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**An Examination of the Relationships between Safer Sex Education and Intentions to Practice Safer Sex in Undergraduate Students: A Cross-Sectional Study**

By:

**Mandy Smith-Grant**

A Thesis  
Submitted to the Faculty of Graduate Studies  
through the Faculty of Nursing  
in Partial Fulfillment of the Requirements  
for the Degree of Master of Science in Nursing  
at the University of Windsor

Windsor, Ontario, Canada

2020

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**An Examination of the Relationships between Safer Sex Education and Intentions to Practice Safer Sex in Undergraduate Students: A Cross-Sectional Study**

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May 12, 2020

## DECLARATION OF ORIGINALITY

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## ABSTRACT

Canadian rates of sexually transmitted infections (STIs) are increasing, with young adults being at higher risk. Safer sex practices, including barrier use, can decrease the risk of acquiring STIs. This exploratory study utilized a cross-sectional, quantitative design to investigate if any relationships existed between characteristics of undergraduate students, their sources for and levels of STI-related knowledge, and intentions to engage in safer sex practices. A sample of 138 undergraduate students completed an anonymous, online survey. Two-thirds reported engaging in sexual activity in the past year. Only 41% of sexually active participants reported using a barrier the last time they engaged in sexual activity, whereas 50% intended to use a barrier the next time they had sex. Although 68% of sexually active participants reported being in a committed relationship, relationship status was not a significant factor in barrier use at last intercourse or intentions to use a barrier at next intercourse. The most common sources of STI education were the internet, followed by teachers and peers. Sexually active participants who identified that peers influenced their current safer sex practices had higher intentions to use barriers in risky sexual situations and they were more prepared to use barriers in general. Many participants reported that the STI education they received was not perceived to be influential and many do not recall learning about different STI prevention topics. The STI knowledge score in this sample was under 50%. Higher knowledge was associated with older age and later year of study. These results suggest that undergraduate students may not have adequate tools to prevent the acquisition of STIs. Improved programming to support comprehensive sexual health education for youth is recommended to curb rising STI rates.

## DEDICATION

I would like to dedicate this work to my husband Paul and my children Harleigh, Kennedy and Hunter. Without your support and sacrifice, this would not have been possible. I would also like to dedicate this work to my mother Alexandria who passed away March 13, 2016. Losing you has been heavy burden to carry.

## ACKNOWLEDGEMENTS

I am grateful to each of my thesis committee members, whose knowledge, experience and efforts have provided me with the support and guidance required to complete this endeavor. I am grateful to my primary advisor, Dr. Laurie Freeman, who patiently supported and mentored me throughout this process; my second reader, Dr. Jody Ralph, for her perspectives that helped navigate the course of this project; and my external reader, Dr. Charlene Senn, for her expertise and advice about measuring sexuality issues.

I am extremely grateful to my family and the sacrifices that my husband and children have endured over the years. I know that “soon” took longer than expected but I promise that I will spend the rest of my life making up this time to you. I also lost my mother during this process, and grief has been a very heavy burden to carry. I take comfort in knowing that she would be proud of my accomplishments. I am also thankful to my colleagues and friends who have been curious about my findings and supportive every step of the way.

This research was based on a group project that was completed as a course requirement for Advanced Professional Nursing Practicum. I would like to thank the group members, Dajana Ivanis, Alicia Savoni and Anthony Siu, our professor Dr. Michelle Freeman and staff from the Windsor Essex County Health Unit (WECHU) for their knowledge and efforts on the project that inspired this research.

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## ACRONYMS

<b>AIDS</b>	acquired immune deficiency syndrome
<b>HIV</b>	human immunodeficiency virus
<b>IMB</b>	information-motivation-behavioral skills (model)
<b>LGBTQ2+</b>	lesbian-gay-bisexual-transgender-queer-questioning-two-spirit-plus
<b>OAHP</b>	Ontario Agency for Health Protection and Promotion
<b>PHAC</b>	Public Health Agency of Canada
<b>STI/D</b>	sexually transmitted infections/diseases
<b>STIEO</b>	STI education outcomes (model)
<b>UNESCO</b>	United Nations Educational, Scientific, and Cultural Organization
<b>UWindsor</b>	University of Windsor
<b>WECHU</b>	Windsor Essex County Health Unit
<b>WHO</b>	World Health Organization

## CHAPTER 1

### INTRODUCTION

#### *Background*

The transmission of STIs remains a significant public health concern locally and internationally (Public Health Agency of Canada [PHAC], 2010, 2015, 2018; WECHU, 2016; World Health Organization [WHO], 2016a, 2016b). Despite public health agencies' attempts at controlling these infections, rates continue to rise (PHAC, 2010, 2015, 2018; WECHU, 2016). In Canada, chlamydia and gonorrhea are the most common reportable STIs with rates of infection steadily increasing since 1997 (PHAC, 2010, 2015, 2018).

STI rates have been increasing within Windsor-Essex County, with chlamydia and gonorrhea being the predominant type of all locally reported STIs (Ontario Agency for Health Protection and Promotion [OAHPP], 2018; WECHU, 2016). The highest reported rates were among those aged 20 to 24 years (see Appendix A [for chlamydia rates by age]; OAHPP, 2018). Density mapping revealed higher concentrations of chlamydia in West Windsor where the University of Windsor (UWindsor), a midsized university, is located (see Appendix B [to view density map]; WECHU, 2016). While UWindsor students cannot be directly implicated in the high concentration of chlamydia in West Windsor, many undergraduate students are young adults, a known risk factor for STI acquisition (Baja et al., 2017; Boislard, Bongardt & Blais, 2016; Falasinnu et al., 2015; Hagher, Madampage & Moraros, 2018; OAHPP, 2018; PHAC, 2015, 2018; United Nations Educational, Scientific and Cultural Organization [UNESCO], 2018; WECHU, 2016; WHO, 2016a, 2016b). Young adults are at higher risk of acquiring STIs because

they are more likely to be sexually active, have sex with multiple partners, have difficulty with prevention strategies (such as condom/barrier use), and have obstacles when accessing healthcare services (Falasinnu et al., 2015; OAHPP, 2018; PHAC, 2015, 2018; UNESCO, 2018; WECHU, 2016; WHO, 2016a, 2016b).

In Ontario, attempts to reduce the transmission of STIs among adolescents and young adults include the offering of a health and physical education curriculum to students in public school, with specific information about STIs provided in grades seven and nine (Government of Ontario, 2015; Ministry of Education, 2019). However, despite public health standards and curriculum recommendations from the government, sexual health education programs can vary between public health regions and school boards within Ontario (Ivanis et al., 2018; Ministry of Health and Long-Term Care [MOHLTC], 2018; WECHU Sexual Health Team, personal communication, February 6, 2018). In addition, Ontario parents can choose to opt their children out of receiving sex education (Ministry of Education, 2019). Furthermore, 22% of UWindsor's student population are from over 100 countries (UWindsor, 2019) and sexual health education programs can differ greatly between countries (UNESCO, 2018). These factors may result in varied STI prevention education experiences among undergraduate students at the UWindsor, potentially leading to reduced knowledge, unknown intentions, and the skill levels necessary to protect themselves or others from acquiring STIs.

### ***Statement of the Problem***

It was unknown if the sexual health education offered to students in Ontario was sufficient enough to provide young adults with the tools required to avoid STIs. There was also a paucity of literature evaluating sexual health education programs in Ontario



schools. In addition, there was incomplete information about local populations that are at risk for STIs and limited evaluation of local STI prevention programs within Windsor-Essex County. This gap in knowledge may hinder the development of evidence-based programs to prevent STI transmission (J. D. Fisher & Fisher, 1992; W. A. Fisher & Fisher, 1998; Ivanis et al., 2018; PHAC, 2008; WECHU Sexual Health Team, personal communication, February 6, 2018; WHO, 2016a; UNESCO, 2018).

Undergraduate students are an appropriate population to measure the effectiveness of sexual health education programs as many students are young adults and were recently connected to schools in the public education system. While many undergraduates are at risk for STIs because of their age, there was limited prior research examining the sexual health and STI risk of undergraduate students at the UWindsor (Maticka-Tyndale, Kerr, Mihan, & Mungwete, 2016; Skakoon-Sparling, 2016; Sparling & Cramer, 2015). Maticka-Tyndale et al. (2016) found lower than average condom usage among their sample, however the proportion who were UWindsor students was not identified. Skakoon-Sparling's (2016) sample consisted of a portion of participants who were undergraduate students from the UWindsor. Of the UWindsor participants in their study who reported having sexual relations, a third reported not having sexual relations with an exclusive partner, and more than half of them reported not using condoms during every sexual encounter. Sparling and Cramer (2015) found that undergraduate student participants were less likely to perceive that a potential partner was at risk for carrying an STI if that partner seemed familiar to the participant, which could lead to unprotected sex (Sparling & Cramer, 2015). Although these studies provided some perspective about sexual health and STI risk among students at UWindsor, the STI risk of this particular

population remained largely unknown. Specifically, it was unknown if undergraduate students at the UWindsor have the knowledge, skills, and intention necessary to avoid STIs.

There was a variety of Canadian literature looking at university students and STI risk (Boislard et al., 2016; Camilleri, Kohut & W. Fisher, 2015; Cragg, Steenback, Asbridge, Andreou & Langille, 2016; Fullerton, Rye, Meaney & Loomis, 2013; Hagher et al., 2018; Keeler, 2016; Milhausen et al., 2013; Skakoon-Sparling, 2016). While these studies provided perspective about university students, their sources of STI prevention education, and sexual health outcomes, a gap in research regarding undergraduate students in Southwestern Ontario remained. This gap may be creating a barrier to planning and implementing sexual health and STI prevention programs for this undergraduate student population.

### ***Purpose of the Study***

The purpose of this explorative, cross-sectional, quantitative study was to investigate if any relationships existed between characteristics of undergraduate students, their sources and levels of STI knowledge, and intentions to engage in safer sex practices. The goal was to gain an understanding about the effectiveness of sexual health education programs offered to students in Windsor-Essex and Ontario. Research questions examined were:

1. Where did undergraduate students acquire their STI prevention education, what topics were taught/sought, and which education sources were perceived as influential on current safer sex practices?

2. What is the level of STI knowledge of undergraduate students and is it related to readiness and intentions to practice safer sex?
3. What education factors of undergraduate students are associated with STI knowledge level, readiness, and intentions to practice safer sex?
4. What demographic characteristics of undergraduate students are associated with STI knowledge, readiness, and intentions to practice safer sex?

The results of this study may inform public health nurses and departments, whose mandate is to create supportive environments to promote healthy sexual practices for populations at risk for acquiring STIs, in developing educational resources for adolescents and young adults (Ivanis et al., 2018; MOHLTC, 2018; WECHU Sexual Health Team, personal communication, February 6, 2018). Information regarding STI prevention knowledge, motivation, and skills of this undergraduate student population could also potentially assist in the evaluation of current programs, determination of risk for acquiring STIs, and support the appropriate allocation of preventative resources.

## CHAPTER 2

### REVIEW OF THE LITERATURE

#### *Description of Search*

Literature searches were done primarily through the advanced search feature, Ex Libris Primo. Additional searches were done using the Cumulative Index to Nursing and Allied Health Literature (CINAHL), Google, and government agency sites on the internet. An ancestry search of collected articles was also conducted.

Inclusion criteria were English language, peer-reviewed articles from 2009 to 2019. Due to lack of research found in the past ten years, the search was expanded to twenty years for some aspects (e.g. pertaining to Canadian research or the theoretical framework). Search terms included university, college or undergraduate students and young adults; a combination of sexual health interventions, indicators, and outcomes, along with the specific terms of sexually transmitted infections or diseases; sexual health or STI prevention education; knowledge; sexual health and STI prevention behavior; condom use; STI risk; and intention (see Appendix C for search history).

This section examines STI risk factors and why undergraduate students are at higher risk for acquiring STIs. The theoretical framework, the information-motivation-behavioral skills (IMB) model originally developed by J.D. Fisher and Fisher (1992), and how it was modified will be discussed. The variables of STI prevention education, demographic characteristics, STI knowledge, and intentions to practice safer sex will be examined, as well as the relationships between them. Finally, gaps in the literature regarding these variables were identified.

### ***STI Risk Factors***

There are many factors contributing to the upsurge of reported STI cases across Canada (PHAC, 2018). Individual behaviors that have been associated with STI diagnosis include decreased public knowledge about risk factors and modes of transmission; sexual activity that begins early; participating in sexual behaviors that increase risk such as having sex without a condom/barrier or with multiple, anonymous, or infected partners; and increased drug and alcohol use (Bajaj et al., 2017; Falasinnu et al., 2015; Haghiri et al., 2018; PHAC, 2010, 2015, 2018). While individual sexual behaviors are directly related to the transmission and acquisition of STIs, social determinants of health are directly and indirectly involved as well (Bajaj et al., 2017; Falasinnu et al., 2015; PHAC, 2015). Relational, community, and structural factors, such as access to healthcare, relationship power, culture, and socio-economic status can increase one's susceptibility to acquiring STIs (Bajaj et al., 2017; Falasinnu et al., 2015; PHAC, 2015). Those most at risk for acquiring STIs include women, adolescents, young adults, and populations whose members are vulnerable and/or have a high number of sexual partners (Bajaj et al., 2017; Falasinnu et al., 2015; PHAC, 2015, 2018; WHO, 2016a, 2016b). Conversely, factors that protect individuals from STIs include marriage along with higher income and education levels (Bajaj et al., 2017).

The literature demonstrated that Canadian undergraduate students may be at increased risk for acquiring STIs as many students are young adults who may partake in unsafe sexual activity (Boislard et al., 2016; Camilleri et al., 2015; Haghiri et al., 2018; Keeler, 2016; Milhausen et al., 2013; Skakoon-Sparling, 2016). Approximately two-thirds of Canadian post-secondary students reported being sexually active (Haghiri et al.,

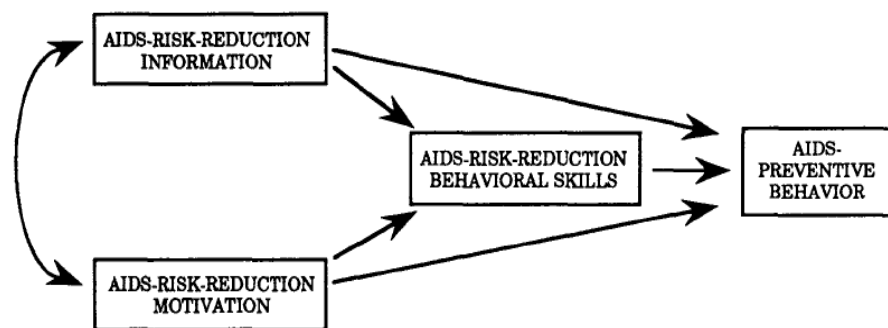
2018; Skakoon-Sparling, 2016) and many reported engaging in casual sex, a known risk factor for STI acquisition (Boislard et al., 2016; Skakoon-Sparling, 2016). Many Canadian undergraduate students reported using condoms inconsistently (Camilleri et al., 2015; Skakoon-Sparling, 2016) and half reported not using a condom during their last sexual encounter (Milhausen et al., 2013, 2017; Skakoon-Sparling, 2016). Unfortunately, many Canadian undergraduate students underestimated their risk for acquiring STIs (Cragg et al., 2016; Keeler, 2016), which can lead to unprotected sexual activity. STI diagnosis in Canadian post-secondary students has been associated with factors such as having multiple partners, engaging in anal intercourse, using marijuana, and being female (Keeler, 2016; Haghiri et al., 2018).

Prior research looking specifically at STI risk of undergraduate students at the UWindsor was limited (Maticka-Tyndale et al., 2016; Skakoon-Sparling, 2016; Sparling & Cramer, 2015). Maticka-Tyndale et al. (2016) found lower-than-average condom use among African, Black, and Caribbean youth in Windsor. Unfortunately, the number of participants who were UWindsor students was not specified. Skakoon-Sparling (2016) examined motivational factors related to sexual health decision-making with a sample that was one-third UWindsor undergraduate students. A third of their sample reported engaging in casual sex and half reported using condoms inconsistently (Skakoon-Sparling, 2016). Lastly, Sparling and Cramer (2015) examined motivational factors in sexual health decision-making. They found that potential sexual partners who had familiar attributes were perceived to be at lower risk for having STIs, which could lead to unprotected sexual encounters (Sparling & Cramer, 2015).

Although these studies provided some perspective about STI risk among undergraduate students at the UWindsor, the STI risk factors for this population remained largely unknown. It also is unknown if undergraduate students were contributing to the high density of chlamydia infections found in West Windsor. Knowing the specific factors that place undergraduate students at risk could be an asset for STI prevention planning.

### ***Theoretical Framework***

The WHO (2016a) stated that the most effective STI prevention frameworks are evidence-based, comprehensive, and include a strategic combination of behavioral, biomedical, and structural approaches. While many frameworks are appropriate for sexual health programs, the Canadian Guidelines for Sexual Health Education recommended the IMB model, originally developed by J.D. Fisher and Fisher (1992) to explain HIV risk (see Figure 1; PHAC, 2008, 2015).



*Figure 1.* The information-motivation-behavioral skills (IMB) model by J. D. Fisher and W. A. Fisher (1992, p. 465).

The IMB model has been tested within multiple populations internationally and interventions based on the model have demonstrated effectiveness in sexual risk reduction with long-lasting effects (Camilleri et al., 2015; Chang, Choi, Kim, & Song, 2014; J. D. Fisher & Fisher, 1992; J. D. Fisher, Fisher, Williams, & Malloy, 1994; W.A. Fisher, Williams, Fisher, & Malloy, 1999; Fullerton et al., 2013; Hawa, Munro & Doherty-Poirier, 1998; PHAC, 2008; Skakoon-Sparling, 2016; Walsh, Senn, Scott-Sheldon, Vanable & Carey, 2011). The IMB model has also been modified and used within other health areas such as cancer screening, diabetes, cardiovascular health, and nutrition (Chang et al., 2014).

The IMB model describes an approach to understanding the psychosocial factors that influence health behavior (J.D. Fisher & Fisher, 1992; J.D. Fisher et al., 1994). Its internal three components of information, motivation, and behavioral skills, when combined, can lead to health behavior change (J.D. Fisher & Fisher, 1992; W. A. Fisher et al., 1994, 1999; PHAC, 2008). The component information includes the facts, heuristics, and biases that impact behavior (J. D. Fisher & Fisher, 1992; J. D. Fisher et al., 1994; PHAC, 2008). The component motivation consists of the attitudes, beliefs, perceptions, emotional responses, and social support that influence behavior (J. D. Fisher & Fisher, 1992; PHAC, 2008). Lastly, behavioral skills consist of the objective ability and self-efficacy required to perform a health behavior (J. D. Fisher & Fisher, 1992; J. D. Fisher et al., 1994; PHAC, 2008).

The IMB model assumes that a person will perform a desired health behavior if they have accurate information, are motivated, and have the necessary skills to perform the behavior (J. D. Fisher & Fisher, 1992; J. D. Fisher et al., 1994). When considering



the use of barrier methods such as condoms, an individual must know the benefits of using condoms, believe that condom use is a beneficial behavior, perceive that their friends and sexual partners are in support of condom use, know how to obtain and use condoms properly, have confidence in their ability and skill to negotiate use, and actually use the condom during a sexual act (J. D. Fisher & Fisher, 1992; Fullerton et al., 2013).

To guide the current research study, the IMB model was modified and the STI education outcomes (STIEO) model was developed (see Figure 2). The STIEO model assisted in the exploration of relationships between demographic characteristics of undergraduate students, their sources of STI prevention education, levels of STI knowledge, and intentions to practice safer sex. The literature discussing these variables follows.

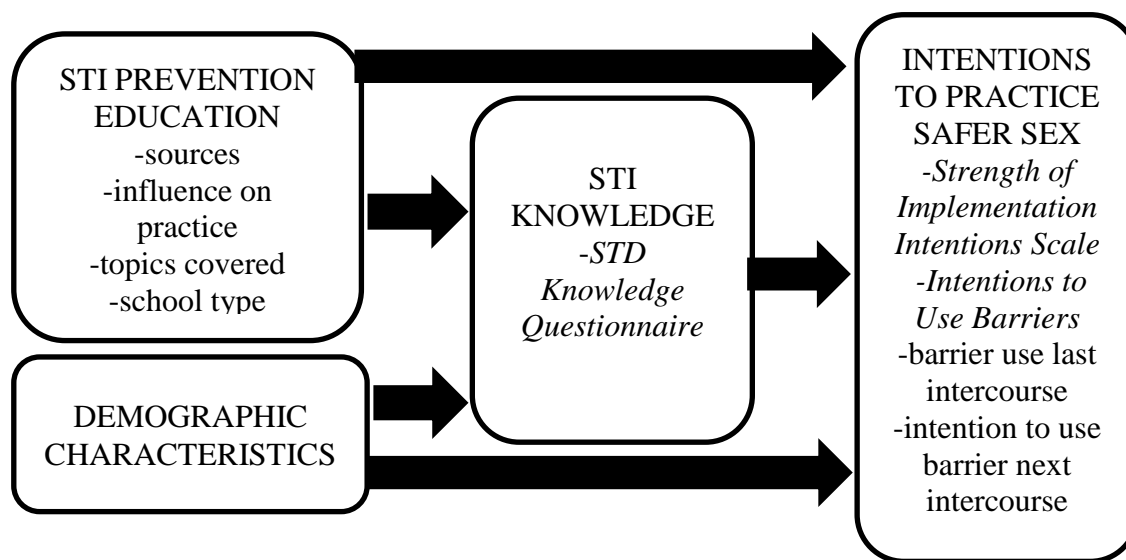


Figure 2. STI Education Outcomes (STIEO) Model. Adapted from the IMB model from “Changing AIDS-Risk Behavior” by J. D. Fisher and W. A. Fisher (1992). *STD Knowledge Questionnaire* by Jaworski and Carey (2007). *Strength of Implementation Intentions Scale and Intentions to Use Barriers* by Nydegger et al. (2017, 2018).

### ***STI Prevention Education***

STI prevention is one topic within a comprehensive sexual health education curriculum (PHAC, 2008; UNESCO, 2018). Comprehensive sexual health education programs have been shown to increase knowledge, motivation, and skills which can lead to improved sexual health decision-making, and thereby reduced incidence of STIs (Denford, Abraham, Campbell, & Busse, 2017; Morales, Espada, Orgiles, Johnson & Lightfoot, 2018; PHAC, 2008; UNESCO, 2018). Adolescent STI prevention education programs have generally had short-term, low to medium effects on attitudes and self-efficacy toward condom use, intentions to refuse sex, condom use intentions, and actual condom use (Morales et al., 2018). The effect size on knowledge has been shown to be high (Morales et al., 2018). Unfortunately, many sexual health education programs contain information that is outdated, limited, irrelevant, incomprehensible, frightening, sexist, and/or harmful (W. A. Fisher & Fisher, 1998; UNESCO, 2018). In addition, teachers often lack confidence, enthusiasm, and knowledge to provide effective sexual health education (Cohen, Byers, & Sears, 2012; Ivanis et al., 2018; UNESCO, 2018; WECHU Sexual Health Team, personal communication, February 6, 2018). As a result, knowledge deficits tend to be prevalent among populations most at risk for adverse sexual health outcomes (W. A. Fisher & Fisher, 1998; UNESCO, 2018).

Undergraduate students at the UWindsor may have received sexual health and/or STI prevention education from a variety of sources. Many youth reported getting information from healthcare providers, family members, peers, sexual partners, teachers, movies, television, books, pamphlets, the internet, and pornography (Byers et al., 2017; Charest, Kleinplatz & Lund, 2016; Kumar et al., 2013; PHAC, 2012; Phillips &

Martinez, 2010; Planned Parenthood Toronto, 2009). Peers were reported to be the most important source of sexual health education for many youths (Byers et al., 2017; Charest et al., 2016; Planned Parenthood Toronto, 2009). Many youths also reported seeking sexual health information from the internet, especially those from the lesbian-gay-bisexual-transgender-queer-questioning-two-spirit-plus (LGBTQ2+) community whose members reported not getting pertinent information from traditional education sources (Charest et al., 2016; Planned Parenthood Toronto, 2009).

In Canada, most students in publicly funded schools receive sexual health education beginning in elementary grades and continuing into secondary school (Byers et al., 2017; Phillips & Martinez, 2010; PHAC, 2008). However, few Canadian studies have looked at the effectiveness of this education (Cassidy et al., 2015; Denford et al., 2017; Morales et al., 2018). Of the studies that examined knowledge retention, variable levels of STI knowledge among Canadian youth were found (Cragg et al., 2016; Fullerton et al., 2013; Kumar et al., 2017; Milhausen et al., 2013). Many Canadian youths also reported that the sexual health education they received in school was limited in scope (Byers et al., 2017; Phillips & Martinez, 2010; Planned Parenthood Toronto, 2009).

In Ontario, the government recommends a comprehensive health and physical education curriculum for students in public schools (Government of Ontario, 2015; Ministry of Education, 2019). STI prevention education, including methods of transmission and symptoms of infections, is first introduced in grade seven and continues in grade nine (Government of Ontario, 2015; Ministry of Education, 2019). However, despite public health standards and curriculum recommendations from the government,

sexual health education programs can vary greatly between public health regions and school boards within Ontario (Ivanis et al., 2018; MOHLTC, 2018; Phillips & Martinez, 2010; WECHU Sexual Health Team, personal communication, February 6, 2018). For example, many students attending publicly funded Catholic schools in Ontario receive sexual health education with an emphasis on abstinence (Ivanis et al., 2018; Phillips & Martinez, 2010; WECHU Sexual Health Team, personal communication, February 6, 2018), despite research supporting that sexual health education based on abstinence is frequently ineffective in decreasing adverse sexual outcomes (Denford et al., 2017; Morales et al., 2018; PHAC, 2008; UNESCO, 2018). Ontario students in publicly funded Catholic, private, or home schools also have limited access to programs offered by public health departments (Ivanis et al., 2018; Phillips & Martinez, 2010; WECHU Sexual Health Team, personal communication, February 6, 2018). In addition, parents may choose to opt their children out of sexual education class altogether (Ministry of Education, 2019). Thus, the quality and quantity of sexual health education is not equitable for all students in Ontario. As a result, sexual health knowledge retention may not be consistent among Ontario youths (Kumar et al., 2013). In addition, it was not known if sexual education programs are effective in influencing sexual health behaviors of adolescents and young adults. Even within Windsor-Essex County, sexual health programs are not consistent across schools and the unknown outcomes of those programs is a barrier to program planning (Ivanis et al., 2018; WECHU Sexual Health Team, personal communication, February 6, 2018).

Regarding UWindsor undergraduate students, the quality and retention of their public school STI prevention education is currently unknown. Many UWindsor

undergraduate students did not received sexual health education in Ontario, because approximately 22% of UWindsor's students are from over 100 countries (UWindsor, 2019) and sexual health education can differ greatly between countries (UNESCO, 2018). Therefore, some variability in the quality and quantity of STI education among UWindsor undergraduate students was expected.

### ***Demographic Characteristics***

Demographic characteristics examined in this research are age, gender, sexual orientation, relationship status, ethnicity, year of study along with location and type of high school education. Younger age was often associated with increased STI risk and older age with increased knowledge (Bajaj et al., 2017; Cragg et al., 2016; Dhalla & Poole, 2009; Falasinnu et al., 2015; Hawa et al., 1998; Milhausen et al., 2013). Gender and sexual orientation have also been found to be associated with STI risk, knowledge, intentions and behaviors (Asare, 2015; Bajaj et al., 2017; Cragg et al., 2017, Dhalla & Poole, 2009; Hawa et al., 1998; Keeler, 2016; Maticka-Tydnale et al., 2016; Milhausen et al., 2013). Relationship status has been shown to be an important factor, with people in committed relationships being at lower risk of acquiring STIs and they are also less likely to use barrier methods (Bajaj et al., 2017; Harvey et al., 2006; Milhausen et al., 2013, 2017). Ethnicity has also been identified as an important factor in some research, as some minority groups have been shown to be at higher risk for STIs (Bajaj et al., 2017; Dhalla & Poole, 2009; Falasinnu et al., 2015; Maticka-Tydnale et al., 2016). Students in higher years of study have also been shown to have higher levels of sexual health knowledge (Franklin & Dotger, 2011). The available demographic characteristics of the undergraduates, from the Registrar's office at the UWindsor, was limited to gender, year

of study, program of study and the regions that students comes from (UWindsor, 2019). This current research may identify additional characteristics of undergraduate students related to sexual health practices and knowledge. .

### ***STI Knowledge***

In the STIEO model, STI knowledge represents the information component of the parent IMB model. STI knowledge is the understanding of STIs including information about transmission, prevention, and the dangers of STI acquisition; misinformation or myths about sexual health; and cognitive processes that bias knowledge, and sexual health decision-making (Jaworski & Carey, 2007, p. 558). The level at which STI knowledge offers protection from STIs has been not been identified in the literature (Jaworski & Carey, 2007).

Cassidy et al. (2015) found that Canadian research about university students' sexual health knowledge was limited and that international research showed minimal STI knowledge levels among university students. Of the few studies that examined the levels of STI knowledge of Canadian university students, variable levels of knowledge were found (Cragg et al., 2016; Foster & Byers, 2008; Fullerton et al., 2013; Milhausen et al., 2013). Higher levels of STI knowledge among university students were associated with STI prevention behaviors such as condom use and STI testing (Cragg et al., 2016; Fullerton et al., 2013; Milhausen et al., 2013). Among these studies, the only predictor of higher STI knowledge levels was female gender (Cragg et al., 2016). Another study of Ontario adolescents also found higher sexual health knowledge levels among females (Kumar et al., 2013). An American study found that senior students had higher levels of sexual health knowledge than freshman undergraduates (Franklin & Dotger, 2011). The

level of STI prevention knowledge and predictors of STI knowledge for undergraduate students at the UWindsor was unknown.

### ***Intentions to Practice Safer Sex***

For this study, intentions to practice safer sex was the motivation and behavioral skills required to practice safer sex. Intentions to use barriers and implementations intentions for barrier use were examined.

### ***Intentions to Use Barriers***

Intention is a significant sub factor for the motivation component of the parent IMB model (Fullerton et al., 2013; Hawa et al., 1998; Nydegger, Ames & Stacy, 2017; Nydegger & Walsh, 2018). For the purpose of this research, intentions to use barriers was the motivation that a person had for using barrier methods, such as condoms or dental dams, in circumstances such as having sex with a casual partner, a person they just met, or a partner whose STI status was unknown (Nydegger & Walsh, 2018). Intentions to use condoms has been shown to be strongly correlated to actual use of condoms (Asare, 2015; Harvey et al., 2006; Nydegger et al., 2017; Nydegger & Walsh, 2018).

Factors associated with intentions to use condoms often include age, relationship status, attitudes, perceived behavioral control, and subjective social norms (Asare, 2015; Harvey et al., 2006; Nydegger & Walsh, 2018). Factors found to be associated with actual use and non-use of condoms in university students have included perceived vulnerability to STIs, access, perceived costs and benefits of use, knowledge, education, attitudes, intentions, age, gender, relationship status, birth control, pleasure, preference, partner characteristics, peer behavior, cultural and religious expectations, discrimination, self-esteem, social support, self-efficacy, depression, stress, and use of drugs or alcohol

(Boislard et al., 2016; Camilleri et al., 2015; J. D. Fisher et al., 1994; Fullerton et al., 2013; Haghiri et al., 2016; Keeler, 2016; Milhausen et al., 2013, 2017; Hawa et al., 1998; Scott-Sheldon et al., 2016; Skakoon-Sparling, 2016; Sparling & Cramer, 2015; UNESCO, 2018).

Actual condom use among the UWindsor's student population has been shown to be inconsistent and half reported not using a condom during their last sexual encounter (Skakoon-Sparling, 2016). Intentions to use barrier methods, and the associated factors, for the undergraduate student population at UWindsor, were unknown.

### ***Implementation Intentions***

Implementation intentions are situation-linked action plans that lead to the performance of a behavior (Nydegger et al., 2017; Nydegger & Walsh, 2018). When people are aware of the environmental context in which they want to perform certain behaviors, the likelihood of them performing that behavior increase, as compared to developing an intention alone (Nydegger et al., 2017; Nydegger & Walsh, 2018). For example, use of a barrier method is more likely to occur if a person has detailed plans about barrier use, such as knowing when to carry a barrier and what to say to a partner about using a barrier.

Implementation intentions was shown to be a significant sub factor of the skills component of the parent IMB model (Nydegger et al., 2017; Nydegger & Walsh, 2018). Past research showed that implementation intentions fully mediated the relationship between condom use intentions and actual condom use in drug users and men who have sex with men (Nydegger et al., 2017; Nydegger & Walsh, 2018). Forming implementation intentions was also shown to be effective in promoting other healthy



behaviors such as healthy eating and smoking cessation (Nydegger et al., 2018). Studies examining this specific behavioral skill were limited. Implementation intentions and behavioral skills in general, for students at the UWindsor were gaps in the literature.

### ***Relationships between Variables of the STI Education Outcomes Model***

Receiving comprehensive STI prevention education from a variety of sources has been shown to have a positive effect on knowledge, motivation, and skills required to prevent STI acquisition (Boislard et al., 2016; Charest et al., 2016; Denford et al., 2017; Foster & Byers, 2008; Morales et al., 2018; PHAC, 2008; UNESCO, 2018). Preventative education mostly impacts knowledge (Morales et al., 2018), which has been shown to lead to preventative behaviors (Cragg et al., 2016; Fullerton et al., 2013; Milhausen et al., 2013). However, research has shown that knowledge alone is not sufficient to impact behavior and the relationship between knowledge and behavior can be inconsistent (J. D. Fisher & Fisher, 1992; J.D. Fisher et al., 1994; W. A. Fisher et al., 1999; Fullerton et al., 2013; Hawa et al., 1998; Walsh et al., 2011). Motivation has often been demonstrated to be a stronger determinant of behavior than information (J. D. Fisher & Fisher, 1992; J.D. Fisher et al., 1994; W. A. Fisher et al., 1999; Fullerton et al., 2013; Hawa et al., 1998; Scott-Sheldon et al., 2015; Walsh et al., 2011). Intention, a sub construct of motivation, has also been demonstrated to lead to healthy behaviors (Fullerton et al., 2013; Hawa et al., 1998; Harvey et al., 2006; Nydegger et al., 2017; Nydegger & Walsh, 2018).

The IMB model asserts that information and motivation are relatively independent constructs (J. D. Fisher & Fisher, 1992; J.D. Fisher et al., 1994; W. A. Fisher et al., 1999). Implementation intentions, a behavioral skill subcomponent, has been shown to

fully mediate the relationship between intentions (a motivation sub construct) and actual condom use (behavior) (Nydegger et al., 2017; Nydegger & Walsh, 2018).

The STIEO model asserts that STI education will lead to increased knowledge about STIs. It was theorized that knowledge about STIs would lead to increased intentions to practice safer sex behaviors, which included the motivation and skills to do so. This research examined if there were significant relationships between knowledge and the other variables, considering the mixed findings in the literature (J. D. Fisher & Fisher, 1992; J.D. Fisher et al., 1994; W. A. Fisher et al., 1999; Fullerton et al., 2013; Hawa et al., 1998; Walsh et al., 2011). It was also theorized that demographic characteristics would be associated with some of these components.

### ***Gaps in the Literature***

Several gaps were identified within the literature on STI prevention in the post-secondary school population. There were few Canadian studies examining the effectiveness of STI prevention education programs within the post-secondary school population, with no studies specifically looking at undergraduate students at UWindsor. The levels of STI prevention knowledge, motivation, and behavioral skills in this population were unknown. It was also unknown if this population contributed to the high rates of chlamydia diagnosed in West Windsor. Using the STIEO model as a guide, this research attempted to evaluate STI prevention education received, sources that provide STI education, and their influence on current sexual behaviour, intentions, and readiness to practice safer sex methods by undergraduate students at the UWindsor.

## CHAPTER 3

### METHODOLOGY

#### ***Research Design***

This exploratory study utilized a quantitative, descriptive, cross-sectional survey design to investigate the relationships between STI prevention education sources, STI knowledge levels, along with readiness and intentions to practice safer sex in a convenience sample of undergraduate students at the UWindsor in southern Ontario.

#### ***Research Questions***

Four research questions were examined:

1. Where did undergraduate students acquire their STI prevention education, what topics were taught/sought, and which education sources were perceived as influential on current safer sex practices?
2. What is the level of STI knowledge of undergraduate students and is it related to readiness and intentions to practice safer sex?
3. What education factors of undergraduate students are associated with STI knowledge level, readiness, and intentions to practice safer sex?
4. What demographic characteristics of undergraduate students are associated with STI knowledge, readiness, and intentions to practice safer sex?

#### ***Sample and Setting***

UWindsor is a mid-sized university that hosted 12, 283 undergraduate students in 2018-2019, the year of data collection (University of Windsor, 2019). The university is located in the west end of the city where prevalence mapping indicated a high density of chlamydia diagnoses (see Appendix B for density map; WECHU, 2016).

A G\*Power *a priori* analysis was performed suggesting that the minimum number of participants required was 115, given proposed statistical tests and a power of 95%. To ensure an adequate sample was obtained, 150 undergraduate students were sought to participate in the current study.

### ***Survey Design***

An anonymous survey was constructed in Qualtrics® (see Appendix D for survey). At the start of the survey, participants were informed that sexual intercourse was defined to include vaginal, oral, and anal sex and the term barrier methods referred to male and/or female condoms and/or dental dams. The term STI was also defined.

All participants received a demographic characteristics questionnaire asking age, year of study, university program, high school type, high school location, ethnicity, gender, and sexual orientation. Participants were provided with five relationship types to choose from, including not dating, casual dating, committed not living together, committed living together and more than one type of relationship status.

The *STI Prevention Education Questionnaire* was developed for this study to ask participants about any STI prevention education received. This component included a yes/no questionnaire that asked participants if they received STI prevention education from teachers, parents/guardians, healthcare providers, friends or peers, programs on campus, and/or the internet. For each education source identified, participants were asked if the source influenced their current safer sex practices and if they learned about safe sex, abstinence, communicating with potential partners, how to be tested for STIs, and/or how to be treated for STIs.

The *STD Knowledge Questionnaire* by Jaworski and Carey (2007), a 27-item, true/false/don't know measure, previously validated with American college students, was also provided to all participants. To score this instrument, one point was awarded for each correct response with a higher score indicative of higher STD knowledge. Jaworski and Carey (2007), reported the internal consistency (Cronbach  $\alpha = .86$ ) and a test-retest reliability ( $r = .88$ ). The acronym "STD" was changed to STI for consistency within the current study and to be consistent with contemporary terminology in the literature.

The remaining survey questions were asked only of students who identified as being sexually active in the past year. Sexually active participants were asked if they used a barrier method during their last sexual encounter and if they intended to use a barrier method during their next encounter. In addition, sexually active participants were administered two measures asking about intentions and plans for barrier use. The *Intentions to use Condoms* questionnaire by Nydegger and Walsh (2018) is a three-question measure that asked participants if they intend on using condoms whenever they have sex with a casual partner, someone they just met or someone whose HIV status they don't know. Responses ranged from one (*definitely no*) to four (*definitely yes*; Nydegger & Walsh, 2018). A higher score indicated higher intentions to use condoms in intimate situations that were at higher risk for acquiring HIV (Nydegger & Walsh, 2018). Nydegger and Walsh (2018) reported good internal consistency with a Cronbach alpha of 0.84. For the current study, terms were modified for consistency and inclusivity. The original measure referred to HIV status, which was changed to STI status, condoms were referred to as barrier methods, and all items referring to sexual intercourse included vaginal, anal, and oral sex. This measure was renamed *Intentions to Use Barriers Scale*.

The *Strength of Implementation Intentions Scale* (SIIS; Nydegger et al., 2017) was also modified for the current study. The nine-item measure asked participants if they made detailed plans about 1) when they will carry a condom, 2) when to use a condom for vaginal or anal intercourse, 3) when to use a condom for oral sex, 4) where they will keep condoms readily available, 5) what they will say to a partner about using condoms before sex, 6) what they will say if the partner refuses, 7) the actions to take if the partner refuses to use a condom, 8) how to put on a condom or offer one to their partner, and 9) when to initiate use of a condom (Nydegger et al., 2017). The psychometric properties, direct, and interaction effects of the SIIS were evaluated using structural equation modeling and general linear regressions (Nydegger et al., 2017). Using baseline measures, overall goodness of fit was evaluated using structural equation modeling in Mplus (Nydegger et al., 2017). The SIIS strongly predicted condom use at one-year follow up (Nydegger et al., 2017). Nydegger and Walsh (2018) further tested and modified the scale with good results (Cronbach  $\alpha = 0.94$ ). The scale was found in that study to also completely mediate the relationship between condom use intentions and condomless sex (Nydegger & Walsh, 2018).

For this research, the original nine-item scale was modified by combining items two and three, resulting in an eight-item measure. Sexual intercourse included anal, vaginal, and/or oral sex for all questions and condoms were referred to as barrier methods. Responses ranged from one (*strongly disagree*) to six (*strongly agree*) (Nydegger et al., 2017). Higher scores indicated greater strength of implementation intentions to use barriers (Nydegger et al., 2017).

Prior to distribution, the survey underwent validity testing by content experts and was pilot tested with a small group of nursing students.

### ***Procedures***

Ethical clearance to conduct this research project was sought and granted by the UWindsor Research Ethics Board. The Office of Institutional Analysis provided a random list of 2000 undergraduate students' email addresses. In March of 2019, an initial invitation to participate in the study was sent to students through the UWindsor email system, followed by two reminder emails. Three emails in total, were sent to the students at one-week intervals to encourage participation (Grove, Burns, & Gray, 2013). The emailed invitations provided information about the survey, an attached Letter of Information for Consent to Participate in Research, and an imbedded direct link to the anonymous survey in Qualtrics® (see Appendix E for email invitation or Appendix F for consent letter).

Prior to participating in the survey, participants were given the opportunity to download and review the consent letter if they so desired. They provided consent by continuing with the survey and were informed that they could skip questions or leave the survey at any time by closing their browser. At the conclusion of the survey, participants were asked if they wished to submit their survey results. Surveys without this final consent were automatically eliminated from the data collected and the results were not used in the aggregate information presented here. Once submitted, participants had the option to be redirected to a separate landing page where they could enter into a draw for one of twenty-five \$20 Subway gift cards. No additional personal data was collected in the gift card draw, only email addresses for the draw were used and those were destroyed

once the draw took place. The survey was closed three weeks after the final reminder email was sent to potential participants.

### ***Data Screening and Analysis***

The results were downloaded from Qualtrics® to Microsoft Excel®. The data was cleaned and screened for errors, outliers and missing data following procedures recommended by Pallant (2016). Some cleaning processes were not available in IBM SPSS® version 26, so Microsoft Excel® was used to mitigate this issue. There was minimal missing data that appeared to be random in nature. Missing demographic responses, such as university program, gender, and sexual orientation, were coded as unidentified/other. Cases missing age or year of study were imputed. Text responses were coded for analysis.

After cleaning and coding, the data was transferred to and analyzed using IBM SPSS® version 26. The demographic variables were coded, defined, compressed, and some were dichotomized. The scales were tested for normalcy and reliability. *The STI Knowledge Questionnaire* was normally distributed with good reliability ( $\alpha = .86$ ). *The Strength of Implementation Intentions Scale* had very good reliability ( $\alpha = .97$ ) but was negatively skewed (-.808). *The Intentions to Use Barriers Scale* was also negatively skewed (-.739) and approached internal reliability ( $\alpha = .68$ ). Skewed variables are typical in this type of research, therefore parametric tests were used (C. Senn, personal communication, March 17, 2020). Univariate and bivariate testing was done to examine study variables. No multivariate testing was done due to the small sample size of sexually active participants.



## CHAPTER 4

## RESULTS

*Descriptive Statistics**Survey Responses*

Of the 2000 undergraduate students contacted, 146 completed the survey in the allotted period of five weeks for data collection. Eight results were excluded due to the insincere nature of the responses. The total number of participants included in the final analysis was 138 for a completion rate of 7%.

*Sample Characteristics*

Table 1 lists the characteristics of the complete sample compared with the reported UWindsor undergraduate population for 2018-2019. Of the information available, the current sample was consistent with all but a few variables. The present sample had a higher proportion of females (72%) as compared to males (32%), whereas the actual gender distribution of the university population is more equitable  $\chi^2(1, n = 138) = 19.329, p = .000$ . The proportion of nursing students (20%) in the sample was also higher than the university population (6%)  $\chi^2(1, n = 138) = 51.741, p = .00$ . Students from out-of-province (4%) were under-represented in this sample versus the actual university population (22%)  $\chi^2(1, n = 138) = 33.959, p = .00$ . Other demographic characteristics of the undergraduate population were unavailable.

The range of ages in this sample was 18 to 37 years ( $M = 20, SD = 2.8$ ). The majority of participants identified as Caucasian (72%). Nearly half of the sample reported being in some type of committed relationship (47%). The majority of participants self-identified as heterosexual (87%) with groups representing the LGBTQ2+

community being very small. The percentage of gay or lesbian participants was one percent for each, with an added five percent identifying as bisexual.

The demographic characteristics of sexually active participants ( $N = 91$ ; see Table 2) were consistent with the entire sample, aside from relationship status. A significantly higher percentage of sexually active participants reported being in a committed relationship (68%) than non-sexually active participants (6%)  $\chi^2 (1, n = 138) = 44.98, p = .00, phi = .586$ .

Two-thirds of participants identified that they had sexual intercourse in the past year (66%; see Table 3). Only 41% of sexually active participants reported using a barrier method the last time they engaged in sexual intercourse and 50% reported that they intended to use a barrier method the next time they had intercourse. Of those who identified as not being sexually active ( $N = 47$ ), 42% stated that it was because of lack of opportunity, whereas 51% stated that they chose to be abstinent.

To determine if being in a committed relationship was a significant factor in barrier use at last intercourse or intentions to use a barrier at next intercourse, chi-square tests for independence (with Yates' Continuity Correction) were conducted. There were no significant associations between being in a committed relationship and barrier use at last intercourse,  $\chi^2 (1, n = 91) = .613, p = .434, phi = -.106$ , or intention to use a barrier at next intercourse,  $\chi^2 (1, n = 91) = 2.514, p = .113, phi = -.190$ .

Results of the STI Knowledge Questionnaire in the whole sample were low with a mean score of 13.1 out of a possible 27 ( $SD = 5.9$ ; see Table 4). STI knowledge scores were similar for the sexually active participants ( $M = 13.38, SD = 5.94$ ) as compared to the non-sexually active participants [ $M = 12.28, SD = 5.95; t (136) = -1.038, p = .301$ ].

Results of the *Strength of Implementation Intentions Scale* showed that overall, sexually active participants somewhat agreed that they had a detailed plan for barrier use ( $M = 33.07$  out of a possible 48,  $SD = 13.25$ ). Regarding *Intentions to Use Barriers*, sexually active participants mostly agreed that they intended to use a barrier with higher risk sexual partners ( $M = 9.43$  out of a possible 12,  $SD = 2.81$ ). Independent t-tests confirmed that there were no significant differences in these means for groups divided by demographic characteristics of the sexually active participants.

Years of study was examined using a one-way between groups analysis of variance. There was a statistically significant difference in STI knowledge scores at the  $p < .05$  level [ $F(3, 87) = 4.145, p = .009$ ]. The magnitude of the differences in the means (mean difference =  $-5.471$ , 95%  $CI: -9.58$  to  $-1.37$ ) was large ( $eta\ squared = .125$ ). Post-hoc comparisons using the Tukey HSD test indicated a significant difference in STI knowledge between lower year 2 scores ( $M = 10.89, SD = 5.22$ ) and the higher scores in year 3 ( $M = 16.36, SD = 5.35$ ). Year 1 ( $M = 12.86, SD = 6.05$ ) and year 4 ( $M = 13.65, SD = 6.14$ ) scores were not found to be significantly different from each other or any of the other years scores. Older age was also found to be moderately associated with increased STI knowledge using Pearson's ( $r = .402, p < .001$ ). STI knowledge was not found to be significantly associated with either the *Strength of Implementation Intentions Scale* ( $r = -.123, p > .05$ ) or the *Intentions to Use Barriers scale* ( $r = -.114, p > .05$ ), however these two scales had a small association with each other ( $r = .245, p < .05$ ).

### ***STI Prevention Education***

Table 5 demonstrates how many participants in the complete sample ( $N = 138$ ) received STI prevention education from each of the possible sources (parent, teacher,

etc.), how many participants perceived that the education provided by each source influenced their current safer sex practices, along with the topics covered (safer sex, abstinence, etc.). The vast majority of participants reported that they received STI prevention education from the internet (91%), teachers (89%), and peers (83%). On average, participants reported receiving STI prevention education from 4.18 out of six presented sources ( $SD = 1.26$ ). The top sources that participants identified as influential on current safer sex practices were the internet (70.3%), followed by teachers (62%), and peers (55%). Participants reported on average, only 2.99 out of a possible six sources provided education that was perceived to influence their current safer sex practices ( $SD=1.68$ ).

To explore if receiving influential education leads to desired outcomes, independent sample *t*-tests were conducted to compare means for participants who rated a source as influential versus those who received the education from that source but did not perceive it as influential. This examination was limited to sexually active participants and the top three education sources identified. There were no significant differences in means for participants who did and did not identify that teachers or the internet influenced their safer sex practices, however sample size differences between those who identified a source as influential and those that did not were quite large.

When peers were identified as an influential source on intentions to practice safer sex, participants scored higher on the *Strength of Implementation Intention Scores* ( $M = 38.04$ ,  $SD = 10.12$ ) when compared to participants who did not perceive that education from peers influenced their current safer sex practices [ $M = 28.54$ ,  $SD = 15.02$ ;  $t(37.638) = -2.748$ ,  $p = .009$ ]. Levene's test was significant therefore equal variances was not

assumed ( $F = 8.951, p = .004$ ) and the degrees of freedom was adjusted from 76 to 38. The magnitude of the differences in the means (mean difference = -8.692, 95% *CI*: -15.098 to -3.163) was moderate (*eta squared* = .09). Participants who identified peers as influential also had higher *Intentions to Use Barriers* scores ( $M = 10.14, SD = 2.46$ ) than participants who did not perceive that peers influenced their current safer sex practices [ $M = 8.15, SD = 2.98; t(75) = -3.116, p = .003$ ]. The magnitude of the differences in the means (mean difference = -1.983, 95% *CI*: -3.252 to -.715) was large (*eta squared* = .12). The Bonferroni adjusted  $p$  value used for these tests was .017. Similar to above the peer groups (who identified the source as influential or not) also had large size differences (N=96 versus N=18), although not as large as the teacher influential group (N=111 versus N=12) and the internet as influential (N=115 versus N=11) groups.

Regarding topics learned, students reported that the most common topic from all sources was safer sex practices. Seventy-eight percent of students reported that mainly teachers discussed abstinence. Interestingly, how to get tested or treated for STIs and how to communicate with partners to negotiate safer sex options were the topics least likely to be discussed by any source, with the internet being the main source of information on these topics (70-83%).

Table 1

*Characteristics of Study Sample and University Population*

Characteristics	Sample <i>N</i> = 138 N (%)	University <sup>a</sup> <i>N</i> = 12,283 (%)
Age	<i>M</i> =20.4, <i>SD</i> =2.8, range 18-37	
Gender		
Female	99 (71.7)	(52)
Male	37 (26.8)	(46)
Other, n/a	2 (1.4)	(2)
Sexual Orientation		
Heterosexual	120 (87)	
Lesbian	2 (1)	
Gay	1 (1)	
Bisexual	7 (5)	
Other	3 (2)	
Not identified	5 (4)	
Relationship status		
Not dating anyone	54 (39.1)	
Casual dating	16 (11.6)	
Committed, not cohabitating	54 (39.1)	
Committed, cohabitating	11 (8)	
More than one relationship	3 (2.2)	
Ethnicity		
White/European	99 (71.7)	
Arabic/Middle Eastern	14 (19.7)	
South/East Asian	10 (14)	
African descent	5 (7)	
Canadian, mixed, n/a	10 (19.7)	
University Program		
Arts, Humanities, Social Science	39 (28.3)	(36)

Characteristics	Sample N = 138 N (%)	University <sup>a</sup> N = 12,283 (%)
Business	16 (12)	(11)
Education	3 (2)	(4)
Human Kinetics	20 (14.5)	(12)
Engineering	20 (14.5)	(8)
Nursing	28 (20.3)	(6)
Sciences	2 (1)	(10)
Concurrent, undeclared, n/a	10 (7)	(7)
Year of study		
First	42 (30.4)	(26)
Second	41 (29.7)	(24)
Third	36 (26.1)	(26)
Fourth and beyond	19 (13.8)	(25)
High school location		
Within WEC	87 (63)	(66*)
Outside WEC/within Ontario	46 (33.3)	(12)
Outside of Ontario	5 (3.6)	(22)
High school type		
Public	79 (57.2)	
Religion-based	57 (41.3)	
Other	2 (1.4)	

*Note.* n/a = not available/identified; WEC = Windsor-Essex County, \* tri-county.  
<sup>a</sup> Available data about university population was obtained from Office of Institutional Analysis, UWindsor, personal communication, December 11, 2019.

Table 2

*Characteristics of Sexually Active Participants (N = 91)*

Characteristics	N (%)
Age	$M=20.9$ , $SD=3.2$ , range 18-37
Gender	
Female	67 (73.6)
Male	23 (25.3)
Other, n/a	1 (1.1)
Sexual orientation	
Heterosexual	78 (85.7)
Not heterosexual, n/a	13 (14.3)
Relationship status	
Not committed	29 (31.9)
Committed	62 (68.1)
Ethnicity	
White	69 (75.8)
Not-white, mixed, n/a	22 (24.2)
University Program	
Arts, Humanities, Social Science	24 (26.4)
Human Kinetics	17 (18.7)
Engineering	11 (12.1)
Nursing	15 (16.5)
Business, Education, Sciences, other	24 (26.4)
Year of study	
First	22 (24.2)
Second	27 (29.7)
Third	25 (27.5)
Fourth and beyond	17 (18.7)
High school location	
Within WEC	53 (58.2)
Outside WEC	38 (41.8)



Characteristics	<i>N</i> (%)
High school type	
Public	51 (56)
Religion-based, other	40 (44)

*Note.* n/a = not available/identified; WEC = Windsor-Essex County.

Table 3

*Sexual Activity in the Past Year*

Sexual activity in the past year	<i>N</i> (%)
Yes	91 (65.9)
Barrier used last intercourse	37 (40.7)
Intends to use barrier next intercourse	47 (51.6)
No	47 (34.1)
Due to lack of opportunity	18 (41.9)
By choice	22 (51.2)
Other reason, n/a	7 (14.9)

Table 4

*Scores on measures*

Measures	<i>N</i>	<i>M</i>	<i>SD</i>	Range
<i>STI Knowledge Questionnaire</i> (whole sample)	138	13.1	5.9	1-27
<i>STI Knowledge Questionnaire</i> (not sexually active)	47	12.28	5.96	1-23
<i>STI Knowledge Questionnaire</i> (sexually active)	91	13.38	5.94	2-27
<i>SIIS</i> (sexually active)	91	33.97	13.25	8-48
<i>Intentions to Use Barriers</i> (sexually active)	90	9.43	2.81	3-12

*Note.* *SIIS* = *Strength of Implementation Intentions*

Table 5

*STI Education Source, Influence of Source and Topics Taught by Source (N=138)*

Education source	Education received N (%)	Influenced practices N (%)	STI prevention topics				
			Safer sex N (%)	Abstinence N (%)	Communication with partners N (%)	STI testing N (%)	STI treatment N (%)
Teachers	123 (89.1)	111 (80.4)	108 (78.3)	86 (62.3)	52 (37.7)	49 (35.5)	86 (62.3)
Parents/guardians	74 (53.6)	63 (45.7)	56 (40.6)	45 (32.6)	29 (21)	27 (19.6)	53 (38.4)
Healthcare providers	94 (68.1)	77 (55.8)	43 (31.2)	55 (39.9)	67 (48.6)	59 (42.8)	68 (49.3)
Peers/friends	114 (82.6)	96 (69.6)	48 (34.8)	78 (56.5)	61 (44.2)	47 (34.1)	76 (55.1)
Campus programs	46 (33.3)	38 (27.5)	22 (15.9)	35 (25.4)	33 (23.9)	32 (23.2)	33 (23.9)
The internet	126 (91.3)	115 (83.3)	75 (54.3)	97 (70.3)	98 (71)	96 (69.6)	97 (70.3)

## CHAPTER 5

### DISCUSSION

This was one of few Canadian studies to explore undergraduate students' sources of STI prevention education, the influence of the educational sources on current sexual practices, STI knowledge levels, and if these factors were related to intentions to practice safer sex. Canadian post-secondary students who partake in unsafe sexual activity are known to be at risk for acquiring STIs (Baja et al., 2017; Falasinnu et al., 2015; Haghiri et al., 2018; PHAC, 2015, 2019; WECHU, 2016). Intention to use barriers has been linked to using protection during sexual activities, which can prevent the spread of STIs (Morales et al., 2018; Nydegger et al., 2017; Nydegger & Walsh, 2018; UNESCO, 2018).

#### *Sample Characteristics*

The present research had some variability within the sample characteristics that may affect the generalizability of the findings. As data was lacking on the intersection of demographics, STI prevention education, and STI knowledge in the undergraduate population in general, the present study did not employ purposeful sampling techniques. Although, survey invitations were sent to a random sample of undergraduate students, the low response rate did not yield a truly representative group of the undergraduate population at the UWindsor. Consequently, the final sample contained very few students from out of province compared to the actual undergraduate population. Therefore, an understanding of the STI knowledge of students from other provinces and countries was unobtainable. The final sample had a higher proportion of female participants than male, similar to past research conducted with undergraduate students at the UWindsor (Skakoon-Sparling, 2016; Sparling, 2015), which may also contribute to decreased

generalizability of the present findings. Interestingly, gender was not found to be a significant factor for knowledge or intentions to practice safer sex, whereas other research found that females tended to have higher levels of sexual health knowledge (Cragg et al., 2016; Kumar et al., 2013).

The current study found that two-thirds of participants reported engaging in sexual activity in the prior year, similar to findings by Haghiri et al. (2018) and Skakoon-Sparling (2016). However, only 41% of sexually active participants reported using a barrier during their last sexual encounter although 50% intended to use a barrier during their next sexual encounter. Reported barrier use and intentions to use barriers in the current study were lower than other research findings, however other research had different exclusion criteria (Fullerton et al., 2013; Milhausen et al., 2013; Sparling, 2015). Prior research found that barrier use decreased when undergraduates reported being in committed relationships (Milhausen et al., 2013), whereas in the present study, no significant differences in barrier use was found between groups who did and did not identify as being in a committed relationship. However, examination of relationships status in this study was limited in scope and further statistical testing may have uncovered other findings. For instance, Milhausen et al. (2013) found that university students in longer relationships were less likely to use barriers, whereas that factor was not examined in the present study. Another factor that may have inadvertently impacted the findings was that participants and researchers may define relationships in different ways, effecting the self-reporting of relationship status.

### ***STI Knowledge***

The average STI knowledge score was less than 50% which is consistent with findings from Jaworsky and Carey (2007) and Canadian research demonstrating low and variable levels of STI knowledge among post-secondary students (Cragg et al., 2016; Foster & Byers, 2008; Fullerton et al., 2013; Milhausen et al., 2013). These findings demonstrated that STI knowledge levels among undergraduate students remained low. Two moderate predictors of STI knowledge were discovered, age and year of study. Interestingly, second year participants had the lowest scores for STI knowledge and third year participants had the highest STI knowledge scores. Although, first and fourth year participants did not have significantly different knowledge levels from the other years, participants in higher years had higher knowledge overall than participants in earlier years of study. In their research, Franklin and Dotger (2011) similarly found that senior students had higher levels of sexual health knowledge than freshman students did. These findings suggest that knowledge about STIs can be acquired over time, but also highlights that younger students have lower levels of STI knowledge.

STI knowledge was not associated with implementations intentions or intentions to use a barrier. These findings suggest that STI knowledge, on its own, may not be an important factor in barrier use intentions and practices. Fullerton et al. (2013) found that STI and condom knowledge did not necessarily predict behavior directly and was a weak predictor of behavioral skills, which they defined as the abilities and self-efficacy to implement sexual health tasks. Conversely, other Canadian research showed that higher STI knowledge did lead to an increase in STI prevention behaviors (Cragg et al., 2016;

Milhausen et al., 2013). Unfortunately, both of these studies measured knowledge and STI prevention outcomes differently, therefore a direct comparison could not be made.

It remains inconclusive if STI knowledge levels lead to safer sex intentions, however, it can be concluded that overall STI knowledge in this undergraduate population was low. It may also be concluded that current sexual health education programs are not having the desired effect. However, specific STI knowledge deficits were not explored in this study, as well knowledge about specific preventive information may be more beneficial than a general knowledge about STIs. Future research could look at different components of STI knowledge and relationships to safer sex intentions.

### ***STI Prevention Education***

The vast majority of participants used the internet to access information on STI prevention and deemed the internet as an influential source effecting their current sexual prevention practices. The majority also stated that they accessed the internet for a variety of topics on sexual health (e.g. safer sex, abstinence, communication with partners, STI testing/treatment). Charest et al. (2013) similarly found that the majority of youths used the internet to access sexual health education, especially populations identifying as LGBTQ2+. They suggested that the internet was used when youths felt that they did not receive relevant information from traditional sources. While the internet contains many good sources of information, it may also be a source of uninformed or misguided information and have unadulterated images, like barriers not being used in pornography, which may dissuade youths from practicing safer sex behaviors (Byers et al., 2017 Government of Ontario, 2015; Ministry of Education, 2019; UNESCO, 2018). Despite the high usage of internet to access information, the overall STI knowledge and barrier

use intentions of this group were low. This brings into question the quality of actual websites accessed and whether students know how or where to look for required information online. The present study supports that young adults require information on how to access and use reputable websites.

Teachers in this study were identified as the second most frequent source of STI prevention education with 80% of participants reported receiving education from a teacher that influenced their current safer sex practices. This finding was similar to other research that indicated most undergraduate students received sexual health education in school, but not all students perceived the education as being of high quality or adequate (Byers et al, 2017). A potential reason that sexual health education in school settings was less impactful for some students, in this study, could be that often teachers are not adequately equipped to provide effective sexual health education, especially for some populations, such as the LGBTQ2+ community (Cohen et al., 2012; Ivanis et al., 2018; UNESCO, 2018). Unfortunately, the number of participants who identified as LGBTQ2+ in the present study were too small to draw the same conclusion.

Lastly, 83% of participants reported that they received education from their peers and 70% stated that this education influenced their current safer sex practices. Participants who perceived that peers influenced their current safer sex practices reported higher intentions to use barriers in risky sexual situations and were more likely to have an implementation plan for barrier use. These findings are congruent with research by Byers et al. (2017), Charest et al. (2013), and Fullerton et al. (2013) which found that peers are an important source of sexual health education among Canadian undergraduate students. Peer influence, such as perceived attitudes and behaviors of friends and sexual partners,

can empower students or deter them from engaging in safer sex practices (Brandhorst, Ferguson, Brandon, Seby & Weeks, 2012; Charest et al., 2013; Cragg et al., 2016; Fullerton et al., 2013; UNESCO, 2018; van de Bongardt, Reitz, Sandfort & Dekovic, 2015; Zelin, Erchull, & Houston, 2015). van de Bongardt et al. (2015) found that sexual activity of adolescents is strongly related to peer approval, peer pressure, and the perceived sexual activity of close friends, as well, sexually risky behaviors were related to the perceived behaviors of peers, especially for females. Brandhorst et al. (2012) also found that the perceived sexual activity levels of peers resulted in increased sexual activity and unprotected sex for American college students. Whereas most of the research demonstrated that peer influences could lead to negative outcomes, the present study found that peer influence could lead to higher motivation and skills to use barriers. This suggests that young adults may benefit from more programs built around relationships, peer support, and mentoring models for issues related to sexual health.

Although undergraduate students reported receiving STI prevention education from at least a few sources, many reported not receiving education from parents and healthcare providers. This is concerning as these should be trusted sources where young adults can get reliable information. Many students also reported that past education received from different sources was limited in the topics covered and/or did not influence their current safer sex practices. Lastly, the education received does not appear to be having the desired effect, as demonstrated by the low level of STI knowledge and moderate barrier use intentions in this study. Which is consistent with other research that showed that although young adults may be exposed to sexual health education from a number of sources, the information received may vary in quality, comprehensiveness, and



influence (Byers et al., 2017; Charest et al., 2016; Kumar et al., 2013; PHAC, 2012; Phillips & Martinez, 2010; Planned Parenthood Toronto, 2009; UNESCO, 2018). It can be concluded that a better understanding on how to make sexual health education programs more effective is required.

### ***Implications for Nursing Practice***

Public health nurses and departments have been mandated to create supportive environments to promote healthy sexual practices for populations at risk for acquiring STIs (Ivanis et al., 2018; MOHLTC, 2018; WECHU Sexual Health Team, personal communication, February 6, 2018). One such environment should be an expansion on the internet (Charest et al, 2016). The high usage of the internet by students to seek information on safer sex practices in the current study supports that this source of education has the potential to be a more effective and efficient way to disperse factual information to youth. Therefore, public health websites should be prominent, updated, and contain relevant information required by youth to promote healthy sexual practices. In addition, health promotion campaigns to educate and inform youth could be distributed through social media ads, as this type of intervention is beginning to show positive results (Gabarron & Wynn, 2016).

Providing supportive environments also includes providing supports to youth through schools and teachers (Ivanis et al., 2018; MOHLTC, 2018; UNESCO, 2018; WECHU Sexual Health Team, personal communication, February 6, 2018). The literature and present research support that teachers are often moderately effective when it comes to providing safer sex education and teachers are one of the main sources of this type of education (Borawski, et al., 2015; Cohen et al., 2012; Denford et al., 2017; Ivanis

et al., 2018; UNESCO, 2018). Programs to further assist teachers in providing more effective safer sex education could be beneficial (Denford et al., 2017; Ivanis et al., 2018; UNESCO). Nurses could also provide safer sex education and support directly to students through school-based health clinics, as the current research indicated a low uptake of sexual health education from healthcare providers. Past evidence has demonstrated that school -based clinics are a valuable resource for youth (Denford et al., 2017; Ivanis et al., 2018; UNESCO). Therefore, comprehensive programs that provide adolescents and young adults with a variety of health skills, increase their knowledge, and influence their motivation to practice safer sex are needed (Denford et al., 2017; Flores & Barroso, 2017; Gaven et al., 2015; Morales et al., 2018; UNESCO, 2018).

Primary care nurses and nurse practitioners may also be able to influence youth to use barriers by discussing the importance of barrier use, how to access barriers, and how to use them effectively. Youths have reported a preference for receiving sexual health education from their healthcare providers (Charest et al., 2016; Planned Parenthood Toronto, 2009), however youth who are healthy have limited opportunities to encounter healthcare providers (Charest et al., 2016). Primary care providers should strive to incorporate sexual health assessments and education into every standard routine visit for all populations, but especially youth (PHAC, 2019). In addition, nurses could expand their practice to include sexual health promotion outreach to youth populations.

### ***Implications for Further Research***

This study identified many implications for further research. The current research described the undergraduate student population as a whole. Future research could look at more specific, higher-risk sub-groups within the undergraduate student population, such

as men who have sex with men or lower income students, to explore unknown contributors of STI risk. Furthermore, populations that were underrepresented in the present study, such as international students, should be examined to understand their sexual health risk and needs. Further research should employ purposeful sampling methods targeting populations that are typically underrepresented in undergraduate samples, such as men or international students (Grove et al., 2013). Qualitative research within these populations may also reveal richer data and a better understanding of STI risk.

Further research would benefit from larger sample sizes. Offering an incentive to every participant may have increase recruitment for this study (C. Senn, personal communication, May 12, 2020; Grove et al., 2013). Keeping the survey open for a longer period may have also been beneficial (L. Freeman, personal communication, May 14, 2020). The *Total Design Method* by Dillman guarantees a high response rate and should be utilized in future research design (Hoddinott & Bass, 1986).

Education sources can also be further examined to determine what educational factors lead to successful sexual health outcomes. More research on how youth use the internet is required, along with an examination about how to better prepare and support peers, parents, teachers, and healthcare providers in the provision of sexual health education. In addition, the sexual health education curriculum in Ontario was recently updated (Government of Ontario, 2015; Ministry of Education, 2019), therefore further research should explore if the updated curriculum leads to improved sexual health knowledge levels and STI prevention outcomes in future undergraduate cohorts.

Further research to examine other subcomponents of the IMB or STIEO models to gain a richer understanding of the relationships between the identified variables is required. The instruments used in the current study could also benefit from further study and/or modification as well. Alternatively, other learning and behavior models are worth examining as they may explore moderating effects of variables that were unexplored in this study and contribute to the understanding of sexual and other health behaviors. STI prevention is a complex, multifactorial health issue with many potential research opportunities to further the knowledge in this field.

### ***Implications for Policy***

Public health departments and governments have the mandate to provide education, promote health, and protect populations at-risk for STIs (Ivanis et al., 2018; MOHLTC, 2018; WECHU Sexual Health Team, personal communication, February 6, 2018). Collaboration between stakeholders at different policy levels and from diverse disciplines will ensure that appropriate programs are in place to meet the needs of individuals at high risk for acquiring STIs (Denford et al., 2017; Planned Parenthood Toronto, 2009; UNESCO, 2018). The present findings suggest that populations at risk, including undergraduate students, require higher quality education from multiple trained sources that are impactful on future STI prevention strategies (Denford et al, 2017; Gavin, Williams, Rivera & Lachance, 2015; Morales, et al. 2018; Planned Parenthood Toronto, 2009; UNESCO, 2018). The present research and the literature also support that policies for dispersing information through the internet and social media, along with supporting youth in accessing high quality information from the internet, are required (Denford et al, 2017; Gabarron & Wynn, 2016; Planned Parenthood Toronto, 2009;

UNESCO, 2018). All educational, community, and government institutions working with adolescents and young adults should be encouraged to further develop or revise current policies and use evidence-based practices to support and promote healthy sexual practices (Denford et al, 2017; Planned Parenthood Toronto, 2009; UNESCO, 2018).

### *Limitations*

This exploratory study had limitations. Consequently, the results may be less generalizable to other populations. One issue was the sample size, although adequate for some aspects of the study, was reduced for the portion of the survey that explored intentions to practice safer sex, as only sexually active students were asked those questions. As a result, the sample size did not generate enough power to conduct multivariate testing. Further, two-thirds of the sexually active students in the present study reported being in a committed relationship, which is a protective factor against STI acquisition (Bajaj et al., 2017), has been associated with reduced condom use (Milhausen et al., 2013, 2017), and may have also impacted the power of the findings. Because purposeful sampling methods and/or stratified sampling methods were not employed, the proportion of male and international students in the present sample were lower than the UWindsor population. As well, since the email invitation informed potential participants that the survey was about STIs and safer sex, it may have been perceived as a sensitive, personal subject, and thus dissuaded some students from participating due to self-selection bias (Grove et al., 2013). The survey also had multiple self-report components; therefore, the potential for social desirability bias must be considered as well (Grove et al., 2013). Due these factors, the findings of this research may not be truly representative

of any undergraduate population or generalizable to other populations and should be interpreted with caution.

One final limitation was that the measures chosen for the survey were inadequate in some ways. For example, the *STI Prevention Education Questionnaire* asked participants if the information received from each identified source influenced them to practice safer sex methods, however the term influence was not defined. Participants may have interpreted this question in different ways. As well, the measure representing the motivation component of the IMB model, *Intentions to Use Barriers* was found to have a lower than desired internal consistency and it was only associated with one other variable, therefore limiting its usability in this study. Further evaluation and potential work on survey development to research education, knowledge, motivation, and skills for using barriers in undergraduates may produce more robust results.

### ***Conclusion***

In summary, most undergraduate students received STI prevention education from multiple sources and the internet, teachers and peers were perceived to be influential sources more frequently than other sources noted. Many undergraduates in the study reported that STI prevention education sources did not influence their current safer sex practices and/or did not cover a wide range of topics. Peers were the only identified influential source that led to higher intentions and preparedness to use barriers in undergraduates. In addition, STI knowledge levels and barrier use among undergraduates were low in this study, suggesting that the STI prevention programs they were exposed to did not adequately provide them with the tools required to consistently protect themselves from acquiring STIs. These findings suggest that the effectiveness of sexual health

education programs is questionable, which may be contributing to sexually active undergraduate students being at a higher risk for acquiring STIs. However, barrier use, along with other safer sex practices, are complex behaviors with several contributing factors that were not explored in this study (Camilleri et al., 2015; J. D. Fisher & Fisher, 1992; Fullerton et al., 2013; Milhausen et al., 2013, 2017). Therefore, precise conclusions about STI risk in this undergraduate population cannot be made without further exploration. Improvement to programming that supports comprehensive sexual health education for young people is recommended to encourage increased barrier use in an attempt to curb rising global STI rates.

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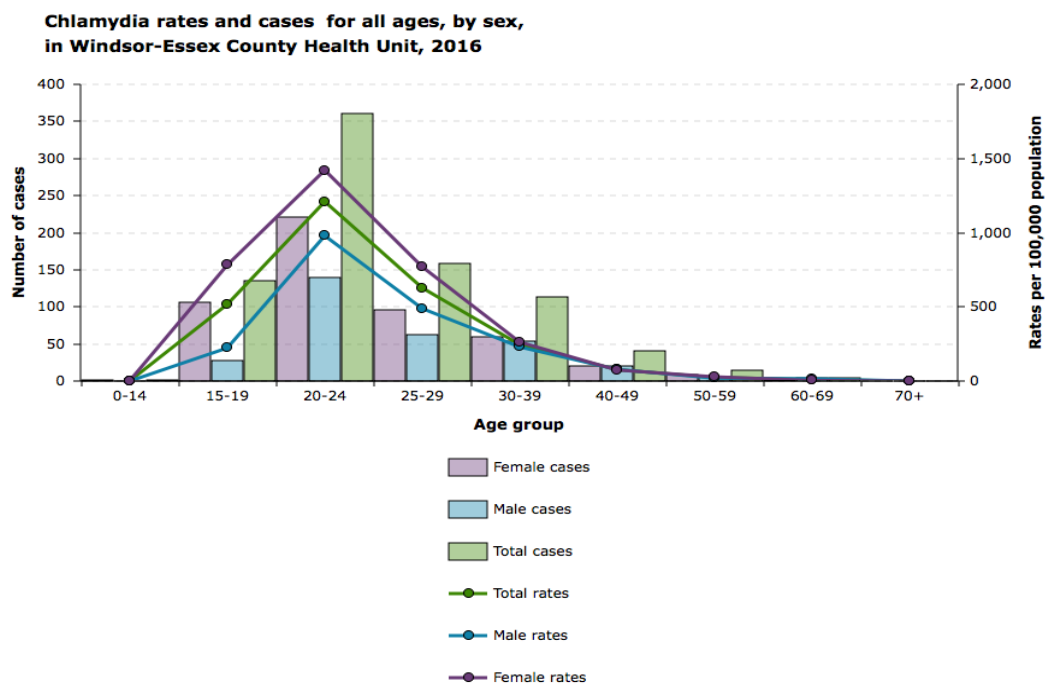


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## APPENDICES

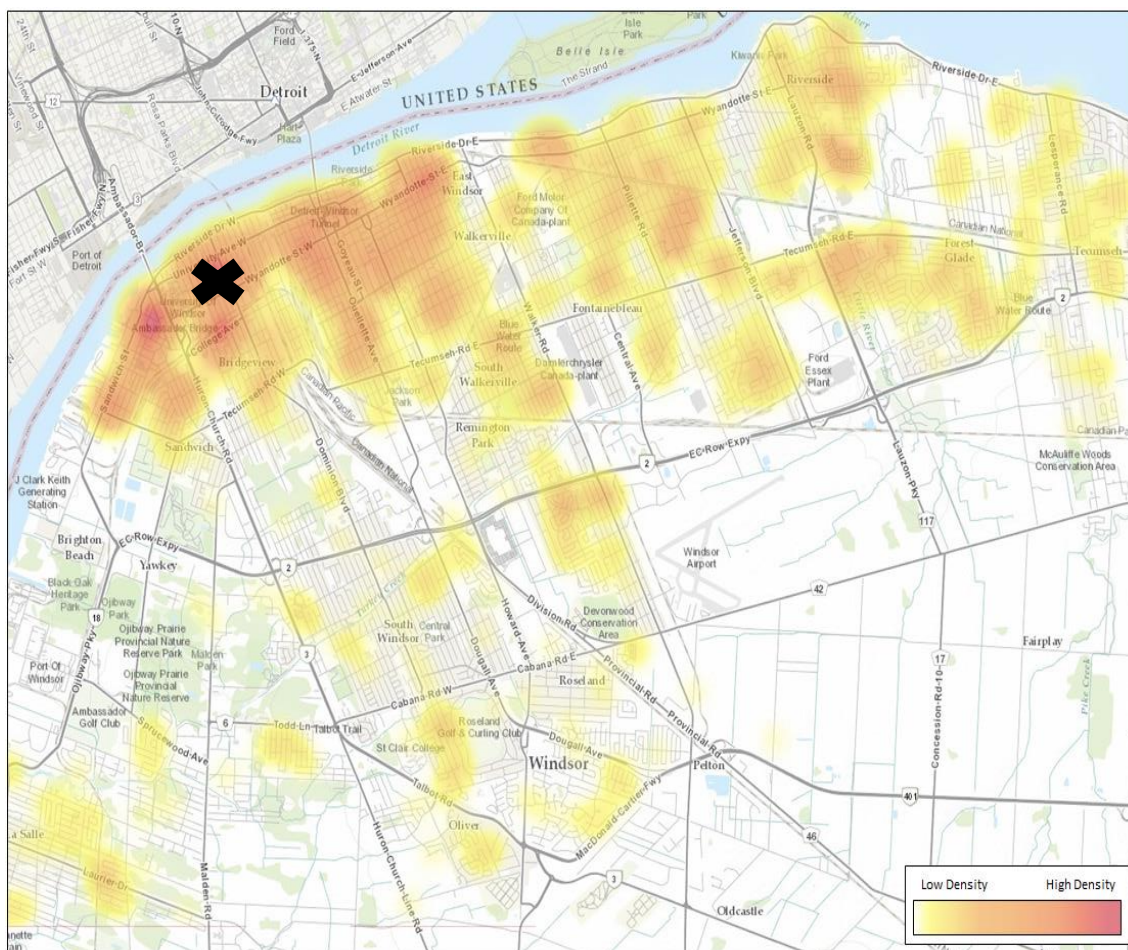
## Appendix A

*Prevalence of Chlamydia in Windsor-Essex County by Age*

*Figure A1. Prevalence of Chlamydia in Windsor-Essex County by Age in 2016 (OAHP, 2018).*

## Appendix B

### *Chlamydia Density Mapping for the City of Windsor*



*Figure B1. Chlamydia Density Mapping for the City of Windsor in 2014 (WECHU, 2016).*

✘ = University of Windsor

## Appendix C

### *Literature Search*

**Population/problem**-university or college or undergraduate students; international students; young adults; students

**Intervention/indicator**-sexually transmitted infections or diseases; sexual health education; STI prevention education; knowledge retention;

**Comparison**-IMB vs other models

**Outcome**-sexual health behavior; sexual behavior; STI prevention behavior; condom use; sexual health outcomes; STI risk; intention; intention to use barrier methods; implementation intentions; knowledge; information.

**Time**-1998-2019; 1992 for articles pertaining to IMB model

Table H1

### *Literature Search History*

Date	Search engine	Search terms	Inclusion criteria	Number of results
April 15, 2018	Ex Libris Primo	Sexually transmitted diseases or infections AND university or college students AND Canada	2010 to present, English articles in peer reviewed journals	715
April 28, 2018	CINAHL	sexually transmitted diseases or sexually transmitted infections AND university or college or undergraduate students AND Canada	English peer-reviewed research articles	10
		sexual health outcomes AND university or college or undergraduate students	English peer-reviewed research articles	15

Date	Search engine	Search terms	Inclusion criteria	Number of results
April 28, 2018	Ex Libris Primo	Sexually transmitted diseases or infections AND university or college students	last 20 years, reviews, English, peer reviewed journals	77
April 29, 2018	Ex Libris Primo	Condom use AND young adults	last 10 years, reviews, English, peer reviewed journals	176
	CINAHL	Condom use AND young adults or university students or college students or undergraduate students AND Canada	English, peer-reviewed research articles	15
May 5, 2018	<u>University of Windsor Thesis and Dissertation Collection</u>	Sexually transmitted diseases or infections AND university or college students	Since 2010	9
May 21, 2018	CINAHL	information motivation behavioral skills (IMB) model	English, peer-reviewed	62
	Ex Libris Primo	Information Motivation Behavioral Skills Model	1992-2018, English, peer-reviewed research articles, authors: Fisher, W.A; Fisher, William; Fisher, J.D.; Fisher, William A.; Fisher, Jeffrey; Fisher, Jeffrey D.	69
			2010-2018, English, systematic reviews	22

Date	Search engine	Search terms	Inclusion criteria	Number of results
May 21, 2018	Ex Libris Primo	Nursing IMB model	1992-2018, subject: nursing, peer-reviewed journals	25
October 6, 2018	Ex Libris Primo	STI prevention education AND STI behaviour AND university students AND Canada	2008-2018, articles in peer-reviewed journals, English. Exclusion: AIDS.	564
October 7, 2018	Ex Libris Primo	International students AND sexual health education AND STI risk	English, articles, in peer reviewed journals, 2008-2018	145
		Sexually transmitted infections or diseases AND knowledge retention AND sexual behavior AND students	English, articles, in peer reviewed journals, 2008-2018	417
		International students AND sexual health knowledge AND sexual health behavior or behavior AND STI risk	English reviews	35
November 11, 2018	Ex Libris Primo	Intention measure AND condom use AND IMB model	Peer-reviewed, journals, English articles	135
April 15, 2019	Ex Libris Primo	sexually transmitted infections) OR (sexually transmitted diseases) AND prevention education evaluation AND university students AND Canada	Peer-reviewed, journals, English articles, last 20 years. Exclusion: Index Medicus, medicine	729
April 19, 2019	Ex Libris Primo	(sexually transmitted infections) OR (sexually transmitted diseases) AND knowledge OR information	Peer-reviewed, journals, English articles, last 10 years. Exclusion: Index Medicus,	1006

Date	Search engine	Search terms	Inclusion criteria	Number of results
April 19, 2019	Ex Libris Primo	AND university students AND Canada	medicine, sexuality	304`
		(sexually transmitted infections) OR (sexually transmitted diseases) AND intention to use condoms AND university students AND Canada	Peer-reviewed, journals, English articles, last 20 years.	
		(sexually transmitted infections) OR (sexually transmitted diseases) AND implementation intentions AND university students AND Canada	Peer-reviewed, journals, English articles, last 20 years.	
April 20, 2019	Ex Libris Primo	Sexually transmitted infections or diseases AND education AND knowledge OR information AND university students	Peer-reviewed, journals, English articles, last 10 years. Exclusion: Index Medicus, medicine, sexuality	1619
		Sexually transmitted infections or diseases AND knowledge OR information AND intentions AND university students	Peer-reviewed, journals, English articles, last 20 years. Exclusion: Index Medicus, medicine, sexuality	466

## Appendix D

### **Survey: A Study on STI Prevention Knowledge and Intention to Engage in Safer Sex Practices**

---

Start of Block: Introduction

Q1 Welcome to the survey "A Study on STI Prevention Knowledge and Intention to Engage in Safer Sex Practices." Please carefully read the [Letter of Information for Consent to Participate in Research](#) that can be downloaded and printed from this link.

---

Q2 **CONSENT OF RESEARCH PARTICIPANT** By consenting, you are indicating that you have read the Letter of Information for Consent to Participate in Research and understand the information provided for the study "A Study on STI Prevention Knowledge and Intention to Engage in Safer Sex Practices" as described herein. Any questions you have, has been answered to your satisfaction, and you agree to participate in this study. By choosing Yes, you are providing consent to proceed with this survey. If you do not wish to participate, please close your browser. You may close your browser at any time to leave the survey. Do you consent to participate in this study?

Yes

---

Page Break

---

End of Block: Introduction

---

Start of Block: STI Prevention Knowledge Acquisition

**Q3 Please read the following definitions to become familiar with the terms used in this survey.**

**Sexual intercourse**, for the purpose of this study, is contact or penetration with one's mouth or genitals with another person's oral, vaginal or anal cavities, and not including kissing.

**Sexually transmitted infections or diseases (STIs/STDs)** are infections that are passed through sexual intercourse. Common STIs include Chlamydia, Gonorrhea, Human



Papilloma Virus (HPV), Herpes, Syphilis, Hepatitis B and Human Immunodeficiency Virus (HIV).

**Barrier methods**, for the purpose of this study, are devices that prevent one's contact with the body fluids of a sexual partner and may include male condoms, female condoms and/or dental or rubber dams (for oral sex).

---

Page Break

Q4 The following questions ask you about any past education (“sex-ed.”) regarding sexually transmitted infections (STIs).

Have you received information regarding sexually transmitted infections (STIs) from any of the following sources?

	Yes	No/I don't remember
Teachers in elementary and/or high school	<input type="radio"/>	<input type="radio"/>
Your parents/guardians	<input type="radio"/>	<input type="radio"/>
Healthcare providers, such as your family doctor, nurse practitioner, or public health nurses at school, clinics or health fairs	<input type="radio"/>	<input type="radio"/>
Your friends or peers	<input type="radio"/>	<input type="radio"/>
Programs at the University of Windsor	<input type="radio"/>	<input type="radio"/>
The Internet	<input type="radio"/>	<input type="radio"/>

End of Block: STI Prevention Knowledge Acquisition

Start of Block: Education from Teachers

*Display This Question:*

*If The following questions ask you about any past education ("sex-ed.") regarding sexually transmitt...  
= Teachers in elementary and/or high school [ Yes ]*

**Q5** While in elementary and/or high school, did you receive information about any of the following topics from your teachers?

	Yes	No/I don't remember
Safe sex including the use of barrier methods	<input type="radio"/>	<input type="radio"/>
Abstinence/avoiding sex	<input type="radio"/>	<input type="radio"/>
Talking to a potential partner about safe sex	<input type="radio"/>	<input type="radio"/>
How to be tested for STIs	<input type="radio"/>	<input type="radio"/>
How to be treated for STIs	<input type="radio"/>	<input type="radio"/>

*Display This Question:*

*If The following questions ask you about any past education ("sex-ed.") regarding sexually transmitt...  
= Teachers in elementary and/or high school [ Yes ]*

**Q6** In your opinion, has the information you received from your teachers, influenced you to practice safer sex methods?

Yes

No

**End of Block: Education from Teachers**

**Start of Block: Education from Parents**

*Display This Question:*

*If The following questions ask you about any past education ("sex-ed.") regarding sexually transmitt...  
= Your parents/guardians [ Yes ]*

Q7 Did you receive information about any of the following topics from your parents/guardians?

	Yes	No/I don't remember
Safe sex including the use of barrier methods	<input type="radio"/>	<input type="radio"/>
Abstinence/avoiding sex	<input type="radio"/>	<input type="radio"/>
Talking to a potential partner about safe sex	<input type="radio"/>	<input type="radio"/>
How to be tested for STIs	<input type="radio"/>	<input type="radio"/>
How to be treated for STIs	<input type="radio"/>	<input type="radio"/>

*Display This Question:*

*If The following questions ask you about any past education ("sex-ed.") regarding sexually transmitt...  
= Your parents/guardians [ Yes ]*

Q8 In your opinion, has the information you received from your parents/guardians, influenced you to practice safer sex methods?

- Yes
- No

End of Block: Education from Parents

Start of Block: Education from Healthcare Providers

Display This Question:

If The following questions ask you about any past education ("sex-ed.") regarding sexually transmitt...  
= Health care providers, such as your family doctor, nurse practitioner, or public health nurses at school, clinics or health fairs [ Yes ]

Q9 Did you receive information about any of the following topics from healthcare providers, such as your family doctor, nurse practitioner, or public health nurses at school, clinics or health fairs?

Display This Question:

If The following questions ask you about any past education ("sex-ed.") regarding sexually transmitt...  
= Health care providers, such as your family doctor, nurse practitioner, or public health nurses at school, clinics or health fairs [ Yes ]

	Yes	No/I don't remember
Safe sex including the use of barrier methods	<input type="radio"/>	<input type="radio"/>
Abstinence/avoiding sex	<input type="radio"/>	<input type="radio"/>
Talking to a potential partner about safe sex	<input type="radio"/>	<input type="radio"/>
How to be tested for STIs	<input type="radio"/>	<input type="radio"/>
How to be treated for STIs	<input type="radio"/>	<input type="radio"/>

Q10 In your opinion, has the information you received from healthcare providers, such as your family doctor, nurse practitioner, or public health nurses at school, clinics or health fairs, influenced you to practice safer sex methods?

Yes

No

End of Block: Education from Health Care Providers

Start of Block: Education from your Friends or Peers

*Display This Question:*

*If The following questions ask you about any past education ("sex-ed.") regarding sexually transmitt...  
= Your friends or peers [ Yes ]*

Q11 Did you receive information about any of the following topics from your friends or peers?

*Display This Question:*

	Yes	No/I don't remember
Safe sex including the use of barrier methods	<input type="radio"/>	<input type="radio"/>
Abstinence/avoiding sex	<input type="radio"/>	<input type="radio"/>
Talking to a potential partner about safe sex	<input type="radio"/>	<input type="radio"/>
How to be tested for STIs	<input type="radio"/>	<input type="radio"/>
How to be treated for STIs	<input type="radio"/>	<input type="radio"/>

*If The following questions ask you about any past education ("sex-ed.") regarding sexually transmitt...  
= Your friends or peers [ Yes ]*

Q12 In your opinion, has the information you received from your friends or peers, influenced you to practice safer sex methods?

- Yes
- No

End of Block: Education from your Friends or Peers

Start of Block: Education from programs at the University of Windsor

*Display This Question:*

*If The following questions ask you about any past education ("sex-ed.") regarding sexually transmitt...  
= Programs at the University of Windsor [ Yes ]*

Q13 Did you receive information about any of the following topics from programs at the University of Windsor?

*Display This Question:*

	Yes	No/I don't remember
Safe sex including the use of barrier methods	<input type="radio"/>	<input type="radio"/>
Abstinence/avoiding sex	<input type="radio"/>	<input type="radio"/>
Talking to a potential partner about safe sex	<input type="radio"/>	<input type="radio"/>
How to be tested for STIs	<input type="radio"/>	<input type="radio"/>
How to be treated for STIs	<input type="radio"/>	<input type="radio"/>

*If The following questions ask you about any past education ("sex-ed.") regarding sexually transmitt...  
= Programs at the University of Windsor [ Yes ]*

Q14 In your opinion, has the information you received from programs at the University of Windsor, influenced you to practice safer sex methods?

Yes

No

End of Block: Education from programs at the University of Windsor

Start of Block: Education from the Internet

Display This Question:

If The following questions ask you about any past education ("sex-ed.") regarding sexually transmitt...  
= The Internet [ Yes ]

Q15 Did you receive information about any of the following topics from the Internet?

Display This Question:

If The following questions ask you about any past education ("sex-ed.") regarding sexually transmitt...  
= The Internet [ Yes ]

	Yes	No/I don't remember
Safe sex including the use of barrier methods	<input type="radio"/>	<input type="radio"/>
Abstinence/avoiding sex	<input type="radio"/>	<input type="radio"/>
Talking to a potential partner about safe sex	<input type="radio"/>	<input type="radio"/>
How to be tested for STIs	<input type="radio"/>	<input type="radio"/>
How to be treated for STIs	<input type="radio"/>	<input type="radio"/>

Q16 In your opinion, has the information you received from the internet, influenced you to practice safer sex methods?

Yes

No

End of Block: Education from the Internet

Start of Block: STD Knowledge Questionnaire

Q17 The following questions are going to ask you about sexually transmitted infections.

Instructions: For each statement below, choose True, False, or I don't know. If you do not know, do not guess; instead, choose I don't know.

	True	False	I don't know
Genital Herpes is caused by the same virus as HIV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Frequent urinary infections can cause Chlamydia.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is a cure for Gonorrhoea.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is easier to get HIV if a person has another STI.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Human Papillomavirus (HPV) is caused by the same virus that causes HIV.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Having anal sex increases a person's risk of getting Hepatitis B.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Soon after infection with HIV a person develops open sores on his or her genitals (penis or vagina).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is a cure for Chlamydia.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A woman who has Genital Herpes can pass the infection to her baby during childbirth.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A woman can look at her body and tell if she has Gonorrhoea.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The same virus causes all of the STIs.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Human Papillomavirus (HPV) can cause Genital Warts.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using a natural skin (lambskin) condom can protect a person from getting HIV.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Human Papillomavirus (HPV) can lead to cancer in women.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A man must have vaginal sex to get Genital Warts.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



STIs can lead to health problems that are usually more serious for men than women.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A woman can tell that she has Chlamydia if she has bad smelling odor from her vagina.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If a person tests positive for HIV the test can tell how sick the person will become.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is a vaccine available to prevent a person from getting Gonorrhea.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A woman can tell by the way her body feels if she has a STI.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A person who has Genital Herpes must have open sores to give the infection to his or her sexual partner.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is a vaccine that prevents a person from getting Chlamydia.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A man can tell by the way his body feels if he has Hepatitis B.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If a person had Gonorrhea in the past, he or she is immune (protected) from getting it again.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Human Papillomavirus (HPV) can cause HIV.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A man can protect himself from getting Genital Warts by washing his genitals after sex.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is a vaccine that protects a person from getting Hepatitis B.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

End of Block: STD Knowledge Questionnaire

---

Start of Block: Safer Sex Practices

Q18

The following questions are going to ask you about your intentions to practice safer sex.

Have you had sexual intercourse in the past year (including oral, vaginal and/or anal sex)?

- Yes
- No
- I prefer not to answer

*Skip To: Q23 If The following questions are going to ask you about your intentions to practice safer sex. Have y... = No*

*Skip To: End of Block If The following questions are going to ask you about your intentions to practice safer sex. Have y... = I prefer not to answer*

*Display This Question:*

*If The following questions are going to ask you about your intentions to practice safer sex. Have y... = Yes*

## Q19

Please indicate how much you agree with the following statements:  
I have made detailed plans...

	Strongly agree	Agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
...about when I will carry a barrier method.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...about when I will use a barrier method for vaginal, anal or oral sex.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...on where I will keep barrier methods readily available.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...on what I will say to a partner about using barrier methods before having sex.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...about what I will say if my partner refuses to use a barrier method.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...about the actions I will take if my partner refuses to use a barrier method.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...about how I will initiate use of a barrier method or offer one to my partner before sex.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...about when I will initiate use of a barrier method or offer one to my partner.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*Display This Question:*

*If The following questions are going to ask you about your intentions to practice safer sex. Have y... = Yes*

Q20 I intend on using a barrier method...

	Definitely yes	Probably yes	Probably not	Definitely not
...whenever I have sex (oral, vaginal or anal) with a casual partner.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...if I have sex with someone I just met.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...if I have sex with a partner whose STI status I do not know.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*Display This Question:*

*If The following questions are going to ask you about your intentions to practice safer sex. Have y... = Yes*

Q21 Did you use a barrier method the last time you had sexual intercourse (oral, vaginal or anal)?

Yes

No

Display This Question:

If The following questions are going to ask you about your intentions to practice safer sex. Have y... =  
Yes

Q22 Do you intend to use a barrier method the next time you have sexual intercourse (oral, vaginal and/or anal)?

Yes

No

Display This Question:

If The following questions are going to ask you about your intentions to practice safer sex. Have y... =  
No

Q23 Please indicate the reason you have not partaken in sexual intercourse in the past year.

The opportunity to have sex has not arisen.

I choose not to have sexual intercourse.

I prefer not to answer.

Other reason, please specify:

\_\_\_\_\_

End of Block: Safer Sex Practices

Start of Block: Demographic Information



Q24

The following questions ask for general information about you:

What is your age?

\_\_\_\_\_

Q25 What year of school are you in?

- First year
- Second year
- Third year
- Fourth year
- Fifth or more year undergraduate
- 

Q26 What is your program of study?

---

---

Q27 What type of high school did you attend?

- Public school
- Religion-based school (Catholic/separate or other religion)
- Home school
- Non-religious private school
- Other, please indicate:
-

Q28 Where did you attend high school?

- Windsor-Essex County
- Outside Windsor-Essex County but within Ontario
- Outside Ontario but within Canada
- Outside of Canada

---

Page Break

Q29 Describe your race or ethnicity.

---

Q30 Which gender do you identify as?

---

Q31 What is your sexual orientation?

---

Q32 What is your current relationship status? Choose all that apply:

- Not dating anyone
- Casual dating
- Committed relationship, not living together
- Committed relationship, living together
- Separated or divorced
- Widowed
- Other, please specify \_\_\_\_\_

End of Block: Demographic Information

---

Start of Block: End of Survey

Q33 You have reached the end of the survey.

Would you like to submit your information?

If you choose Yes, your information will be submitted, and you will be eligible to enter the draw for a Subway gift card. If you do not want to submit your information, please close your browser.

- Yes, please submit my information.

End of Block: End of Survey

---



## Appendix E

### *Email Invitations*

#### *First Email Invitation*

**Subject:** Invitation to Participate in a Survey

**Attachment:** Letter of Information for Consent to Participate in Research

As an undergraduate student at the University of Windsor, you are invited to participate in a research study conducted by XXX, M.Sc.N. student. Results from this study will be used to fulfil the requirements of a Masters' in Nursing Science thesis.

The study's main aim is to examine the relationship between sexually transmitted infections (STI), level of prevention knowledge, and intention to engage in safer sex practices.

Participation in this online survey will take approximately 15 minutes.

If you choose to participate, you can enter into a draw for one of twenty-five \$20 Subway gift cards.

**If you are interested please click on this link to participate in this study:**

[https://uwindsor.ca1.qualtrics.com/jfe/form/SV\\_3getmcUZyt7gLhb](https://uwindsor.ca1.qualtrics.com/jfe/form/SV_3getmcUZyt7gLhb)

If you have any questions or concerns about the research, please feel to contact XXX at [XXX@uwindsor.ca](mailto:XXX@uwindsor.ca) or Dr. XXX at [XXX@uwindsor.ca](mailto:XXX@uwindsor.ca).

This study has been cleared by the University of Windsor Research Ethics Board.

#### *Reminder Email Advertisement for Research Participation*

**Subject: Reminder-**Invitation to Participate in a Survey

**Attachment:** Letter of Information for Consent to Participate in Research

This is a reminder that, as an undergraduate student at the University of Windsor, you are invited to participate in a research study conducted by XXX, M.Sc.N. student. Results from this study will be used to fulfil the requirements of a Masters' in Nursing Science thesis.

The study's main aim is to examine the relationship between sexually transmitted infections (STI), level of prevention knowledge, and intention to engage in safer sex practices.

Participation in this online survey will take approximately 15 minutes.

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If you have any questions or concerns about the research, please feel to contact XXX at [XXX@uwindsor.ca](mailto:XXX@uwindsor.ca) or Dr. XXX at [XXX@uwindsor.ca](mailto:XXX@uwindsor.ca).

This study has been cleared by the University of Windsor Research Ethics Board.

***Final Reminder Email Advertisement for Research Participation***

**Subject: Final Reminder-Invitation to Participate in a Survey**

**Attachment:** Letter of Information for Consent to Participate in Research

This is a final reminder that, as an undergraduate student at the University of Windsor, you are invited to participate in a research study conducted by XXX, M.Sc.N. student. Results from this study will be used to fulfil the requirements of a Masters' in Nursing Science thesis.

The study's main aim is to examine the relationship between sexually transmitted infections (STI), level of prevention knowledge, and intention to engage in safer sex practices.

Participation in this online survey will take approximately 15 minutes.

If you choose to participate, you can enter into a draw for one of twenty-five \$20 Subway gift cards.

**If you are interested please click on this link to participate in this study:**

[https://uwindsor.ca1.qualtrics.com/jfe/form/SV\\_3getmcUZyt7gLhb](https://uwindsor.ca1.qualtrics.com/jfe/form/SV_3getmcUZyt7gLhb)

If you have any questions or concerns about the research, please feel to contact XXX at [XXX@uwindsor.ca](mailto:XXX@uwindsor.ca) or Dr. XXX at [XXX@uwindsor.ca](mailto:XXX@uwindsor.ca).

This study has been cleared by the University of Windsor Research Ethics Board.

## Appendix F

### *Letter of Information for Consent to Participate in Research*

**TITLE OF STUDY:** A Study on Sexually Transmitted Infection (STI) Prevention Knowledge and Intention to Engage in Safer Sex Practices.

You are asked to participate in a research study conducted by XXX, M.Sc.N. student, under the guidance of Dr. XXX, and Dr. XXX from the School of Nursing, and Dr. XXX from the Department of Psychology at the University of Windsor. This study has been cleared by the University of Windsor Research Ethics Board (REB). Results from this study will be used to partially meet the requirements of a Masters' thesis.

If you have any questions or concerns about the research, please feel to contact XXX at [XXX@uwindsor.ca](mailto:XXX@uwindsor.ca) or Dr. XXX at [XXX@uwindsor.ca](mailto:XXX@uwindsor.ca).

#### PURPOSE OF THE STUDY

The purpose of this survey to examine the relationship between sexually transmitted infections (STI), level of prevention knowledge, and intention to engage in safer sex practices.

#### PROCEDURES

If you volunteer to participate in this study, you will be asked to complete an online survey asking for demographic information, information on any education you received regarding STIs, your intentions to engage in safer sex practices and lastly a short quiz about STI knowledge. Completing the survey should take approximately 15 minutes.

#### POTENTIAL RISKS AND DISCOMFORTS

Some questions about sex or STIs may make you feel a little uncomfortable or embarrassed. You have the option of skipping any question that makes you feel uncomfortable. You can terminate the survey at any time by closing your browser. Any questions collected prior to exiting will be deleted automatically if you exit the survey prior to finishing. Links to community resources are provided below, and at the end of the survey, for your information.

#### POTENTIAL BENEFITS TO PARTICIPANTS AND/OR TO SOCIETY

Future students may benefit from what we find as it may change methods for STI education. You may also gain some insight into your own sexual practices and knowledge. Links to community resources are provided here, and at the end of the survey, if you are interested in obtaining sexual health services or information.

For more information or concerns about sexually transmitted infections, sexual health and sexual health services in Windsor Essex County, visit:

Windsor Essex County Public Health Unit [www.wechu.org](http://www.wechu.org)

University of Windsor Student Health Services <http://www.uwindsor.ca/studenthealthservices/>

Sexual Assault Crisis Centre <https://saccwindsor.net>

AIDs Committee of Windsor <https://www.aidswindsor.org>

Lesbian Gay Bi Trans Youth Line <http://www.youthline.ca>

#### COMPENSATION FOR PARTICIPATION

You may choose to provide your email address to be entered into a draw for one of twenty-five \$20 Subway gift cards.

## CONFIDENTIALITY

Any information that is obtained from this study will remain anonymous and confidential. If you choose to enter the draw for a Subway gift card, you will be directed to a separate landing page where you can enter your University of Windsor email address. Your email address will not be linked to your survey answers in any way. Once the incentive draw occurs, your email address will be deleted within ten days. Your personal information will only be handled by the principle investigator for draw purposes. Survey data will be stored on a secure server, password protected and will have no personal information attached to it once it is collected. Data will be kept until the study is complete then stored for potential future use on a secure server. If you choose to withdraw your survey, and you will be brought to the end of the survey and your data will be deleted by the primary investigator.

For additional privacy, complete the survey when you are alone. Instructions on how to clear your browser's cache is provided at the end of the survey.

## PARTICIPATION AND WITHDRAWAL

Your participation in this survey is completely voluntary. You must agree to the consent if you wish to enter the survey. If you accept, you will proceed through the survey and will have the option to skip questions that make you feel uncomfortable. If you do not accept, you will be brought to the end of the survey. You can leave the survey at any time by closing the internet browser. Once you submit the survey, your participation is final. Your data will be unable to be withdrawn because your answers are anonymous. If you decide to withdraw your survey, your data will be deleted by the primary investigator. If you choose to enter the draw, you will be brought to a separate landing site where your email address will be collected. As soon as the draw occurs, your email address will be deleted. There will be no links between your email address and the survey data.

## FEEDBACK OF THE RESULTS OF THIS STUDY TO THE PARTICIPANTS

A summary of the research findings will be available on the REB website <https://scholar.uwindsor.ca/research-result-summaries/> and the Leddy Library website <https://scholar.uwindsor.ca/etd/> by May 30, 2019.

## SUBSEQUENT USE OF DATA

This data may be used in subsequent studies, in publications and in presentations.

## RIGHTS OF RESEARCH PARTICIPANTS

If you have questions regarding your rights as a research participant, contact: Research Ethics Coordinator, University of Windsor, Windsor, Ontario, N9B 3P4; Telephone: 519-253-3000, ext. 3948; e-mail: [ethics@uwindsor.ca](mailto:ethics@uwindsor.ca)

## SIGNATURE OF INVESTIGATOR

These are the terms under which I will conduct research.

March 3, 2019

## VITA AUCTORIS

NAME: Mandy Elna Smith-Grant

PLACE OF BIRTH: North Bay, Ontario, Canada

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