and test for STIs without relaying information about risks involved with these behaviours and safe sexual health practices to the patient. Students' accurate STI risk perception could be lost in provider translation.

CHAPTER 8. STRENGTHS

This study draws on a strong research methodology. The survey was piloted on a subset of the population before data collection began, and validated instrumentation was used.

This study was successful in answering the research questions and providing Maritime university healthcare promoters and providers with information about the prevalence of STI risk misperception and characteristics of those who misperceive their risk, potential factors relating to risk misperception, and how risk and behaviours are associated with STI testing. This is the first study to explore STI risk misperception in the university student population within the Maritime Provinces. As such, using university students as the population of interest allows for the results to be used with the most impact, as this cohort is at a high risk of contracting STIs due to their sexual risk-taking.^{23-30,43,55,56} Past studies have used clinic-based samples, limiting the variance of perceived STI susceptibility,¹⁰¹ as well as assessing fewer covariates as predictors of risk misperception.⁵⁹ This study addresses the gap in the literature by using a broad range of covariates as predictors of risk misperception, allowing for more effective, targetable and beneficial public health efforts on Maritime university campuses.

CHAPTER 9. LIMITATIONS

While this study addresses gaps in the literature, there are logistical and measurement flaws. The nature of the study is descriptive and exploratory, and therefore with this design it is not possible to establish temporality or infer causality. Longitudinal and experimental studies are required to demonstrate stronger evidence about the directions of associations and have been shown to be “more valuable” to delineate the nature of the association between perceived risk and risk behavior.⁸⁶ While this is true, no other research has looked at risk perception of STIs within the Maritime University population and having a basic description of how students perceive their sexual risk through cross-sectional data allows for an understanding for the direction of future research. Our results can provide future research with a direction for further testing of associations and hypotheses.

The original study collected data using a self-report survey. Self-report surveys can be prone to non-response bias, due to item non-response. While we performed multiple imputation to compensate for missing survey responses, individuals who did not respond to certain key variables could have done so purposely, and may be systematically different from those who did respond, due to not being comfortable disclosing sensitive information, which may ultimately bias our findings.¹³³ Questionnaires are also vulnerable to recall bias, where individuals cannot recall specific events (like non-condom use at last intercourse or number of sexual partners within the past year) and social desirability bias, where individuals want to be viewed a certain way by others, so they do not report truthfully.¹³⁴ Anonymity and confidentiality of participants was maintained through the consent form to address this study limitation. Online questionnaires have also been shown to demonstrate more truthful responses to sensitive items, meaning less social desirability bias.^{121,122} Validity throughout the questionnaire was obtained by pilot testing the entire survey, and ensuring that participants agreed with the survey items.

Another limitation is how we classified risk behaviours and perception. We used single-question items to ask students about condom use, number of sexual partners, and perceived STI risk. The constructs of perceived and actual risk were based on a limited number of questions in this study. While the literature has informed us that people incorporate many factors when making risk assessments, some individuals may measure risk in a complex way and based on factors that are not captured in the original survey, making our measurements less valid. Considering face validity, the perceived risk question “appears to” measure what it is supposed

to measure; however, the content validity may not be high for this measurement, as individuals weigh the decisions of measuring risk differently based on different social experiences and knowledge.¹⁰¹ As data had already been collected before this project, future research should consider this limitation when moving forward with collection.

Prior literature has noted the advantage of having information on partner risk and relationship length.¹⁴ Our results show that those students who engage in risky sexual behaviours are more likely to misperceive their STI risk (consider themselves at low risk of infection) if living with a romantic partner. We saw this association with both condom non-users and those who had multiple sexual partners in the past year, which made us believe that this relationship could be confounded by relationship duration, which we did not capture in the survey. Intuitively, this relationship seems logical for condom non-users, as previous studies suggest that as romantic relationships evolve, risk perception may decrease over time, even if risky behaviour (condom non-use) remains constant.¹⁴ Students who had multiple sexual partners in the past year could have had one casual sexual partner and then could have begun their relationship with their long-term partner, which was not captured in our study. Due to the context and temporality of the relationship, STI risk misperception may not be the most likely cause of this association, which we have considered when interpreting our results. Future research should include relationship duration to see its effect on risk perception.

There could have been misclassification of STI testing among students that did not differentiate between actively seeking out STI testing and those who went to a health clinic for other reasons (i.e. PAP testing), where professionals could have asked them about getting tested. The associations we uncovered in our third objective using ‘ever having accessed STI testing’ as the main outcome could have been overestimates of any actual associations if fewer students had actually been tested. More objective measures of STI testing should be considered in future research.

The response rate at all participating universities (20.4%) was not as high as researchers had anticipated; however the response rate is comparable to other internet-based surveys conducted among university student populations.¹³⁶ Individuals who participate in voluntary sexual health surveys typically have novelty-seeking personalities, are more likely to be educated, consume alcohol, have had a major depressive episode, and are less conservative than those who refuse to participate.¹³⁷ Internal and external validity can be compromised with a low

response rate as response bias could be due to a higher proportion of individuals in these groups. To increase representativeness, statistical weights were created (based on age, sex, and university attending) to allow for more representative estimates of the population parameters. Since survey non-response could have been either random or systematic, our results must be interpreted with caution.

CHAPTER 10. CONCLUSIONS

Overall, using survey data from eight different universities in Maritime Canada, we were able to describe the levels of students' perceived risk of contracting an STI across categories of their risky sexual behaviours, identify several factors related to high STI risk perception and low STI risk perception, and determine if STI risk perception and sexual behaviours were associated with STI testing.

As this study is the first quantitative study to look at how sexual risk behaviour is related to STI risk perception in a Canadian Maritime university population, we determined that while there is a cohort of sexually active students who misperceive their STI risk, those who engage in more risky sexual behaviours are more likely to have an accurate perception of their STI risk. Low STI risk perception, however, is still systemically present and could be due to students' denial of threat and lack of threat perception, a key component of the HBM. We also determined that those who engage in less risky sexual behaviours, yet who also perceive their STI risk as low are the least likely to get STI testing, compared to those students that having high STI risk perception and engage in riskier sexual behaviours who are more likely to access STI testing. In addition, this is the first study to investigate, among those sexually active Maritime university students who engage in less risky and riskier sexual behaviours, variables that are associated with high and low STI risk perception. Based on results stratified by risk behaviour, associations between covariates and the odds of perceiving low STI risk is not modified to a great extent by actual risk. Ethnicity, sexual orientation, living arrangements, having been subjected to non-consensual sex, marijuana and alcohol usage, peer sexual risk-taking influence, being at risk for depression, and hormonal contraceptive usage were identified as being potential correlates to high and low perceptions of being at risk no matter how actual risk had been defined.

If certain characteristics are always associated with over or under-estimating risks, then our results show how students' characteristics and experiences are related to high and low STI risk perception regardless of sexual practices. Almost all of the students in the sample perceived themselves as having no or very low STI risk, despite the entire sample being sexually active, yet it was having a higher STI risk perception that predicted having ever accessed STI testing. Although we cannot assume with certainty the direction of this association, if having a more accurate awareness of STI risk predicts taking action to reduce the consequences of risky behaviour, then focusing sexual health interventions to increase risk awareness and perception

(especially among those who consistently underestimate their STI risk when they are actually at risk) should be priority if more students with higher STI risk awareness are more likely to get tested.

Perceived risk of contracting a condition is an important component of the HBM. If students can increase their risk perception, and if they feel they can do something about that risk, then they can take action to avoid that risk. We have identified demographic factors, health behaviours, and health and knowledge factors in our sample that could contribute to why students perceive their STI risk as high or low. We have identified a group of individuals with certain characteristics who perceive their risk as low, which is especially problematic when they are engaging in risky sexual behaviours. We have also identified an entire population who perceive their STI risk as low. Interventions targeting those at high risk who have low STI risk perception as well as taking a more generalized population approach to promoting health might be beneficial on university campuses. Effective health promotion and intervention strategies could potentially benefit from Dr. Geoffrey Rose's strategy of preventive medicine, where those at high risk are just one extreme of the distribution, and therefore targeting the population at risk would be most beneficial.¹⁵⁰ Feedback on personal behaviour and providing risk information through self-constructed scenarios have also been noted to be effective at increasing perceptions of susceptibility regarding STIs.¹⁴⁹ Interventions like these, meant to empower young adults as well as using targetable and tangible factors that students can recognize and assign meaning to as the focus of sexual health promotional messages, could elicit behaviour change aimed at decreasing the risk of infection and doing something about the risk.

Since risk misperception is so widespread among our population, taking an "upstream" approach, where risk awareness intervention begins early on in the education of individuals' sexual health may be an effective way to address the issue. We need to approach STI risk just like any other health risk; integrating our sexual health into our overall well-being is a way to begin to normalize the discussion of STIs, STI risk, and STI testing. Having healthy sexual practices needs to start with accountability and responsibility, and for this to occur, the discussion about these issues needs to begin early.

In summary, this exploratory study is the first study to provide evidence regarding self-perceived risk of contracting STIs among sexually active Maritime University students, predictors of risk, and how sexual risk behaviour and risk perception are associated with STI

testing. Until now, this issue has not been examined in Maritime Canada and few studies have collected information on a broad range of important covariates. This study makes a contribution to the literature by identifying potential predictors of risk perception and STI testing to be explored in future longitudinal studies. Findings from this study provide a framework for health promotional messages enabling students to take responsibility for their health and helping university officials to make appropriate decisions about sexual health services offered throughout the Maritime universities.

REFERENCES

1. Public Health Agency of Canada. Infectious disease prevention and control – Report on sexually transmitted infections in Canada: 2010. Available from http://publications.gc.ca/collections/collection_2013/aspc-phac/HP37-10-2010-eng.pdf. Retrieved March 20, 2014.
2. Population health Assessment and Surveillance. Nova Scotia Health and Wellness – Notifiable disease in Nova Scotia 2012 surveillance report. Available from <http://novascotia.ca/dhw/populationhealth/documents/Annual-Notifiable-Disease-Surveillance-Report-2012.pdf>. Retrieved March 20, 2014.
3. Hickey, MT, Cleland, C. Sexually transmitted infection risk perception among female college students. *JAANP* 2013;25(7): 377-84.
4. World Health Organization, Dept. of Reproduction Health and Research. Global incidence and prevalence of selected curable sexually transmitted infections -2008. Geneva, 2012. Available from http://apps.who.int/iris/bitstream/10665/75181/1/9789241503839_eng.pdf Retrieved March 20, 2014.
5. Land JA, Van Bergen JE, Morre SA, Postma MJ. Epidemiology of Chlamydia trachomatis infection in women and the cost-effectiveness of screening. *Hum Reprod Update*. 2010;16:189–204.
6. Rottingen JA, Cameron DW, Garnett GP. A systematic review of the epidemiologic interactions between classic sexually transmitted diseases and HIV: How much really is known? *Sex Transm Dis*. 2001;28:579–97.
7. Singh AE, Romanowski B. Syphilis: Review with emphasis on clinical, epidemiologic, and some biologic features. *Clin Microbiol Rev*. 1999;12:187–209.
8. Fisman D, Laupland KB (2011) Sexually transmitted infections in Canada: an STicky situation. *Can J Infect Dis Med Microbiol* 22(3):80–82.
9. Smylie L, Lau P, Lerch R, et al. The economic burden of chlamydia and gonorrhoea in Canada. *Sex Transm Infect*. 2011;87(1 [Suppl 1]):A156.
10. Tuite AR, Jayaraman GC, Allen VG, Fisman DN. Estimation of the burden of disease and costs of genital Chlamydia trachomatis infection in Canada. *Sex Transm Dis*. 2012;39:260–7.

11. Public Health Agency of Canada. Canadian Guidelines on Sexually Transmitted Infections: Section 2- Primary care and sexually transmitted infections. Available from <http://www.phac-aspc.gc.ca/std-mts/sti-its/cgsti-ldcits/section-2-eng.php#a2>. Retrieved March 20, 2014.
12. Gabhainn SN, Baban A, Boyce W, Godeau E. How well protected are sexually active 15-year olds. Cross-national patterns in condom and contraceptive pill use 2002-2006. *International Journal of Public Health*. 2009;54:209-215.
13. Martens MP, Page JC, Mowry ES, Damann KM, Taylor KK, Cimini MD. Differences between actual and perceived student norms: An examination of alcohol use, drug use, and sexual behavior. *Journal of American College Health*. 2006;54:295–300.
14. Kershaw TS, Ethier KA, Niccolai LM, Lewis JB, Ickovics JR. Misperceived risk among female adolescents: Social and psychological factors associated with sexual risk accuracy. *Health Psychol*. 2003;22:523–532.
15. Wildsmith E, Schelar E, Peterson K, Manlove J. Sexually transmitted diseases among young adults: Prevalence, perceived risk, and risk-taking behaviors. *Trends: Child Research Brief*. 2010. Available from http://www.childtrends.org/Files//Child_Trends-2010_05_01_RB_STD.pdf. Retrieved March 20, 2014.
16. The Association of Universities and Colleges of Canada. (2011). Trends in higher education: Volume 1 – enrolment. Available from: <http://www.caiss.ca/uploaded/trends-2011-vol1-enrolment-e.pdf>. Retrieved May 20, 2014.
17. King AJC, Beazley RP, Warren WK, Hankins CA, Robertson AS, Radford J. Canada youth and AIDS survey. Kingston (ON): Queen’s University, 1988.
18. R.P. Perry, S. Hladkyj, R.H. Pekrun, S.T. Pelletier. Academic control and action control in the achievement of college students: a longitudinal field study *Journal of Educational Psychology*, 93 (2001), pp. 776–789.
19. M.W. Pratt, B. Hunsberger, S.M. Pancer, S. Alisat, C. Bowers, K. Mackey, A. Ostaniewicz, E. Rog, B. Terzian, N. Thomas Facilitating the transition to university: evaluation of a social support discussion intervention program *College and Student Development*, 41 (2000), pp. 427–441.
20. Statistics Canada. (2012). Heavy Drinking. Available from: <http://www.statcan.gc.ca/pub/82-625-x/2012001/article/11662-eng.htm>. Retrieved May 20, 2014.

21. Adlaf EM, Demers A, Gliksman L. Canadian campus survey. (2004). Toronto (ON): Centre for Addiction and Mental Health; 2005.
22. Dalton AL, Galambos NL. Affect and sexual behavior in the transition to university. *Arch Sex Behav* 2008;38:675-687.
23. Kalina O. Sexual risky behaviour among Slovak adolescent and young adults: Social and psychological factors. PhD thesis University of Groningen 2012. Available from file:///Users/laurakeeler/Downloads/Kalina_thesis.pdf. Retrieved March 20, 2014.
24. Statistics Canada. (2008). Health Report: Trends in Teen Sexual Behaviour and Condom Use. Vol 19(3). [Internet]. [cited 2013Mar10]. Available from: <http://www.statcan.gc.ca/pub/82-003-x/2008003/article/10664-eng.pdf>.
25. Statistics Canada. (2005). Health Report: Sex, Condoms and STDs Among Young People. Vol 16(3). [Internet]. [cited 2013Mar10]. Available from: <http://www.statcan.gc.ca/ads-annonces/82-003-x/pdf/4225220-eng.pdf>.
26. Kirby D, Raine T, Thrush G, Yuen C, Sokoloff A, Potter SC. Impact of an intervention to improve contraceptive use through follow-up phone calls to female adolescent clinic patients. *Perspectives on Sexual and Reproductive Health*. 2010;42(4):251-7.
27. Desiderato LL, Crawford HJ. Risky sexual behavior in college students: Relationships between number of sexual partners, disclosure of previous risky behavior, and alcohol use. *Journal of Youth and Adolescence* 1995;24(1):55-68.
28. Netting N, Burnett M. Twenty years of student sexual behaviour: Subcultural adaptation to a changing health environment. *Adolescence* 2004;39:19-38.
29. Maticka-Tyndale E. Commentary: sexuality and sexual health of Canadian adolescents, yesterday, today and tomorrow. *Can J Hum Sexual* 2008;17:85-95.
30. Boyce W, Doherty M, Fortin C, MacKinnon D. Canadian youth, sexual health and HIV/AIDS study: Factors influencing knowledge, attitudes and behaviours. Toronto, (ON): Council of Ministers of Education of Canada; 2003.
31. Grello CM, Welsh DP, Harper MS. No strings attached: The nature of casual sex in college students. *Journal of Sex Research*. 2006; 43; 255–67.
32. Cooper ML. Alcohol use and risky sexual behavior among college students and youth: Evaluating the evidence. *Journal of Studies on Alcohol, Suppl*. 2002;14;101–117.

33. Lewis MA, Litt DM, Cronce JM, Blayney JA. Underestimating protection and overestimating risk: Examining descriptive normative perceptions and their association with drinking and sexual behaviors. *Journal of Sex Research*. 2014;51(1);86-96.
34. University of Minnesota – Boynton Health Service. College student health survey report: Health and health-related behaviors, Minnesota post-secondary students. Minneapolis: University of Minnesota. 2010:1-49. Available from http://www.bhs.umn.edu/surveys/survey-results/2012_Comprehensive_CSHSReport.pdf. Retrieved June 15, 2014.
35. Bersamin, M.M., Paschall, M.J., Saltz, R.F., & Zamboagna, B.L. (2011). Young adults and casual sex: The relevance of college drinking settings. *Journal of Sex Research*, 48, 1-8.
36. Cooper ML. Does drinking promote risky sexual behavior? A complex answer to a simple question. *Current Directions in Psychological Science*. 2006;15:19-23.
37. Romer D, Black M, Ricardo I, et al. Social influences on the sexual behavior of youth at risk for HIV exposure. *Am J Public Health*.1994;84(6):977–985.
38. Potard C, Courtois R, Rusch E. The influence of peers on risky sexual behavior during adolescence. *Eur J Contracept Reprod Health Care*.2008;13(3):264–270.
39. Fielder RL, Carey MP. Predictors and consequences of sexual “hookups” among college students: A short-term prospective study. *Arch Sex Behav*. 2010; 39(5):1105-19.
40. Eshbaugh EM, Gute G. Hookups and sexual regret among college women. *Journal of Social Psychology*. 2008;148:77-90.
41. Fisher ML, Worth K, Garcia JR, Meredith T. Feelings of regret following uncommitted sexual encounters in Canadian university students. *Culture, Health & Sexuality*. 2012;14:45-57.
42. Manning WD, Giordano PC, Longmore MA. Hooking up: The relationship contexts of “nonrelationship” sex. *Journal of Adolescent Research*. 2006;21:459-83.
43. Downing-Matibag TM, Geisinger B. Hooking up and sexual risk taking among college students: A health belief model approach. *Qual Health Res*. 2009;19:1196-1209.
44. MacDonald TK, Hynie M. Ambivalence and unprotected sex: Failure to predict sexual activity and decreased condom use. *Journal of Applied Social Psychology*. 2008; 28:1092-1107.

45. American Academy of Pediatrics. Fetal alcohol syndrome and alcohol-related neurodevelopment disorders. *Pediatrics*. 2000;106:358-61.
46. Sihvo S, Bajos N, Ducot B, Kaminski M. Women's life cycle and abortion decision in unintended pregnancies. *Journal of Epidemiology and Community Health*. 2003;57:601–605.
47. Eustace LW, Kang DH, Coombs D. Fetal alcohol syndrome: A growing concern for health care professionals. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*. 2003;32:215–221.
48. Arnett JJ. Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist*. 2000; 55:469-80.
49. DiCenso A, Guyatt G, Willan A, Griffith L. Interventions to reduce unintended pregnancies among adolescents: Systematic review of randomised controlled trials. *BMJ*. 2002; 324:1-9.
50. Trojan Condoms. Trojan sexual health report card 2010 edition: The annual ranking of sexual health resources at American colleges and universities. 2010. Available from http://www.trojancondoms.com/assets/pdfs/2010_SHRC.pdf. Retrieved June 15, 2014.
51. Trojan Condoms. New survey points to disparity of access to information about sexual health on college campuses. 2006. Available from <http://www.trojancondoms.com>. Retrieved June 15, 2014.
52. Eisenberg ME, Lechner KE, Frerich EA, Lust KA, Garcia CM. Characterizing sexual health resources on college campuses. *J Community Health*. 2012;27:940-948.
53. University of Minnesota – Boynton Health Service. 2007 Campus tobacco policy report. Minneapolis: University of Minnesota. 2008. Available from http://www.healthycampus.umn.edu/data/download/2007_CampusTobaccoPolicy_Report.pdf. Retrieved June 15, 2014.
54. Eisenberg ME, Garcia CM, Frerich EA, Lechner KE, Lust KA. Through the eyes of the student: What college students look for, find, and think about sexual health resources on campus. *Sex Res Soc Policy*. 2012;9:306-16.
55. Ford C, Jaccard J, Millstein S, Bardsley P, Miller W. Perceived risk of Chlamydial and gonococcal infection among sexually experienced young adults in the United States. *Perspectives on Sexual and Reproductive Health*. 2004;36:258–64.

56. Certain H, Harahan B, Saewyc E, Fleming J. Condom use in heavy drinking college students: The importance of always using condoms. *Journal of American College Health*. 2009;58(3):187–95.
57. Jeffers A. Perceived risk for HIV among high risk individuals: A comparison of adolescents and adults. *Public Health Thesis*. 2012; 230; 7-54.
58. Gerrard M, Gibbons FX, Bushman BJ. Relation between perceived vulnerability to HIV and precautionary sexual behavior. *Psychol Bull*. 1996; 119(3):390-409.
59. Wolfers M, de Zwart O, Kok G. Adolescents in the Netherlands underestimate risk for sexually transmitted infections and deny the need for sexually transmitted infection testing. *AIDS Patient Care & STDs*. 2011;25(5); 311-19.
60. Bellingham K, Gillies P. Evaluation of an AIDS education programme for young adults. *Journal of Epidemiology and Community Health*. 1993;47:134-38.
61. Rimberg H, Lewis R. Older adolescents and AIDS: Correlates of self-reported safer sex practices. *Journal of Research on Adolescence*. 1994;4:453-64.
62. Mgbere O, Monjok E, Abughosh S, Ekong E, Holstad MM, Essein EJ. Modeling covariates of self-perceived and epidemiologic notions of risk for acquiring STIs/HIV among military personnel: A comparative analysis. *AIDS Behav*. 2013;17(3):1159-75.
63. Varghese B, Julie E, Maher JE, Peterman TA, Branson BM, Steketee RW. Quantifying the per-act risk for HIV on the basis of choice of partner, sex act, and condom use. *Sex Transm Dis*. 2002;29(1):38–43.
64. Hingson R, Strunin L, Berlin B, Heeren T. Beliefs about AIDS, use of alcohol and drugs and unprotected sex among Massachusetts adolescents. *American Journal of Public Health*. 1990;80:295-99.
65. Valdiserri R, Arena V, Proctor D, Bonati F. The relationship between women’s attitudes about condoms and their use: Implications for condom promotion programs. *American Journal of Public Health*. 1989;499-503.
66. Janz N, Becker M. The health belief model: A decade later. *Health Education Quarterly*. 1984;11:1-47.
67. Rosenstock IM. Historical origins of the health belief model. *Health Educ Monogr*. 1974;2:328.

68. Becker MH. The health belief model and sick role behavior. *Health Educ Monogr.* 1974;2:409-19.
69. Maiman LA, Becker MH. The health belief model: Origins and correlates in psychological theory. *Health Educ Monogr.* 1974;2:336-53.
70. Ingledue K, Cottrell R, Bernard A. College women's knowledge, perceptions, and preventive behaviors regarding human papillomavirus infection and cervical cancer. *American Journal of Health Studies.* 2004;19(1);28-34.
71. Denny-Smith T, Bairan A, Page M. A survey of female nursing students' knowledge, health beliefs, perceptions of risk, and risk behaviors regarding human papillomavirus and cervical cancer. *Journal of the American Academy of Nurse Practitioners.* 2006;18;62-9.
72. Lin P, Simoni JM, Zemon V. The health belief model, sexual behaviors, and HIV risk among Taiwanese immigrants. *AIDS Education and Prevention.* 2005;17:469-83.
73. Laraque D, McLean DE, Brown-Peterside P, Ashton D, Diamond B. Predictors of reported condom use in Central Harlem youth as conceptualized by the health belief model. *Journal of Adolescent Health.* 1997;21:318-27.
74. Strunin L & Hingson R. Acquired immunodeficiency syndrome and adolescents' knowledge, beliefs, attitudes, and behavior. *Pediatrics.* 1987.79; 825-28.
75. Hingson RW, Strunin L, Berlin BM & Heeren T. Beliefs about AIDS, use of alcohol and drugs, and unprotected sex among Massachusetts adolescents. *American Journal of Public Health.* 1990.80;295-99.
76. Ricket VI, Jay S, Gottlieb A & Bridges C. Adolescents and AIDS: Females' attitudes and behaviors toward condom purchase and use. *Journal of Adolescent Health Care.* 1989.10;313-16.
77. Hiltabiddle SJ. Adolescent condom use, the health belief model, and the prevention of sexually transmitted diseases. *JOGNN.* 1996;25:61-6.
78. Catania JA, Dolcini MM, Coates TJ, Kegeles SM, Greenblatt RM & Puckett S. Predictors of condom use and multiple partnered sex among sexually-active adolescent women: Implications for AIDS-related health interventions. *The Journal of Sex Research.* 1989;26:514-23.
79. Joffe A & Radius SM. Self-efficacy and intent to use condoms among entering college freshman. *Journal of Adolescent Health.* 1993;14:262-68.

80. Kegeles SM, Adler NE & Irwin CE. Adolescents and condoms. *American Journal of Diseases in Children*. 1989;143:911-15.
81. Pendergast RA, DuRant RH & Gaillard GL. Attitudinal and behavioural correlated of condom use in urban adolescent males. *Journal of Adolescent Health*. 1992;13:133-39.
82. Weinstock HS, Lindan C, Bolan G, Kegeles SM & Hearst N. Factors associated with condom use in a high-risk heterosexual population. *Sexually transmitted diseases*. 1993;20:14-20.
83. Leland NL & Barth RP. Gender differences in knowledge, intentions, and behaviours concerning pregnancy and sexual transmitted disease prevention among adolescents. *Journal of Adolescent Health*. 1992;13:589-99.
84. Katatsky ME. The Health Belief Model as a conceptual framework for explaining contraceptive compliance. *Health Ed Mono*. 1977;5(3): 233-43.
85. Nathanson CA, Becker MH. Contraceptive behavior among unmarried young women: A theoretical framework for research. *Pop Environ*. 1983;6(1):39-58.
86. Tenkenorang EY. A multilevel path analysis of risk perception and risky sexual behavior under the framework of the health belief model. *Journal of HIV/AIDS & Social Services*. 2013;12:124-45.
87. Zellner SL. Condom use and accuracy of AIDS knowledge in Cote D'Ivoire. *International Family Planning Perspectives*. 2003;29:41-47.
88. Noar SM. A health educator's guide to theories of health behaviour. *International Quarterly of Community Health Education*. 2005;24:75-92.
89. Takahashi TJK, Bradly KA. A population-based study of HIV testing practices and perceptions in 4 U.S. states. *J Gen Int Med* 2005;20:618–622.
90. Weisman CS, Nathanson CA, Ensminger M, Teitelbaum MA, Robinson JC, Plichta S. AIDS knowledge, perceived risk and prevention among adolescent clients of a family planning clinic. *Fam Plann Perspect* 1989;21:213–217.
91. Goldman JA, Harlow LL. Self-perception variables that mediate AIDS-preventive behavior in college students. *Health Psychol* 1993;12:489–498.

92. Holtzman D, Bland SD, Lansky A, Mack KA. HIV-related behaviors and perceptions among adults in 25 states: 1997 Behavioral Risk Factor Surveillance System. *Am J Public Health* 2001;91:1882–1888.
93. MacKellar DA, Valleroy LA, Secura GM, et al. Perceptions of lifetime risk and actual risk for acquiring HIV among young men who have sex with men. *AIDS Behav* 2007;11:263–270.
94. Maurier WL, Northcott HC. Self-reported risk factors and perceived chance of getting HIV/AIDS in the 1990s in Alberta. *Can J Public Health* 2000;91:340–344.
95. Theall K. Perceived susceptibility to HIV among women: Differences according to age. *Res Aging* 2003;25:405–432.
96. Pringle K, Merchant RC, Clark MA. Is self-perceived HIV risk congruent with reported HIV risk among traditionally lower HIV and prevalence adult emergency department patients? Implications for HIV testing. *AIDS Patient Care and STDs*. 2013;27(10):573-84.
97. Stein JA, Nyamathi A. Gender differences in behavioural and psychosocial predictors of HIV testing and return for test results in a high-risk population. *AIDS Care* 2000;12:343–356.
98. Brown EJ. Female injecting drug users: Human immunodeficiency virus risk behavior and intervention needs. *J Prof Nurs* 1998;14:361–369
99. Kline A, Strickler J. Perceptions of risk for AIDS among women in drug treatment. *Health Psychol* 1993;12:313–323.
100. MacKellar DA, Valleroy LA, Secura GM, et al. Unrecognized HIV infection, risk behaviors, and perceptions of risk among young men who have sex with men: Opportunities for advancing HIV prevention in the third decade of HIV/AIDS. *J Acquir Immune Defic Syndr* 2005;38:603–614.
101. Pollack LM, Boyer CB, Weinstein ND. Perceived risk for sexually transmitted infections aligns with sexual risk behavior with the exception of condom nonuse: Data from a nonclinical sample of sexually active young adult women. *Sexually Transmitted Diseases*. 2013;40(5):388-94.
102. Zak-Place J, Stern M. Health belief factors and dispositional optimism as predictors of STD and HIV preventive behavior. *Journal of American College Health*. 2004;52:229-36.
103. Brown LK, Diclemente RJ, Reynolds LA. HIV prevention for adolescents: Utility of the health belief model. *AIDS Education and Prevention*. 1991;3:50-9.

104. Steers WN, Elliot E, Nemiro J, Ditman D, Oskamp S. Health behaviours as predictors of HIV-preventive behavior and ethnic differences in prediction. *Journal of Social Psychology*. 1996;136:99-110.
105. Coyle K, Basen-Engquist K, Kirby D, Parcel G, Banspach S, Harrist, R, et al. Short-term impact of safer choices: A multicomponent, school-based HIV, other STD, and pregnancy prevention program. *Journal of School Health*. 1999; 69:181–88.
106. Government of Canada. Atlantic Canada - A Profitable Place to do Business. Atlantic Canada Opportunities Agency. Available from http://www.acoa-apeca.gc.ca/eng/publications/FactSheetsAndBrochures/Pages/B_ProfitablePlace.aspx. Retrieved March 20, 2014.
107. Hoddinott S, Bass M. The Dillman total design survey method. *Canadian family physician* 1986;32:2366-2368.
108. Sikkema K, Kelly J, Winnett R, Solomon L, Cargill V, Roffman R, et al. Outcomes of a randomized community-level HIV prevention intervention for women living in 18 low-income housing developments. *American Journal of Public Health*. 2000;90:57-63.
109. Langille D. A consultation process to develop a survey instrument to assess adolescent health in Nova Scotia. Report to the Nova Scotia Health Research Foundation. Dalhousie University, 2006(a).
110. Caldwell JC, Orubuloye IO, Caldwell P. Obstacles to behavioural change to lessen the risk of HIV infection in the African AIDS epidemic: Nigerian research. In: Caldwell J, et al., editors. *Resistances to behavioural change to reduce HIV/AIDS infection in predominantly heterosexual epidemics in third world countries*. Canberra: Health Transition Centre, Australian National University; 1999. p. 113–24.
111. Sandfort TG, Orr M, Hirsch JS, Santelli J. Long-term health correlates of timing of sexual debut: results from a national US study. *Am J Public Health*. 2008;98 (1):155– 161.
112. Bonell C, Allen E, Strange V, Copas A, Oakley A, Stephenson J, et al. The effect of dislike of school and risk of teenage pregnancy: Testing of hypothesis using longitudinal data from a randomized trial of sex education. *Journal of Epidemiology and Community Health*. 2005;59(3): 223-30.
113. Kalina O, Geckova AM, Jarcuska P, Orosova O, van Dijk JP, Reigneveld SA. Psychological and behavioral factors associated with sexual risk behaviours among Slovak students. *BMC Public Health*. 2009;9(15):9-15.

114. Crockett LJ, Bingham CR, Chopak JS, Vicary JR. Timing of first sexual intercourse: The role of social control, social learning, and problem behavior. *Journal of Youth and Adolescence*. 1996;25(1): 89-111.
115. Morrow KM, Allsworth JE. Sexual risk in lesbians and bisexual women. *Journal of Gay and Lesbian Medical Association*. 2000;4(4):159-65.
116. Ratliff-Crain J, Donald K, Dalton J. Knowledge, beliefs, peer norms, and past behaviors as correlates of risky sexual behaviors among college students. *Psychology and Health*. 1999;14:625-41.
117. Winslow R, Frnsini L, Hwand J. Perceived peer norms, casual sex, and AIDS risk prevention. *Journal of Applied Social Psychology*. 1992;22:1809-27.
118. London AS, Aroyds R. The co-occurrence of correct and incorrect HIV transmission knowledge and perceived risk for HIV among women of childbearing age in El Salvador. *Social Science and Medicine*. 2000;51:1267–78.
119. Wilson K, Asbridge M, Kisely K, Langille D. Associations of risk of depression with sexual risk taking among adolescents in Nova Scotia high schools. *Canadian Journal of Psychiatry* 2010; 55:577–585.
120. Kusseling, F. S., Shapiro, M. F., Greenberg, J. M., & Wenger, N. S. (1996). Understanding why heterosexual adults do not practice safer sex: A comparison of two samples. *AIDS Education and Prevention*, 8, 247– 257.
121. Booth-Kewley S, Larson G, Miyoshi D. Social desirability effects on computerized and paper-and-pencil questionnaires. *Computers in Human Behavior* 2007;23: 463–477.
122. Tourangeau R, Couper M, Steiger D. Humanizing self-administered surveys: Experiments on social presence in web and IVR surveys. *Computers in Human Behavior* 2003;19:1-24.
123. Samkange-Zeeb F, Pottgen S, Zeeb H. Higher risk perception of HIV than of Chlamydia and HPV among Secondary School Students in Two German Cities. *PLoS ONE*. 2013; 8(4): e61636.
124. Garofalo R, Wolf RC, Kessel S, Palfrey J, DuRant RH. The association between health risk behaviours and sexual orientation among a school-based sample of adolescents. *Pediatrics*, 1998;101(5): 895-902.
125. Norris J, Nurius PS, Dimeff LA. Through her eyes: factors affecting women’s perception of and resistance to acquaintance sexual aggression threat. *Psychol Women Q*. 1996; 20:123-45.

126. Hampson SE, Severson HH, Burns WJ, Slovic P, Fisher KJ. Risk perception, personality factors and alcohol use among adolescents. *Personality and Individual Differences*. 2001;30(1): 167-81.
127. Ramrakha S, Caspi A, Dickson S, Moffitt TE, Paul C. Psychiatric disorders and risky sexual behaviour in young adulthood: cross sectional study in birth cohort. *BMJ*. 2000;321:263-66.
128. Kosunen E, Kaltiala-Heino R, Rimpela M, Laippala P. Risk-taking sexual behaviour and self-reported depression in middle adolescence – a school-based survey. *Child: Care, Health & Development*. 2003; 29(5): 337-44.
129. Poulin C, Hand D, Boudreau B. Validity of a 12-item version of the CES-D used in the national longitudinal study of children and youth. *Chronic Disease Canada* 2005;26(2-3):65-72.
130. Langille D, Rasic D, Kisely S, Flowerdew G, Cobbett S. Protective associations of school connectedness with risk of depression in Nova Scotia adolescents. *Canadian Journal of Psychiatry* 2012;57(12):759-764.
131. Licht AS, Murphy JM, Hyland AJ, Fix BV, Hawk LW, Mahoney MC. Is use of the human papillomavirus vaccine among female college students related to human papillomavirus knowledge and risk perception? *Sex Transm Infect*. 2010;86:74-68.
132. Nunn A, Zaller N, Cornwall A, Mayer KH, et al. Low perceived risk and high HIV prevalence among a predominantly African American population participating in Philadelphia's rapid HIV testing program. *AIDS Patient Care and STDs*. 2011; 25(4): 229-35.
133. Couper M. Web surveys: A review of issues and approaches. *The Public Opinion Quarterly* 2000;64:464-494.
134. Booth-Kewley S, Larson G, Miyoshi D. Social desirability effects on computerized and paper-and-pencil questionnaires. *Computers in Human Behavior* 2007;23: 463–477.
135. Adalf E, Demers A, Gliksman L (editors). *Canadian Campus Survey 2004*. Toronto: Centre for Addiction and Mental Health; 2005.
136. Braun R, Glassman T, Wohlwend J, Whewell A, Reindl D. Hookah use among college students from a Midwest University. *J Community Health*. 2012;37(2):294-98.
137. Dunne MP, Martin NG, Bailey JM, Heath AC, Bucholz KK, Madden PA, et al. Participation bias in a sexuality survey: psychological and behavioural characteristics of responders and non-responders. *Int J Epidemiol*. 1997;26(4):844-54.
138. Cragg A, Langille D, Steenbeek A, Asbridge M, Andreou P. Understanding STI and HIV testing rates among high-risk Maritime Canadian Undergraduate Students. (Published Master's Thesis) 2014.

139. Caldeira K, Singer B, O'Grady K, Vincent K, Arria A. HIV testing in recent college students: prevalence and correlates. *AIDS education and prevention* 2012;24(4):363-376.
140. Gravningen K, Braaten T, Scjirmer H. Self-perceived risk and prevalent chlamydia infection among adolescents in Norway: a population-based cross-sectional study. *Sex Transm Infect* 2015; 0:1-6.
141. Leval A, Sundstrom K, Ploner A, et al. Assessing perceived risk and STI prevention behavior: a national population-based study with special reference to HPV. *PLoS ONE*. 2011;6(6):20624.
142. Clifton S, Jones K, Tanton N, et al. STI risk perception and its relationship with behaviour and STIs: results from the third British National Survey of Sexual Attitudes and Lifestyles (Natsal-3). XXVIII IUSTI Europe Congress 2014. Poster 95; Malta, 2014.
143. O'Sullivan LF, Udell W, Patel VL. Young urban adults' heterosexual risk encounters and perceived risk and safety: a structured diary study. *J Sex Res* 2006;43:343-51.
144. Ott MA, Adler NE, Millstein SG, Tschann JM, & Ellen JM. The trade-off between hormonal contraceptives and condoms among adolescents. *Perspect Sex Reprod Health*, 2002: 34(1): 6-14.
145. Ellen JM, Boyer CB, Tschann JM, & Shafer MA. Adolescents' perceived risk for STDs and HIV infection. *J Adol Health*, 1996;18:177-81.
146. CM Chelf. An Intervention Model for Recruiting Rape Victims into Treatment . http://www.researchgate.net/publication/228469951_An_intervention_model_for_recruiting_rape_victims_into_treatment/file/5046351e9bb1f5b8a9.pdf.: Virginia Polytechnic Institute and State University; 2004.
147. Walsh W, Banyard V, Moynihan M, Ward S, Cohn E. Disclosure and service use on a college campus after an unwanted sexual experience. *J Trauma Dissociation* 2010, Apr;11(2):134-151.
148. Fortenberry JD, McFarlane M, Bleakley A, Bull S, Fishbein M, Grimley D, et al. Relationships of stigma and shame to gonorrhea and HIV screening. *Am J Public Health* 2002;92(3):378-381.
149. Mevissen FE, Meertens RM, Ruiters RA, Feenstra H, Schaalma HP. HIV/STI risk communication: The effects of scenario risk information and frequency-based risk information on perceived susceptibility to chlamydia and HIV. *J Health Psychol* 2009;14:78-87.
150. Rose G. Sick individuals and sick populations. *Int. J. Epidemiol* 2001;30(3):427-32.

APPENDIX A Questionnaire Content

General Demographics	Age (#1) Ethnicity/Race (#2) International student (#3) Number hours of work at paid job (#4) Year of undergraduate study (#5) GPPA/High school grades (#6) People live with (#7) Living Arrangements (#8) Importance of Religion (#9) Perception of family wealth (#10) Sex of participant(#11) Sexual orientation (#12)
Health and Knowledge	Perception of overall health (#13) Peer norms about sexuality(#14) Knowledge of STIs based on Kuder-Richardson 20 test (#15) Depression using 12 item CES-Depression Scale (#16) Need for control and self-reliance (#17) Social support using Sense of Social Support Scale (#18) Perception of Emergency Contraceptives (#19)
Health Behaviours	Use of marijuana in past 30 days (#20) Binge/Heavy drinking (#21) Ever had heterosexual vaginal intercourse (#22a) Age of first vaginal intercourse(#22b) Use of condom during last vaginal intercourse (#22c) No. of people had vaginal intercourse with past 12 months(#22d) Type of contraception used during last vaginal intercourse(#22e) Ever had anal sex(#23a) Age of first anal intercourse (#23b) Use of condom during last anal intercourse (#23c) Number of people had anal sex with past 12 months (#23d) Relationship with last person had vaginal or anal sex with (#24) Unplanned vaginal/anal sexual encounter due to drug/alcohol use(#25) Perception of personal risk of becoming infected with STI (#26) Ever had an STI (#27) Ever forced to have sex (#28)
Use of University Health Services	Use of Health Centre for educational pamphlets, brochures (#29) Ever seen a doctor or nurse (#30) Frequency of visits to doctor or nurse (users only) (#31) Reason for use of health centre (users only) (#32) Continuation of health services use (users only) (#33) Level of satisfaction with sexual health services (users only) (#34) Level of satisfaction with health services staff (users only) (#35)

Valuation of features of health service (#36)
Perception of applicability of health services for students (#37)
Time preference for Health centre visits (#38)
Best way to tell students about Health centre (#39)
Preference for sex of doctor (#40)
Sexual health services sought (#41)
Reason for not ever using health centre (non users only) (#42)
Suggestions on improving overall services at health centre (#43)
Suggestions on improving sexual health services (#44)

APPENDIX B Survey Response Rate at the Maritime Canada Universities

University	Dal	SMU	StFX	Acadia	MSVU	CBU	UNB	UPEI	Total
Student	14336	6847	4480	4254	2800	2921	9241	4267	49146
Population									
Completed	4520	960	735	944	645	545	1158	517	10024
Surveys									
Response	31.5%	14%	16.4%	22.2%	23.0%	18.7%	12.5%	12.1%	20.4%
Rate									

APPENDIX C Items of STI Risk Perception

33. With your present sexual lifestyle, how much at risk do you personally feel of becoming infected with a sexually transmitted infection (STI)? *(Check one box only.)*

- Greatly at risk
- Quite a lot at risk
- Not very much at risk
- Not at all at risk

APPENDIX D Items of Sexual Risk Behaviour

24. In the **past 12 months**, with how many people have you had heterosexual vaginal intercourse? _____ person/people (*Please fill in number.*)

28. Did you use a condom the last time you had anal sex?

- No
- Yes

APPENDIX E Items of STI Testing

47. Have you ever seen a health professional in order to obtain the following services?
If you answer 'Yes' for a particular service, please indicate the location where you access that service.

Service: _____	Accessed?		If yes, please indicate location	
	Yes	No	University health centre	Other
STI testing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PAP testing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HIV/AIDS testing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>Pregnancy testing</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

APPENDIX F Questionnaire

SECTION A – DEMOGRAPHICS

The following questions are about you and your family. For each question please indicate your answer by checking the appropriate box or by answering on the response lines provided for some of the questions. Please note, all these questions are confidential and anonymous and you can skip any question you are not comfortable with.

1. What is your age in years? _____
2. What ethnic/racial background do you consider yourself to be? (*Check all that apply.*)
 - White (Caucasian)
 - African descent
 - Aboriginal (*specify*) _____
 - Asian
 - Middle Eastern
 - Other (*describe*) _____
3. Are you employed for money during the university year?
 - No
 - Yes (*If yes, specify how many hours you work each week*)
_____ (*hrs/wk*)
4. What year of your undergraduate program are you in?
 - First
 - Second
 - Third
 - Fourth
 - Other (*explain*) _____

5. What was the last GPA you received on your University record? If you are in your first year of university, please provide the average grade of your last high school year instead.

My last GPA at University was _____

OR My last high school average grade was _____

6. Who do you live with?

I live alone

I live with one or both of my parent(s)

I live with my partner (i.e., sexual or romantic partner, spouse or girlfriend/boyfriend)

I live with a roommate(s) (not a sexual or romantic partner)

7. What are your living arrangements?

I live off-campus

I live on campus in student residence/housing

8. How important would you say religion is to you?

Not important at all

Not very important

Fairly important

Very important

9. How wealthy do you see your family as being?

Very wealthy

Quite wealthy

Average

Not so wealthy

Not wealthy at all

10. What is your sex?

- Male
- Female
- Transgendered
- Other (*describe*) _____

11. People have different feelings about themselves when it comes to questions of being attracted to other people. Which of the following best describes your feelings?

- 100% heterosexual (attracted to persons of the opposite sex)
- Mostly heterosexual
- Bisexual (attracted to both males and females)
- Mostly homosexual
- 100% homosexual (gay/lesbian, attracted to persons of the same sex)
- Transgendered
- Not sure

SECTION B – Your Health, Health Knowledge and Social Well Being

The next section asks questions about your health and about your knowledge of sexual health issues. It also asks how you feel about yourself and others. Please remember that all of your answers are anonymous and confidential and you can skip any question you are not comfortable with.

12. In general, would you say that your health is? (*Check one.*)

- Excellent
- Very good
- Good
- Fair
- Poor

13. Please indicate how much you disagree or agree with the following statements by checking the appropriate number on the 5 point scale, where 1 = “Strongly disagree” and 5 = “Strongly agree”.

	1	2	3	4	5
My friends don't think being in a relationship with one person at a time is cool	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My friends mostly have sex for recreation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My friends believe love is not necessary for sex	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My friends do not believe in having sex with someone that looks respectable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My friends are not in steady relationships with one person at a time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Many of my friends have sex under the influence of drugs and/or alcohol	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My friends show little concern for sex education	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My friends don't know/practice safe sex	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My friends don't think safe sex is important	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

14. Please indicate whether you believe each of the following statements are true or false by checking the appropriate response. If you do not know the answer, please do not guess, but answer "Don't Know".

	True	False	Don't Know
If you know a person's sexual history and lifestyle before you have sex with them, you don't need to use condoms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Men with chlamydia always have symptoms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Women with chlamydia always have symptoms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chlamydia infection in women can result in being unable to have children	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If a guy or girl aged 18 – 24 gets chlamydia and is treated properly, he or she can never get chlamydia again	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If both are used properly, condoms are just as effective as birth control pills in preventing pregnancy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Emergency contraceptive pills are available at pharmacies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Emergency contraceptive pills always prevent pregnancies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To be effective, emergency contraceptive pills must be taken within 12 hours of unprotected sex	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Emergency contraceptive pills are more effective the earlier they are taken after unprotected sex	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Doctors will always test for STIs when they do a PAP test	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The time in the monthly menstrual cycle during which a female is most likely to become pregnant is about two weeks before her period begins	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

15. We would like to know how you have been feeling about yourself and your life generally. Below is a list of the ways you might have felt or behaved. Please indicate how much of the time you felt this way during the past week checking the appropriate response.

During the past week:	Rarely or none of the time (less than 1 day)	Some or a little of the time (1–2 days)	Occasionally or a moderate amount of the time (3-4 days)	Most or all of the time (5–6 days)
I did not feel like eating: my appetite was poor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I felt that I could not shake off the blues even with help from my family or friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I had trouble keeping my mind on what I was doing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I felt depressed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I felt like I was too tired to do things	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I felt hopeful about the future	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My sleep was restless	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was happy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I felt lonely	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I enjoyed life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I had crying spells	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I felt that people disliked me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

16. Please indicate how much you disagree or agree with the following statements by checking the appropriate number on the 5 point scale, where 1 = "Strongly disagree" and 5 = "Strongly agree".

	1	2	3	4	5
I would think less of myself for needing help	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I don't like other people telling me what to do	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nobody knows more about my problems than I do	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I'd feel better about myself knowing I didn't need help from others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I don't like feeling controlled by other people	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It would seem weak to ask for help	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I like to make my own decision and not be too influenced by others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Asking for help is like surrendering authority over my life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

17. Please describe how true you believe each of the following statements about your social relationships and support networks, where 1 = not at all true and 5 = completely true

	1	2	3	4	5
I participate in volunteer/service projects	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I have meaningful conversations with my parents and or/siblings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I have a mentor(s) in my life I can go to for support/advice	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I seldom invite others to join me in my social and or/recreational activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There is at least one person I feel a strong emotional tie with	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There is no one I can trust to help solve my problems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I take time to visit my neighbours	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If a crisis arose in my life, I would have the support I need from family and/or friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I belong to a club (e.g., sports, hobbies, support group, special interests)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I have friends from work that I see socially (movie, dinner, sports etc)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I have friendships that are mutually fulfilling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There is no one I can talk to when making important decisions in my life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I make an effort to keep in touch with friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My friends and family feel comfortable asking me for help	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I find it difficult to make new friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I look for opportunities to help and support others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I have a close friend(s) who I feel comfortable sharing deeply about myself	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I seldom get invited to do things with others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel well supported by my friends and/or family	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wish I had more people in my life that enjoy the same interests and activities as I do	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There is no one that shares my beliefs and attitudes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

18. The following are some statements about Emergency Contraception (EC). Please rate whether you agree or disagree with the statements, where 1 = "I completely disagree" and 5= "I completely agree".

	1	2	3	4	5
My partner or I could get EC if we needed it	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I could get EC at my university health centre if I wanted to get	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I would prefer to go to a pharmacy to obtain EC pills if I or my	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SECTION C – HEALTH BEHAVIOURS

The next section asks questions about sexual activity and other health behaviours, and your opinions and feelings about sexuality issues. Please remember that all of your answers are anonymous and confidential and you have the right to skip any question you are not comfortable with.

19. During the past 30 days, how many times did you use marijuana?

- 0 times
- 1 or 2 times
- 3 to 9 times
- 10 to 19 times
- 20 to 39 times
- 40 or more times

20. During the past 30 days, on how many days did you have 5 or more drinks of alcohol in a row, that is, within a couple of hours?

- 0 days
- 1 day
- 2 days
- 3 to 5 days
- 6 to 9 days
- 10 to 19 days
- 20 or more days

The following questions; Q.s21 (a-e) and 22 (a-d) pertain to heterosexual vaginal intercourse and anal sex (male to male or male to female).

21. Read the following definition of heterosexual vaginal intercourse and then answer the question below. “Heterosexual vaginal intercourse occurs when a male’s penis enters a female’s vagina. When this happens, both people are having vaginal intercourse.”

Have you **ever** had heterosexual vaginal intercourse? (*Check one.*)

- I prefer not to answer [*Skip to Question 26(a)*]
- No [*Skip to Question 26(a)*]
- Yes

22. How old were you **the last time** you had heterosexual vaginal intercourse?
_____ (*Specify your age in years.*)

23. Did you or your partner use a condom the last time you had heterosexual vaginal intercourse?

- No
- Yes

24. In the **past 12 months**, with how many people have you had heterosexual vaginal intercourse? _____ person/people (*Please fill in number.*)

25. Which of the following forms of contraception did you and/or your partner use the last time you had heterosexual vaginal intercourse? (*Check all the boxes that apply.*)?

- Oral contraception (the pill)
- Intrauterine device (IUD)
- Depo-Provera (the needle)
- Contraceptive patch
- Condom
- Withdrawal
- Don't know/Can't remember
- Other (specify) _____
- No contraception was used

26. Please read the following definition of anal sex and then answer the question below. "Anal sex occurs when a male's penis enters another person's (male or female) anus or rectum (their behind). When this happens, both people are having anal sex."

Have you ever had anal sex? (*Check one.*)

- I prefer not to answer (*Skip to Question 27*)
- No (*Skip to Question 27*)
- Yes

27. How old were you **the first time** you had anal sex?

28. Did you use a condom the last time you had anal sex?

- No
- Yes

29. In the **past 12 months**, how many people have you had anal sex with? _____ person/people (*Please fill in number.*)

30. Do you or did you have a steady relationship with the last person you had vaginal or anal sex with?

- No
- Yes (*Specify length of your relationship*) _____(years) _____(months)

31. In the **past 12 months** have you had a sexual encounter; either vaginal or anal, when you did not plan to because you were under the influence of alcohol or drugs?

- Yes
- No

If yes, please specify:

- Alcohol
- Drugs
- Both

32. Have you ever had a sexually transmitted infection (STI) which was diagnosed by a health professional?

- No
- Yes (*Specify which STI(s)*)_____

33. With your present sexual lifestyle, how much at risk do you personally feel of becoming infected with a sexually transmitted infection (STI)? (*Check one box only.*)

- Greatly at risk
- Quite a lot at risk
- Not very much at risk
- Not at all at risk

34. Since you have been at university, have you ever been forced to have sex of any type against your will?

- No
- Yes

SECTION D– Use of Health Care Services

This section asks about the health care services provided by your university health centre, both in general and concerning your use of sexual health services. Please remember that all of your answers are anonymous and confidential. You have the right to refuse to answer any of these questions.

35. Have you visited your student health centre in the past 12 months to pick up written material such as pamphlets or brochures about sexual health concerns or other health related issues?

- No
- Yes

36. Have you ever seen a doctor or a nurse at your university health centre for any reason?

- No (*Skip to Question 42.*)
- Yes

(Reason for last visit) _____

37. In the past 12 months, about how often did you see your doctor or nurse at your university health centre? If this is your first year at university, please indicate how often you have seen your doctor or nurse at your university health centre since you first arrived.

- More than once per month
- About once per month
- Less than once per month

38. Please indicate if any of the following is a reason for your using your university health centre (*Check all that apply*)

- I am more comfortable at my university health centre than I am with my family doctor
- The staff at my university health centre are friendly and approachable
- It's confidential – the reason for my visit will be kept secret from other people
- The university health centre provides the information that I need in a way that I can understand
- The university health centre is convenient to use because it is on campus
- I don't get judged for going there.
- It's the only option I have available when I have a concern

39. Have you continued to use your university health centre since your first visit?

- No
- Yes → If "Yes" go to the next Question

If "No" why have you not continued to use your university health centre? (Check all that apply.)

- I felt that I was judged by the nurse/doctor during my last visit
- I did not find it easy to discuss my needs or concerns with the doctor/nurse
- The hours and location are inconvenient
- There was no reason for me to go to my university health centre more than once
- Other (*specify*) _____

40. Please rate your level of satisfaction with the sexual health service(s) you have received at your university health centre by checking the appropriate number on the 5 point scale, where 1 = “not at all satisfied” and 5 = “very satisfied”. Please check N/A (not applicable) if you have never accessed such services.

Type of service	1	2	3	4	5	N/A
Counselling about use of condoms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Counselling about sexually transmitted infections	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Testing for sexually transmitted infections	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Counselling about violence/abuse in relationships	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Discussing issues related to sexual orientation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Discussing other sexual health issues	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pregnancy testing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Provision of educational pamphlets and brochures about sexual health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Referral to another health care provider about sexual health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Provision of emergency contraception	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Counselling about or prescription for birth control	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pap testing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

41. Please rate the following characteristics of your university health centre staff with respect to any sexual health services you have received from them (counselling about relationships, preventing sexually transmitted infections, etc.), where 1 = “poor service ” and 5 = “excellent service”. If you have not received any sexual health services, or the question does not apply to your experiences, please check N/A (not applicable).

Characteristics of care:	1	2	3	4	5	NA
They are not judgmental about my sexual activity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
They take time to explain things about sexual health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
They address the sexual health issues for which I come to the health service very well	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
They let me stay in control of available options during visits about sexual health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The same person sees me on every visit that I have about sexual health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

THE FOLLOWING QUESTIONS ARE FOR EVERYONE - BOTH THOSE WHO HAVE USED THEIR UNIVERSITY HEALTH SERVICES AND THOSE WHO HAVE NOT USED THEM

42. How important would you say the following features of a university health centre are in general, where 1 = “not at all important” and 5 = “extremely important”?

Features	1	2	3	4	5
The range of services available	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The atmosphere of the waiting area	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The privacy of the reception area	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The friendliness of the people working there	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Confidentiality about students’ health information is assured	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hours of operation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Transportation to the university health centre	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Length of time you have to wait to be seen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The location of the university health centre	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

43. How applicable to students’ needs would you say the following services, which can be provided by a university health centre, are where 1 = “not applicable to students’ health needs” and 5 = “very applicable to students’ health needs”.

Type of service	1	2	3	4	5
Counselling about birth control and/or free condoms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Counselling about having sex for the first time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Counselling about sexually transmitted infections	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Counselling about HIV/AIDS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Discussing issues related to my sexual orientation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Counselling about other sexual health issues	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Counselling about other worries to do with sex and sexuality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pregnancy testing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Emergency contraception (sometimes called the morning after)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Educational pamphlets and brochures about sexual health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Referral to another health care provider about sexual health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The following questions concern your preferences for accessing sexual health services at your university health centre

44. When would it be convenient for you to visit your university health centre? (*Check all that apply.*)

- In the morning before classes
- Lunchtime
- Afternoon
- Evenings
- Saturday

45. What do you think would be the best way for us to tell students about the university health centre? (*Check only one*)

- University admission letter
 - Visit to the clinic during student orientation
 - Visit to first year classes by health centre staff
 - Posters on student information boards
 - Leaflets around campus
 - Internet (e.g. a web site, email newsletters, etc.)
 - Other (*specify*)
-

46. If you had a choice of the sex of the doctor/nurse that you see at your university health centre which would you choose? (*Check only one*)

- I would like to be seen by a female doctor/nurse
- I would like to be seen by a male doctor/nurse
- It's not important

47. Have you ever seen a health professional in order to obtain the following services? If you answer 'Yes' for a particular service, please indicate the location where you access that service.

Service: _____	Accessed?		If yes, please indicate location	
	Yes	No	University health centre	Other
STI testing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PAP testing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HIV/AIDS testing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pregnancy testing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

48. If you have never been to your university health centre please indicate below why you did not go. (*Check all that apply.*)

- I haven't had any health concerns
- I don't think a nurse/doctor can help me with my concerns
- I don't think a nurse/doctor will understand gay, lesbian or bisexual issues
- The university health centre was not open when I wanted to use it
- I don't trust the university health centre to keep my health information confidential
- I went elsewhere with my health concerns over the past year (If so, please indicate where)

- Other reasons (*specify*)

49. Do you have any suggestions on how to improve the overall health services provided at the university health centre?

50. Do you have any suggestions on how to improve the sexual health services and or information provided at the university health centre?

51. How did you find out about this study? (*Check all that apply*)

- Email
- Facebook/Twitter
- University news (e.g. newsletter, web page, etc.)
- Poster

- Student told me
- Professor told me
- Other (specify) _____

Thank you for participating in our survey. This information will be used to help improve student health services.

Dalhousie Only Questions:

(DAL_Student_Type) Are you a full time or a part time student?

- Full time
- Part time

(DAL_Previous_Degree) Do you have a previous degree?

- Yes
- No

(DAL_Faculty) What Faculty are you in?

- Faculty of Agriculture
- Faculty of Architecture and Planning
- Faculty of Arts and Social Sciences
- Faculty of Computer Sciences
- Faculty of Engineering
- Faculty of Health Professions
- Interdisciplinary/Multi-Faculty
- Faculty of Management
- Faculty of Science
- School of Journalism
- Faculty of Dentistry

UNB Only Questions:

(UNB_Undergrad) I am a UNB undergraduate student

- Yes
- No

(UNB_Consent) I agree to participate

- Yes
- No