

**YOUTH'S ACCEPTANCE OF MOBILE PHONE TEXT  
MESSAGING FOR STI HEALTH PROMOTION**

by

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## **Abstract**

**Objectives:** The objective of this study was to assess youths' readiness to receive sexually transmitted infection (STI) sexual health promotion Short Message Services (SMS) (or text messages) from a public health nurse. **Methods:** An anonymous survey was given to youth aged 16 to 25 in a metropolitan Canadian city in 2 different areas: (1) youth attending two drop-in public health run sexual health youth clinics; and (2) youth at a campus of a large urban university. **Results:** One hundred and sixty six (n= 166) youth responded to the survey, of which 98% owned a mobile phone and 73% preferred sending and receiving SMS on their phones compared to other modes of communication. The youth in this study still expressed a desire for face-to-face interaction with a nurse for notifications of STI results (56%) or for asking sexual health questions (55%). There was preference for SMS from a nurse for reminders to wear condoms (31%) or reminders to call the nurse/clinic (40%). The youth overall agreed that SMS would provide a continued link between the nurse and themselves (60%) and the ability to use SMS would make it more likely for them to contact the nurse for a question or concern (78%). **Conclusion:** Youth are using SMS on their mobile phones at very high rates. There is general acceptance for SMS sent from a public health nurse in the form of reminders for condom use and for contacting a nurse/clinic, however the youth also indicated preference for face-to-face communication for more personal communications such as notification of STI results.

## **Preface**

This research was approved by:

1. UBC Behavioural Research Ethics Board Certificate of Approval # H10-02329
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## Glossary

For the purpose of this study, the following definitions were used:

**Condoms:** All condom terms refer to male condoms.

**Effective text messages:** The characteristics of appropriate text messages were determined by critically examining the youth's reported knowledge, level of self-efficacy and suggestions for creating effective SMS.

**Nurse:** The term "nurse" was used in the survey rather than PHN for ease of readability and understanding for the youth.

**Nurse-Client relationship:** In this study, this relationship was considered a measure of how well the youth believed they would be able to work with the nurse toward a common health goal (Hatcher, 2010). The impact of text messaging on the nurse-client relationship was assessed through survey questions.

**Readiness:** As assessed in the survey, readiness was defined as youth's current utilization of mobile phones and SMS as well as their perceptions and attitudes regarding confidentiality when communicating via text messages with a nurse.

**Self- Efficacy:** Self-efficacy was defined as an individual's beliefs about their capabilities to produce an effect (Bandura, 1994). It was assessed on the survey in this study to determine youth's current levels of self-efficacy and to examine relationships between self-efficacy and actual behaviour.

**Sex:** Sex was defined as vaginal or anal intercourse only.



**STI Health Promotion:** STI health promotion was defined as attempts to educate and increase awareness of safer sex practices including condom and STI education as well as reminders about condom use, STI testing and information about clinic locations and hours of operation.

**Sexual Health Knowledge:** Within the survey, a short true/false quiz was included to determine the current level of knowledge the participants have. These questions were taken from previous studies that assessed STI knowledge (Jaworski & Carey, 2007; Jones & Haynes, 2006; Geaves, Lonsdale, Whinney, Hood, Mossop & Olowokure, 2009).

**Youth Clinics:** These youth clinics are located in metropolitan city of BC. They offer a free drop in service provided by health care professionals to provide sexual health support services. Physicians, nurse practitioners, public health nurses and youth counselors staff these clinics. The services offered include contraceptive management, STI testing and treatment, Pap testing and gynecological wellness, pregnancy testing and options counseling, mental health counseling, as well as other health care services.

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## **Dedication**

This research is dedicated to my mother, Dianne Symonds, who is always encouraging me to learn, challenge myself and push the boundaries of my abilities. Thank You.

## Chapter 1: Introduction

Rates of sexually transmitted infections (STIs) have been increasing worldwide (Low, 2008). Consistent with this trend, the number of Canadians infected with an STI every year is also rising (Public Health Agency of Canada, 2009). Infection with Chlamydia is especially prevalent in youth aged 15 – 24 (BCDCCD, 2012). The British Columbia Centre for Disease Control (BCCDC) reports that the incidence of Chlamydia has been rising steadily since 1999. There can be serious long-term health challenges resulting from STIs such as Chlamydia or Gonorrhea. Statistics demonstrating increases in these infections are a significant health concern for Canadians. For example, untreated Chlamydia or Gonorrhea in women, can lead to Pelvic Inflammatory Disease (PID) and potential infertility (*Society of Obstetricians and Gynecologists of Canada, SOGC, 2011*). In men, untreated Chlamydia or Gonorrhea can lead to inflammation and infection of the urethra and testicles (Public Health Agency of Canada, 2010). The inconsistent use of condoms among youth may be connected with the increasing rates of STIs in youth (Weller & Davis, 2002). Using condoms is one of the most effective methods to prevent STIs such as Chlamydia and Gonorrhea in sexually active youth (WHO, 2000). Promoting consistent condom use among youth may help to decrease the prevalence of these infections.

Condom use among youth is affected by a number of variables such as knowledge, self-efficacy, and attitudes (DiClemente et al., 2008). Over the past decades, health care providers have used various strategies to help youth overcome barriers to condom use. For example, in British Columbia (BC), public health nurses (PHNs) are pivotal providers of sexual health education for youth. They along with teachers, parent volunteers and outside organizations such

as Options for Sexual Health, perform the majority of the sexual health education (including condom use and STIs) delivered in schools and the community. Although these educators are theoretically teaching appropriate, relevant sexual health information using a variety of traditional educational methods, there can be inconsistencies in the program delivery. A comprehensive approach to sexual health education can be effective in delaying first intercourse and encouraging consistent condom use (SIECCAN, 2010). However, when sexual health education is limited by both content and availability to youth, it is less effective in meeting these objectives (SIECCAN).

The issues appear to be less about the sexual health education content, but by the availability of the education and the method and setting of the delivery. When sexual health education is provided consistently in all classrooms it may in fact be effective, however, the reality is that many youth will complete their schooling with little to no sexual health education and what education is provided is inconsistent at best. For those that do receive sexual health education in schools, it is also possible that the large non-intimate classroom setting leaves some youth feeling disengaged and disconnected. Youth may also feel embarrassed to ask questions or engage in discussion in a larger setting for fear of revealing private information to their peers or appearing inexperienced. Health care providers, specifically PHNs, need to consider additional and innovative ways of providing sexual health education that will capture the attention of youth and provide a safe environment in which to learn.

One innovative strategy that may be beneficial to responding to the issues of availability and personal effectiveness is the use of technology, in particular, Short Message Service (SMS), more commonly known as text messaging. Many youth are already expert users of mobile phones (Rideout, Foehr & Roberts, 2010) and therefore SMS-based education has the possibility

of being easily integrated into health promotion strategies. In fact, the use of this type of technology is already an emerging field for sexual health education (Levine, McCright, Dobkin, Woodruff, & Klausner, 2008).

Most youth are familiar with SMS (Rideout, Foehr & Roberts, 2010). It has become a popular method of communication among young people in which individuals correspond via text messages of up to 160 characters from mobile phone to mobile phone. This method of communication has become increasingly common in the last five years. In 2008, 93% of youth up to age 25 in North America carried a mobile phone and of those 89% of them were using SMS as a method of communication (Terry, 2008). These statistics have been increasing consistently as younger and younger youth want to be connected. This familiarity with text messaging is key to effectively reaching youth to promote personal health, specifically in this case, messages about sexual health and STI prevention.

The nurse-client relationship is deemed to be an important aspect of nursing care. Nurses have a propensity to concentrate on knowing and caring for the client; attributes that often sets nurses apart from other health professions (Nagel, Pomerleau & Penner, 2012). This nurse-client relationship need not only take place in face-to-face interactions but also with the use of patient desired communications such as phone calls or text messaging. As some topics may be considered highly sensitive, such as sexual health, the use of technology for health promotion may better preserve the nurse-client relationship. Youth may perceive messages from a nurse as both easier to receive, more private and caring. They might be more inclined to ask questions in this more private yet familiar environment. Thus, SMS has the potential to create a unique nurse-client relationship that may not be accomplished in a face-to-face or classroom setting.

Previous studies from other countries have shown that SMS can have a positive effect on sexual health. Studies from both Australia (Gold, Lim, Hocking, Keogh, Spelman & Hellard, 2011; Lim et al., 2010) and the developing countries of India and Africa (Deglise, Suggs & Odermatt, 2012) have demonstrated that SMS is an accepted method of education that is effective in increasing both sexual health knowledge and promoting healthy behaviours. Little research has been performed on the use of SMS for sexual health education in North America, Canada, and specifically within BC. Since this method of education has been beneficial elsewhere, it's suitability for a Canadian audience requires assessment.

The goal of this study was to provide a cross-sectional view into youth perceptions of and readiness for SMS as a mode of sexual health education, as well as to help define the characteristics of youth friendly SMS messages. In addition, the impact of SMS on the nurse-client relationship was examined. The research questions were:

1. What is the level of youth readiness for SMSs for sexual health teaching?
2. What are the characteristics of appropriate youth friendly SMSs for sexual health education?
3. What do youth believe will happen to the nurse client relationship if SMSs are used to communicate health messages?

## **Chapter 2: Background**

There are mixed reviews regarding whether traditional methods (face-to-face classroom instruction) of sexual health education are effective at changing youth behaviour. New research has shown that using innovative strategies such as technology can have a positive impact on youth. This chapter outlines examples of successful studies that have used SMS for sexual health promotion purposes as well as other studies that have used SMS to promote other health education. The benefits of using SMS are also addressed and how technology has the ability to create a unique nurse-client relationship.

### **2.1 Traditional STI Health Promotion and Education**

In the literature, there has been some serious concern expressed about the success of traditional health promotion strategies in creating behaviour change in youth sexual health practices (Shneyderman & Schwartz, 2012). For example, two systematic reviews were performed in the United Kingdom (UK) and the United States of America (USA) to determine the effect of interventions performed to reduce the sexual risk of acquiring STIs and HIV in youth. In the UK, only two of the 12 studies found a significant increase in condom use (Picot et al., 2012) and in the USA, only 5 of the 56 studies demonstrated an increase in condom use (Johnson, Carey, Marsh, Levin & Scott-Sheldon, 2003). The majority of the education interventions in these studies implemented traditional group lecture strategies and did not involve the use of technology (although one did involve a computer program).



## 2.2 Text Messaging

Although the use of SMS in health promotion is a relatively new field of study, there is evidence that SMS can be a successful tool for sexual health. As mentioned earlier, previous studies have shown that SMS can influence both sexual health knowledge and behaviour. A large study performed in Australia (Gold, Lim, Hocking, Keogh, Spelman & Hellard, 2011) endeavored to assess whether sending participants sexual health messages over a period of time helped to change their behaviour. In this study, 1771 participants aged 16-29 were recruited at a concert, where they completed a sexual health knowledge and behaviour survey and provided researchers with their mobile phone numbers. For the next four months, they were sent SMS related to sexual health every two weeks. These messages included facts about STIs, as well as condom reminders and locations for STI testing. At the end of the study, the participants were sent a follow up online survey. The results of the study indicated that there was both a significant increase in knowledge and a significant increase in STI testing for both male and female participants.

In addition, there is evidence to show that youth accept SMS as a desirable method of communication with a health care practitioner. Focus group data from 2010 in the USA of youth aged 14-19 (Selkie, Benson & Moreno, 2011), demonstrated that youth viewed interactions with a health educator via text message in a favourable manner. The overall impression from these youth was that this type of service would be beneficial. They also desired health communication via SMS to be with someone trustworthy, such as a nurse. These youth viewed such topics as pregnancy prevention, sexually transmitted infections and relationships to be of most interest to them when communicating with a nurse.

SMS has been used successfully as a health promotion strategy in clients with other health concerns. A study with college students who were interested in quitting smoking was pilot tested (Riley, Obermayer & Jean-Mary, 2008). Multiple text messages with reminders of participants' goals, and motivational support were sent every day to participants at key times when they had previously identified that their smoking urges occurred. The study was deemed successful as 42% of the participants had quit smoking by the end of the two month study and those who continued to smoke, reported that they had reduced their amount of smoking six months later. Another study involved youth with Type 1 diabetes to whom text messages were sent as a reminder of their personal goals (Franklin, Waller, Pagliariti & Greene, 2006). The results indicated improvements in participants' adherence to their programs goals and 82% felt that it improved their ability to self manage their diabetes. These studies suggest that text messaging methods of education, especially with youth, might successfully influence youth health behaviours including their sexual health.

Text messages have also been shown to be acceptable for appointment and medication reminders. A study to determine the acceptance of clients to receiving SMS for enhancement of testing and treatment of Tuberculosis, Human Immunodeficiency Virus (HIV) and Syphilis was also performed (Person, Blain, Jiang, Rasmussen & Stout, 2011). An acceptance survey was submitted to clients at respective community clinics. The majority of participants (56%) believed that they would be open to receiving reminders for appointments and many were open to SMS as reminders to take medication. Those of younger age in the study (range was 18-82) were significantly more likely to accept this method of communication.

Another example of technology influencing behaviour change on a larger scale is ISIS (Internet Sexuality Information Services), a youth program based out of San Francisco (isis-

inc.org, 2013). ISIS has a mission to promote safe sexual health education to youth via modes of technology such as Internet and SMS. The goal is to educate and provide increased access to sexual health services through technology and social media sources such as Facebook (<http://www.facebook.com>), Myspace (<http://www.myspace.com>) and text messaging. ISIS has also created a partnership with laboratories throughout the area where youth can receive immediate STI testing by entering their personal risk factors into a website and then printing out a requisition, therefore eliminating the need to see a health professional in a clinic setting (a more personal and time consuming activity). The youth can then check back on the website at a later date to see their confidential results. Another notable technological service that ISIS provides is a method for notifying sexual partners of a possible STI contact via an anonymous prewritten email (inSPOT). ISIS has shown good response rates in the San Francisco area, with 4500 users of their services in the inaugural four months (Levine, 2009). Due to its success in San Francisco, some provinces in Canada (Ontario and BC) have now begun to adopt inSPOT into their public health practice. The BCCDC now promotes PHNs and other health care professionals to utilize the inSPOT resource and to encourage clients with newly diagnosed STIs to send notification emails to their sexual partners (BCCDC, 2012). The BCCDC has also created the website [www.smartsexresource.com](http://www.smartsexresource.com), where clients can chat online with a nurse to ask sexual health related questions in real time, with instant responses.

### **2.3 Why Use SMS?**

There are many advantages for health care professionals using SMS for youth education purposes. According to the resource 'Texting 4 Health' (Fogg & Adler, 2009), mobile phones are an effective medium for health care education as they are: personal, portable, connected and intelligent. This strategy is founded on the belief that mobile phones are viewed as personal

possessions and therefore health professionals can target individuals or groups of people with a common message that will be viewed by the individual as personal. In addition, since these phones are portable and often with the individual, there are many opportunities for teachable moments. “Research suggests that success in promoting health-behavior change results from providing the correct, prompt, education, and/or feedback at the right time” (Fogg & Adler, p.37). Other traditional programs that try to initiate change may be “limited in their ability to change behavior, possibly because they are episodic in nature; they do not intervene in the critical moment-to-moment choices that individuals make as they move through space and time” (Fogg & Adler, p.37).

SMS can connect clients to health professionals in a timely manner and at a low cost. SMS is an inexpensive method of communication that can reach numerous individuals in a very short period of time. Since multiple recipients can receive messages at one time, this can potentially increase health professionals’ efficiency of communication with clients. Within BC, SMS can either be included for free in mobile phone plans or cost very little for a local message regardless of the number of recipients. SMS is also an efficient way to connect clients geographically to other resources. For example, an SMS can be sent with addresses and maps to locate a local clinic or resource. Mobile phones are also becoming more intelligent. The mobile phones (or “smart phones”) of 2012 are in many ways simply small portable computers, and are often able to access the Internet and its widespread resources in addition to personal communications. Messages and information can be stored in mobile phones for future use and when the individual decides the information might be useful for them. This allows the youth to have some autonomy and control over educational messages they receive (Fogg & Adler, 2009).

To enhance the understanding of how SMS works to change behaviour, Eckles (2009) has outlined the Theory of Mobile Persuasion. This theory was created as a marketing technique for consumer purposes, however, the principles can be applied to health care as it relates to behaviour change. Eckles proposed that a short, clear text message was very influential and could persuade an individual to act in a directed way. He suggested that since SMS was a socially accepted practice, individuals were more likely to comply with something they accepted as a legitimate medium. Also, he noted that it was the relationship between the sender and the receiver that determined the messages' validity. Since the sender in the current study is a health care professional (specifically a PHN), the receiver may be more likely to judge the sender as a reputable source and may be more inclined to interpret the text as significant and be more likely to initiate change.

Eckles (2009) has also suggested that SMS has the potential to persuade individuals if they were reached at critical times in their lives. In this study, since youth often consistently carry their mobile phones with them, an opportune time for health promotion might be before an important social event, or a weekend night that may be associated with increased risk of unsafe sexual activity. For example, if a number of youth received an SMS sexual health reminder on a Friday night, just before leaving for a social gathering, they may be more likely to find immediate meaning in the message. A message to use condoms may be more effective at influencing behaviour if the receiver perceives the possibility of sexual activity in the very near future.

Eckles' Theory of Mobile Persuasion is based on the work of Bandura (2001), who developed the Social Cognitive Theory of Mass Communication. The Social Cognitive Theory of Mass Communication describes the connection of the individual to the text message. Bandura

states that through technology, people now have more contact with each other, thus increasing social networking. Individuals are more 'connected' now than ever before. He suggests that because of their familiarity with mobile phones (and by extension SMS), individuals perceive this type of contact as personal and meaningful (similar to human-to-human contact). Thus, according to Bandura, this meaningful contact may support individuals likelihood of changing their behaviour(s).

## **2.4 Self-Efficacy**

In order to change behaviours, youth not only need to understand their risk of acquiring STIs, but believe that they themselves are capable of protecting themselves. Bandura (1977) developed the concept of self-efficacy to further understand and predict behaviour change. His theory states that the more self-efficacy individuals have regarding a particular behaviour, the more likely they are to initiate and successfully change their behaviour. This theory can be applied to mobile phone SMS because of the nature of the message and its personal connection. As mentioned previously, SMS can be perceived as personal communication. If these messages help the receivers increase their level of self-risk perception, this could potentially enhance self-efficacy within the individual. The more personal the message about the behaviour, the more likely the receiver would be to perceive their susceptibility and to believe that they have the ability to act or change behaviour (such as condom use). Bandura also suggests a relationship between positive feelings and self-efficacy. Since SMS has become such a well utilized and popular method of communication, the ideology supporting this theory predicts that the more positive an individual feels about the message, the more likely they are to change their behaviour.

## 2.5 Nurse-Client Relationship

The relationship between the client and the nurse is a very important aspect of nursing care. Historically, nurse theorists and scholars have emphasized key elements of nursing practice, with a dominant one being the concept of caring. Watson (1999) emphasizes that caring is pertinent to the nurse-client relationship. The nurse demonstrates caring and connection to the client by listening, being open, sympathetic and immersed in the dialogue (Jonsdottir, Litchfield & Dexheimer, 2004). This traditional nursing approach by nurses is viewed by clients as valuable and many believe situates nurses apart from other medical professionals (Sandelowski, 2002). Historically caring has been associated with the nurse being “present” or “face-to-face” with the client (Finfgeld-Connett, 2006). However, societal conditions are changing and as a result health care practices are changing as well. As individuals move towards technologically focused communications, nurses are employing similar tactics within the health care setting. This may require nurses to adapt their definition of being “present” and “connected” to a virtual form. As technology becomes more commonplace within healthcare, perhaps nurses may need to take a more liberal view of caring and adopt new philosophies of professional practice to align with these changes (Nagel, Pomerleau & Penner, 2012). “Nursing has the opportunity to embrace technology for what it can do and make it more compassionate” (Simpson, 2004, p.305).

One example of traditional nursing theories that can be adapted to include technology is the theory of Modeling and Role-Modeling (Kinney & Erickson, 1990). This theory states that caring involves nurses modeling what their clients are doing. Nurses demonstrate caring by promoting the health of their clients using the “unique perspectives of the client’s word” (Kinney & Erickson, p. 98). That is, for PHNs, they can demonstrate caring by communicating using

SMS, something that youth are doing in their everyday lives. The fact that youth can receive a message from a nurse regarding their personal health on their mobile phone at any time may perhaps be seen by youth as caring. Therefore text messaging may initiate a unique nurse-client connectedness, especially with youth. Since youth have demonstrated their expertise with this medium, they may feel encouraged to ask questions regarding their own sexual health in a typed message rather than face- to-face (Lim, Hocking, Hellard & Aitken, 2008). This relationship may lead to increased opportunities for health promotion and perhaps behaviour change.

Through the use of technology, PHNs may be able to provide a perceived safer environment where youth feel they can better engage with the nurse and continue to be cared for. It is this unique caring relationship that can perhaps provide the support that some youth require for effective STI health promotion.



## **Chapter 3: Research Design and Methods**

This was a descriptive correlational study involving youth and technology in a metropolitan Canadian city. An anonymous survey was distributed to youth to assess knowledge and readiness to receive sexual health related text messages to youth in three different populations: (1) a youth clinic in a west side affluent area; (2) a youth clinic in a less affluent east side area; (3) the campus of a large urban university. The surveys were administered by research assistants between May 2012 and July 2012 to participants between the ages of 16 and 25. A total of 166 surveys were completed and returned.

### **3.1 The Sample Selection**

The study sample was obtained from three locations. The first two locations were youth clinics. These youth clinics offer free drop-in sexual health services provided by physicians, nurse practitioners, youth counselors and PHNs for youth up to age 25. Services provided at these clinics include contraception management, pregnancy options, STI testing and treatment, Pap tests and gynecological wellness, mental health counseling, as well as others. This clinic is free, private, and does not require a Medical Services Plan (MSP) number to attend. One of the youth clinics used to recruit participants in this study is located on the West side, in a more affluent area of the city (Location A). The second youth clinic is located on the East side, in a less affluent area (Location B). Both clinics provide identical health care services. At the third location (Location C), surveys were administered was on the campus of a large urban university in the same city as the two youth clinics. Location C was chosen to acquire a sample of youth who were not specifically accessing sexual health clinical services. There was no requirement to

be a student at the university; participants were approached if they were on campus at the time the research was conducted.

It should be noted that the study utilized a convenience sample. All volunteer participants between the ages of 16 to 25 who could read and understand English were accepted. The goal was to recruit at least 50 youth from each of the three sites in order to obtain a sufficiently diverse sample.

At the two drop-in youth clinics sampled, the research assistants approached potential participants as they registered at the reception desk or in the waiting room prior to their consultation with a health care professional. A total of 118 surveys were completed at the youth clinics; 81 from location A and 37 from location B. At the university, potential participants were approached by the research assistants as they walked near a table that was set up in various locations on campus. A total of 48 surveys were completed on campus. All the youth at the three locations were first screened for the appropriate age and then details of the study were explained. Those who volunteered were asked to complete the survey after reading the consent information form (see Appendix 1). Participants were given the option to decline and those who did decline were not approached again or asked to provide their rationale. Those who volunteered to complete the survey were given a writing utensil and advised to sit in a quiet location near the researchers. The completed surveys were returned to the research assistants when participants placed them into a locked box. An honorarium of a \$5 Starbucks gift card was then handed to the participant. After the survey collection was finished for the day, the locked box was secured in a private office at the clinic or university.

The sample size was an estimate of the size needed to provide enough cases in each site for comparison (at least 50 per site). Since this is a relatively new topic of research, there are limited previous studies that can be used to determine an appropriate effect size for the study to calculate power. Instead, this is a feasibility study and its findings will be used to determine a preliminary effect size for studies in the future.

### **3.2 Source of Data: the Survey**

Survey items were created for this study based on previous research. See Appendix 1 and 2 for a complete sample of the survey used. The demographic and sexual behaviour items (#1-10) were developed with the assistance of a research committee. These items were not tested for reliability or validity. This section asked participants common demographic questions such as age and gender and also about number of partners, condom use, contraceptive methods, history of STIs, testing and diagnosis. These questions were developed based on personal work experience as a public health nurse.

The items assessing readiness for SMS (#15-29) were developed in consultation with the thesis committee. These items were not tested for reliability or validity. Youth's readiness for SMS was assessed by creating items that attempted to measure how comfortable youth already were with text messaging and if they had the means to do it. These items included basic questions asking whether participants had a mobile phone, how often they carried it and their preferred method of communicating by phone (talk, voicemail, text, email). Questions about their Internet usage were also asked, along with whether they were searching sexual health topics online. This attempted to estimate the popularity of SMS within this population and to assess whether these youth access sexual health on the Internet or not. Finally, items pertaining to

confidentiality with mobile phone usage as well as Internet usage were designed to assess youth's feelings regarding privacy and confidentiality.

The items pertaining to self-efficacy (# 11-14, 30-37, & 53, 54) were taken from a previous study (Cecil & Pinkerton, 1998). The authors' 22-item scale was designed to measure self-efficacy in terms of participants' ability to refuse sexual intercourse, question potential sexual partners and use condoms. The Cronbach alpha was calculated to be 0.8, indicating that the measurement tool has been a reliable indicator for assessing self-efficacy. The items from this previous study provided a baseline of the participants' current self-efficacy levels. This was important to consider for future research involving SMS and to provide insight for potential content of the text messages. That is, if youth had low self-efficacy levels, then messages aimed to improve self-efficacy would be appropriate for health promotion strategies. Self-efficacy questions were also used to determine any patterns or connection with knowledge, socioeconomic status, and location. Questions were included that measured how sure participants were they could use a condom correctly and use a condom every time. The participants were also asked about how easy it would be for them to have conversations with partners about condom use at varying levels of their relationships. Lastly, the youth were asked about their perceptions about their family and friend's beliefs about condom use.

The questions assessing STI knowledge (#38-52) were based on previous studies (Jaworski & Carey, 2007; Jones & Haynes, 2006; Geaves, Lonsdale, Whinney, Hood, Mossop & Olowokure, 2009) used to assess level of STI knowledge. This previous 85-item scale was created in consultation with STI experts and a sample of the target population, and had been pilot tested on college students. This scale had a strong reliability (Cronbach alpha of 0.88) as an assessment of STI knowledge. Not all questions for the 85-item survey were utilized. Questions

were selected based on the themes of facts, transmission, treatment, consequences and protection from STIs. These particular questions were selected in consultation with the thesis committee, with a total of 15 “True” or “False” type questions selected. The intent of this knowledge assessment was to examine patterns in knowledge amongst the different locations, ages and sexual experiences. This knowledge assessment also provided insight into gaps in STI knowledge, which can then inform the focus of sexual health text messages.

The items pertaining to nurse connectedness (# 61-68) and the desire for SMS were created based on researcher experience as a PHN in consultation with the thesis committee. The items were not tested for reliability or validity. These items attempted to assess youth attitudes towards communication with a nurse via text message. These items also asked how participants preferred to communicate with a nurse for various sexual health topics (such as reminder to use condoms, and information about STIs). The participants were given the options of face to face, SMS, email, phone and doesn't matter. They were also asked to report their comfort levels with communicating with a nurse via text message and if their behaviour was likely to change as a result of receiving this type of message.

For the final question of the survey, youth were asked a qualitative open-ended question to create an example of a text message that could be sent from a nurse to a youth. They were directed to create the content and also indicate when they would send it (day of the week, time of day etc.).

This survey was not pilot-tested. However, since this study is part of a Master of Science in Nursing thesis, the questionnaire was created in consultation by expert researchers from the thesis committee, providing some evidence of content validity. The structure and wording

content of the survey was also reviewed by the expert committee members. Psychometric testing was not used on the questionnaire, due to a lack of an adequate sample for such testing, which usually requires several hundred participants. However, anecdotally when completing the survey, participants did not express confusion or have questions in regards to any of the items. There were no large gaps of lacking data and the responses appeared to be consistent throughout the data acquired.

### **3.3 Ethical Considerations**

Ethical approval was achieved from UBC Behavioural Research Ethics Board (BREB) for research on human subjects. Traditionally parental consent is needed for youth to complete surveys if they are under the age of 18. Due to the personal nature of the topic of research and since participants were recruited from a confidential youth clinic, ethical approval for youth aged 16-18 to be recruited without parental consent was granted. This age group was also approved for youth at a University campus because students who attend university are considered capable for consent for minimum-risk activities.

### **3.4 Data Entry**

Data from questionnaires was collected and input into a computerized statistical program, SPSS (IBM, 2011). Accuracy of data collection was ensured by two research assistants reviewing each questionnaire and recording the data. The data of each questionnaire was then compared before being inputted into SPSS.

### **3.5 Data Analysis Strategies**

Descriptive statistics were computed for each item on the questionnaire including frequency of each response, and where appropriate, mean, median, standard deviation and range.

In addition, subscale scores for nurse connectedness, familiarity with SMS, self-efficacy, sexual health knowledge, and current practices were calculated to address each research question.

Correlation tests were used to compare these subscales where both variables were continuous data. As an example, correlation was used to determine if there was a relationship between STI knowledge and nurse connection subscales, that is, whether participants with higher knowledge were less likely to report the desire to communicate with a nurse via SMS, or vice versa. Chi Square statistics were used to examine the relationships between the variables where data were categorical. For example, a Chi Squared analysis was used to determine if there was an association between condom use and location, that is, whether the participants were less likely to use condoms if they attended a particular youth clinic. Where appropriate, ANOVA statistics were computed to compare means of more than two groups. For example, an ANOVA test was used to compare ease of communication about condoms in each of the three locations.

## **Chapter 4: Results**

Descriptive statistics and statistical analyses are described as they relate to the research questions. Demographic information was synthesized and reported to give insight to the population characteristics of this study. Items from the survey were grouped to reflect specific themes (subscales) and were analyzed and compared to find meaning within the data. The data was analyzed to answer the specific research questions as well as report additional findings or trends.

### **4.1 Demographics**

A total of 166 participants from three different locations completed surveys for this study. Combined, the participants' mean and median age was 19 years (range= 16 to 25 and SD= 2.1). The majority of the participants of the entire study were female (72%) and the majority of these female participants were from the two youth clinics surveyed (90%). The 28% of males who completed surveys, were primarily from the university location (75%). The sample reflects a multi-ethnic group that is similar to that of the city where the study took place. The largest ethnic group identified as East Asian. The frequency distribution of demographic information by location is presented in Table 1.



Table 1 Participant Demographics

Demographic	Location A (n= 81)	Location B (n= 37)	Location C (n= 48)
<u>Gender</u>			
Female	74 (91%)	34 (92%)	12 (25%)
Male	7 (9%)	3 (8%)	36 (75%)
Transgendered	0 (0%)	0 (0%)	0 (0%)
<u>Age</u>			
Mean	18.7	19.2	20.0
Median	18.0	19.0	20.0
<u>Ethnicity</u>			
East Asian	39 (48%)	17 (46%)	20 (42%)
Caucasian	23 (28%)	8 (22%)	12 (25%)
South Asian	5 (6%)	0 (0%)	9 (19%)
South East Asian	5 (6%)	4 (11%)	1 (1%)
Hispanic	4 (5%)	4 (11%)	0 (0%)
Middle Eastern	1 (1%)	0 (0%)	4 (8%)
African	2 (2%)	1 (3%)	2 (4%)
Aboriginal	2 (2%)	3 (8%)	0 (0%)

## 4.2 Sexual Health Practices

Of the surveyed youth, 75% of youth reported having ever engaged in sex. The mean number of sexual partners they reported in the last 12 months was 2.3 (range = 1 to 24, and SD = 2.7). The most frequent method of birth control used in the last 12 months was condoms (61%) followed by oral contraceptives (48%). Of the surveyed youth, 43% had never been tested for STIs, 50% had been tested within the past year, and 7% in the past two years or longer.

The most common STI that youth reporting having was Chlamydia (7%), with others STIs at less than 1% (Herpes, Human Papilloma Virus (HPV) and Human Immunodeficiency Virus (HIV). Females were significantly more likely than males to have been ever diagnosed with an STI ( $\chi^2 = 4.958$ ,  $df = 1$ ,  $p = 0.026$ ). Of those youth who were sexually active, 51% reported that they did use a condom the last time they had sex. The frequency of condom use is reported in Figure 1. Table 2 outlines the participants' reported STI history and condom use.

Table 2 Participant Reports of History of STI and Condom Use With Last Sex

Occurrence	Female (n = 120)	Male (n= 46)	$\chi^2$ (df), p-value
Ever tested positive for an STI	12 (10%)	0 (0%)	$\chi^2 = 4.958$ (1), $p = 0.026$
Used a condom during last sex	53 (43%)	100 (81%)	$\chi^2 = 11.858$ (2), $p = 0.003$

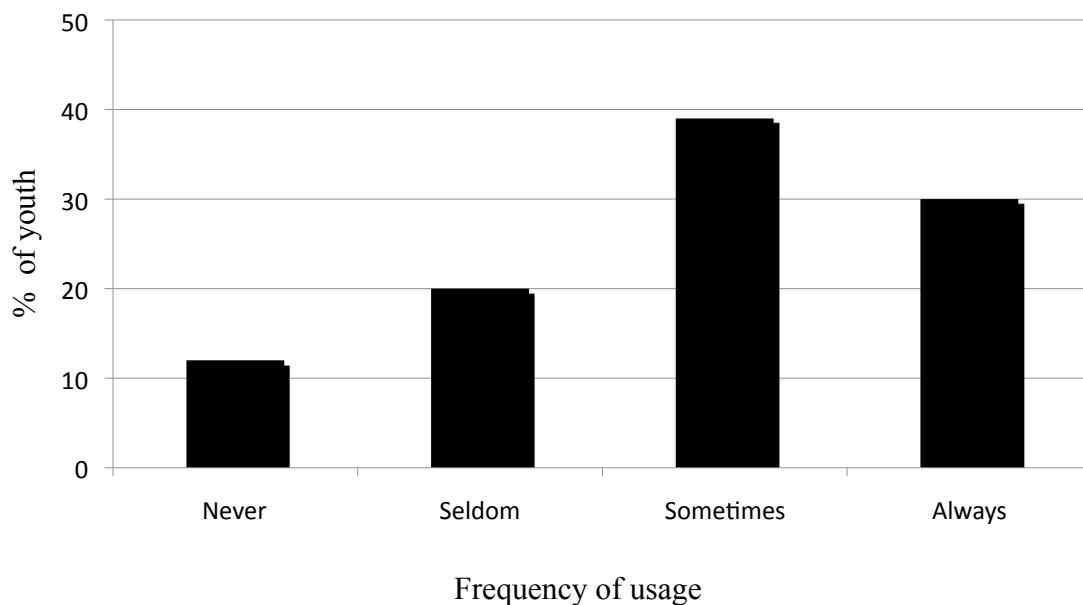


Figure 1 Self-Reported Frequency of Condom Use

Figure 2 illustrates the 62 youth who reported that they did not use a condom during their last sex and their beliefs about the importance of condom use. Of note, 57% indicated that they believed condom use was “important” (25% indicating “very important”) during sex.

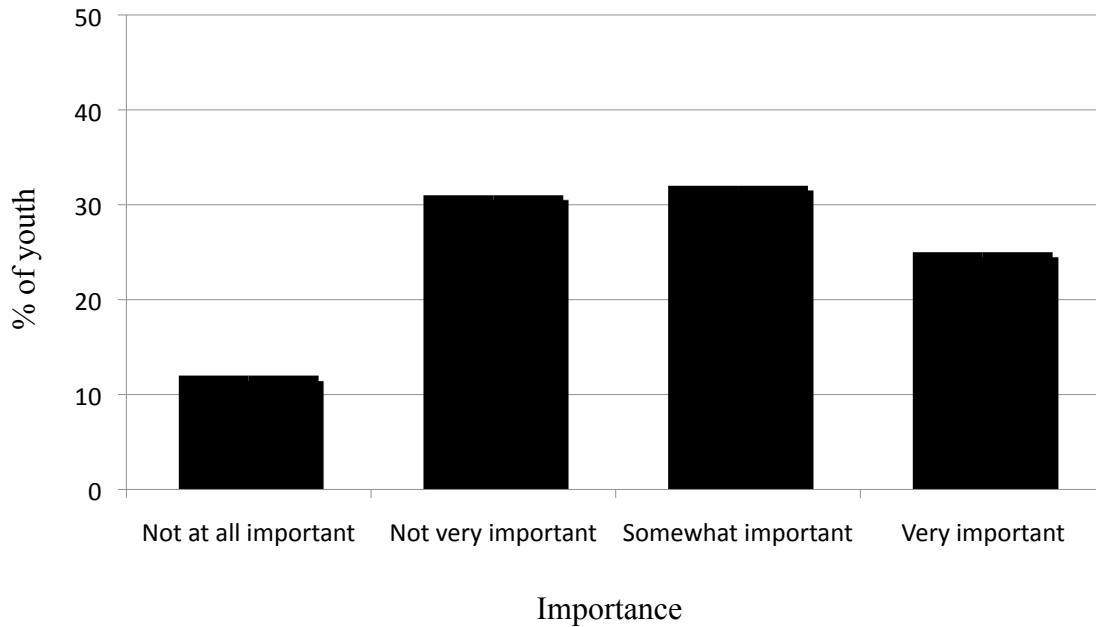


Figure 2 Importance of Condom Use Among Those Who Did Not Use a Condom During Last Sex

A Chi Square analysis showed that there was a significant association between location and condom use ( $\chi^2 = 12.450, p = 0.014$ ) of those who were sexually active. Those from the location B (east side Youth Clinic) were the least likely to report condom use the last time they had sex (see Table 3).

Table 3 Condom Use During Last Sex by Location

Condom Use	Location A (n= 69)	Location B (n= 31)	Location C (n= 27)
Yes	36 (52%)	9 (29%)	20 (74%)
No	33 (48%)	22 (71%)	7 (26%)

When only those results from location B were selected, and their scores for how sure they reported being able to use a condom correctly, 78% of the youth indicated they were “very sure”. However, the reported ability to use a condom correctly was not significantly different between locations ( $F = 1.015, p = 0.365$ ). Similarly there were no significant difference in the mean scores of STI knowledge ( $F = 1.49, p = 0.229$ ), and no difference in the mean level of perceived nurse connectedness among the youth surveyed from the three different locations ( $F = 0.556, p = 0.575$ ).

Of those who reported being sexually active, males in this study were significantly more likely to report condom use than females ( $\chi^2 = 11.858, df = 2, p = 0.003$ ). See Table 2 above.

Youth indicated a preference for speaking with friends regarding issues of sexual health (80%). Speaking with nurses and physicians was the next most common preference reported. Preference for speaking with teachers and parents was rare amongst the surveyed youth (see Table 4).

Table 4 Sexual Health Communication Preference by Youth Participants (n= 166)

Resource	Often	Sometimes	Seldom	Never
Friends	66 (40%)	68 (41%)	23 (14%)	8 (5%)
Nurse/physician	35 (21%)	56 (34%)	43 (26%)	32 (19%)
Teacher	9 (5%)	26 (16%)	36 (22%)	93 (57%)
Parent	7 (4%)	17 (10%)	41 (25%)	99 (60%)

Gender and sexual health communication were also compared. The results indicated no association between gender and preference for sexual health communications with friends ( $\chi^2 =$

5.804,  $df= 3$ ,  $p= 0.122$ ). However when gender and communication with physicians/nurses was examined, there was a different outcome. Females were significantly more likely than males to speak with health care professionals in a clinic setting regarding sexual health matters ( $\chi^2= 31.280$ ,  $df= 3$ ,  $p= 0.000$ ). See Table 5 for frequency of sexual health communication.

Table 5 Preference for Communication with Health Care Professionals by Gender (n=166)

Gender	Never	Seldom	Sometimes	Often
Female	11 (9%)	32 (27%)	38%	32 (27%)
Male	21 (46%)	11 (24%)	11 (24%)	3 (7%)

### 4.3 Readiness for Text Messaging

Nearly all of the youth surveyed reported that they owned a mobile phone (98%) and 64% reported that they had voicemail on this phone. The majority reported that they preferred sending text messages to other communication methods using their mobile phones. These frequencies are reported in Table 6.

Table 6 Preferred Method of Communication On Phone by Youth (n=166)

Method	No.
Verbal	30 (18%)
Text	120 (73%)
Voicemail	2 (1%)
Email	12 (7%)

The majority of youth reported that they carried their mobile phones with them “always” (95%). Most of them (82%) indicated that they sent texts “more than 10 times a day”. Youth were also asked about their perceived confidentiality regarding text messages. The majority of the responses were “very unlikely” (40%) and somewhat unlikely (30%) meaning that most youth perceived text messages as private.

With regards to Internet usage, 92% of the survey respondents indicated that they used the Internet “often”. The location where these youth used the Internet was more widespread; the most common location of Internet use was at a home computer (57%), with the second most common on a smart phone (38%). Other locations such as school computer (2%) and “other” (4%) were not as frequently utilized.

Of the youth surveyed, 59% of participants indicated that they did look on websites for sexual health information. Similarly to perceived text messaging confidentiality, most of these youth believed accessing sexual health information on the Internet was a private activity with 66% of respondents identifying that it was unlikely (very unlikely, 32%, somewhat unlikely, 35%) for others to see their computer screen.

While the majority of the students preferred to see a nurse face-to-face for notification of STI results and to ask questions regarding STIs, there was support for text messaging as a method of communication with nurses (see Table 7). When asked how these youth would prefer communication in the form of reminders, they indicated that they would prefer texts as reminders to call the nurse and as reminders to use condoms. The statistics for this inclination is even higher when you combine them with those who had no preference for a particular method, indicating that they might be okay with text messages (59% and 53%, respectively). However,

it should be noted that 8 (5%) youth preferred only to talk to the nurse in person for all activities.

The details of the preferred method of communication are below in Table 7.

Table 7 Youth’s Preferred Method of Communication with a Nurse (n= 163)

Method	Face-to-face	Email	Phone	Text	Doesn’t matter
Notification of STI results	90 (56%)	13 (8%)	22 (14%)	15 (9%)	22 (14%)
Reminder to call nurse	21 (13%)	25 (15%)	12 (13%)	64 (40%)	31 (19%)
Reminder to use condoms	48 (31%)	21 (14%)	4 (3%)	27 (17%)	55 (36%)
Information about STIs	63 (39%)	52 (32%)	6 (4%)	12 (7%)	30 (18%)
Clinic Locations	24(15%)	51 (31%)	13 (8%)	28 (17%)	47 (29%)
Ask a sexual health question	89 (55%)	21 (13%)	14 (9%)	9 (6%)	30 (18%)

#### 4.4 Determining the Appropriate Message

The mean of the total score of the STI knowledge quiz which part a part of this survey was 10.7 out of a possible 15, with the median being 11.0 (SD= 2.6, range= 0 -15). This indicates that a participant scoring the mean had 71.3% of the items correct. See Figure 3 below for further details of the knowledge scores from the STI quiz.

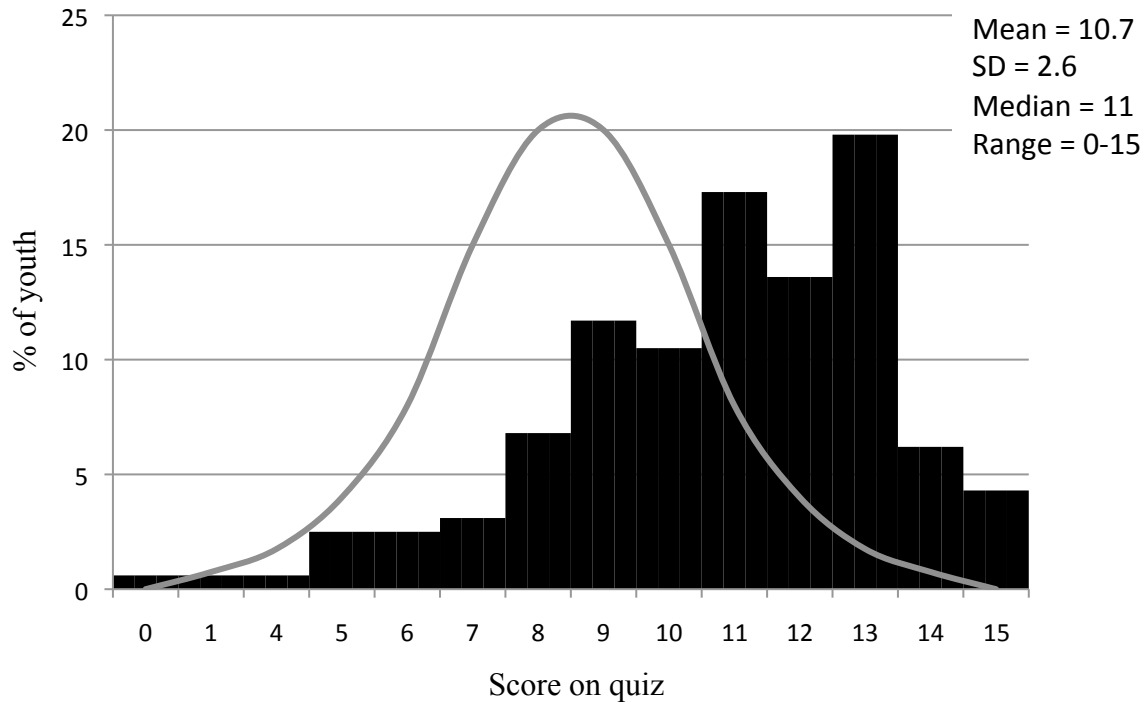


Figure 3 STI Knowledge Quiz Scores Showing Normal Curve

The data in Figure 3 presents with a negative skew and when compared with a normal distribution, demonstrates that the population of youth surveyed scored better than what was expected. The mean scores were not significantly different amongst locations A, B and C. However, although the mean score of the quiz was average, it should be noted that 46 participants scored 60% or fewer of the items correctly, and of these, 11 participants scored below 40% of the items correctly with 3 of these participants scoring 27% or less.

The majority of youth were “very sure” (63%) and somewhat sure (21%) of how to use a condom correctly, indicating higher reported self-efficacy in this area. These results are



presented in Figure 4.

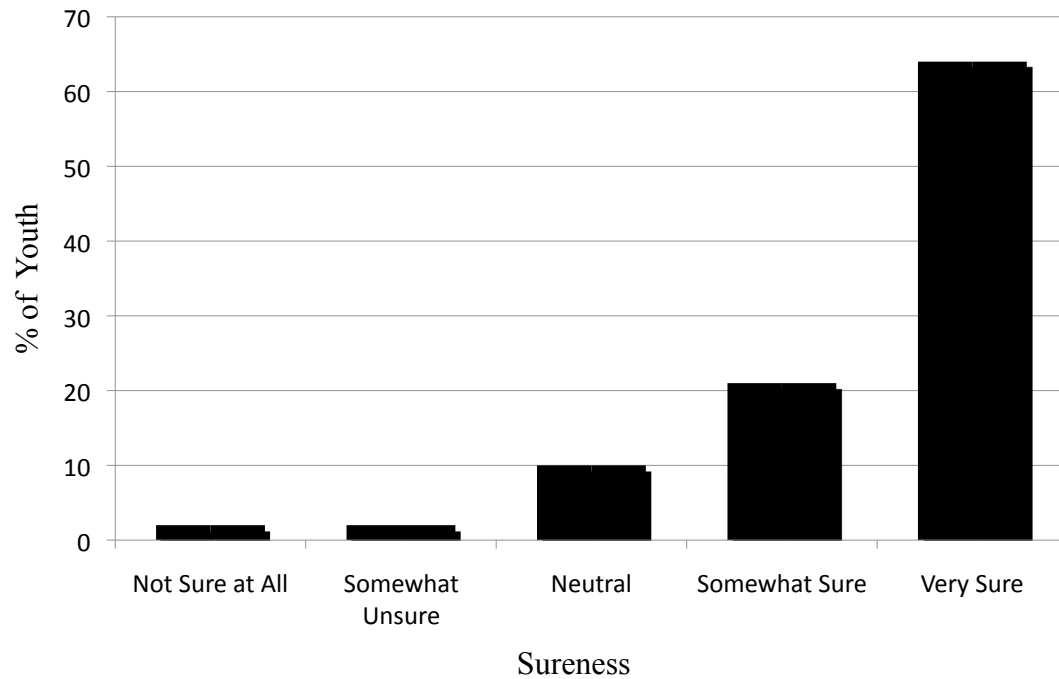


Figure 4 Self-Reported Sureness of Ability to Correctly Use a Condom

Lower self-efficacy was expressed for the use of condoms during sexual intercourse and their perceived ability to refuse sex if a partner refused condom use. 34% of participants indicated that they were “very sure” that they would use a condom every time they had sex. However, 30% of participants were unsure that they would “insist on using a condom” or “refuse sex” if partner would not use a condom (see Figure 5).

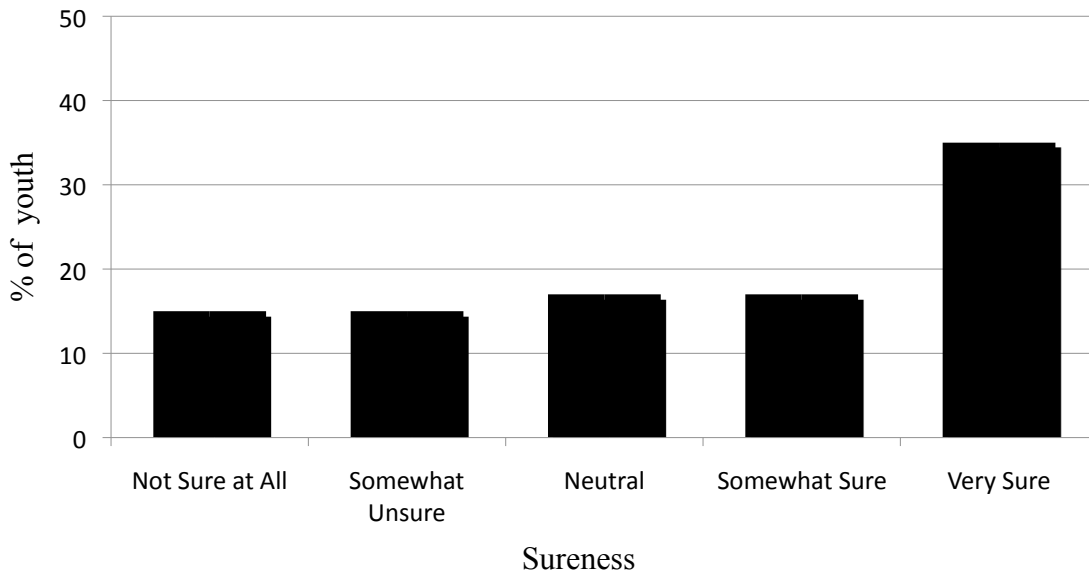


Figure 5 Self-Reported Sureness to Refuse Sex if Partner Will Not Use a Condom

Lastly, participants were asked two key questions to rate their level of self-efficacy. They were asked using a Likert scale, whether they agreed or disagreed with the following statement: “I consider myself capable of convincing my partner to use a condom every time we have sex”. The majority of youth did “strongly agree” or “somewhat agree” with this statement (total of 87%, with 57% being “strongly agree”). The next question was asked in order to get a sense of their support networks as this can have an effect on levels of self-efficacy, especially for the younger population. Participants were asked on a Likert scale, whether they agreed with the statement: “Most people who are important to me would recommend that I use a condom every time I have sex”. The results were slightly lower for “agrees” from this question compared to the above, with 60% of youth who “strongly agree” and 20% who “somewhat agree”.

Youth in this study indicated that they found it most difficult to have conversations about using condoms with partners they had just met (32%), a little less difficult with partners they had

known for less than three months (13%) and a lot less difficult with partners they have known for more than three months (5%). Females were significantly more likely than males to report having a conversation with a partner about condoms as easy ( $F = 7.553, p = 0.007$ ).

#### 4.5 Relationship with the Nurse

A number of items that related to nurse connectedness were asked on a 5 option Likert scale of agreement (see Table 8).

Table 8 Attitudes Regarding SMS Between Nurse and Client

Statement	Strongly agree	Somewhat agree	Neutral	Somewhat disagree	Strongly disagree
I think receiving text messages from this nurse would make it more likely that I would follow her instructions.	13%	34%	32%	14%	7%
Text messages would provide a continuing link between the nurse and me.	21%	39%	27%	10%	3%
The ability to text message the nurse would make it more likely that I would contact her in the future if I had a question or concern.	35%	43%	13%	4%	5%
I think the occasional text message reminders from this nurse would make it more likely that I would use a condom every time.	11%	26%	35%	16%	11%

It is important to note that although the act of text messaging with a nurse was generally accepted by these youth, as seen above, 35% still indicated discomfort with receiving text messages from a nurse and 56% were worried about confidentiality. As well, 64% of the youth

stated that they would be embarrassed if someone saw a text message from a nurse on his/her phone.

For the open-ended final question on the survey, most of the youth participants created a message promoting safe sex and condom use. Many wrote catchy slogans as reminders to use condoms to prevent against both pregnancy and STIs. Slogans such as “no glove, no love” and “don’t be a fool, wrap your tool” were numerous. A few youth created messages that were reminders to get tested and reminders to access the youth clinics. The majority of the participants believed that sending messages like this would be most beneficial in the evening on a weekend night. Some of the youth indicated these messages would be most useful before they attended social gatherings where they might drink alcohol. Others stated that the texts should be sent out monthly and around holidays or special youth events (eg. graduation). Some of the youth stated they would desire “subtle” messaging. That is, they wanted the nurse to get the safe sex message across in the SMS, but to do it in a way that is not explicit, so if others saw the message they would not understand its meaning.

## **Chapter 5: Discussion and Recommendations**

The findings from this preliminary survey suggest that SMS is a popular method of communication among youth with a relatively high acceptance level for certain sexual health messages from health care providers. Youth in this study were frequent users of SMS technology and generally had positive attitudes regarding text messaging with a nurse about their sexual health. Issues of confidentiality and privacy were the primary concern for this population. Most of these youth demonstrated acceptable levels of knowledge of STIs as measured by an STI quiz. Most of the participants self-reported moderately high levels of self-efficacy for condom use. However, it is unknown if these traits necessarily translate into actual condom use or changed behaviours.

### **5.1 Demographics**

The gender of the sample group reflects the demographics of the youth clinics, where most of the youth were recruited. The majority of the clients who attend these clinics are female. The ethnic distribution of the sample reflects the multicultural distribution of the city where the study was performed. The largest group identified in this study as East Asian. According to the 2006 Canadian Census (Statistic Canada, 2006), 28% of the population (the second highest ethnic group in the city) identified as East Asian, indicating that this an accurate ethnic representation of the population. The previous study performed on using SMS for sexual health promotion (Gold, Lim, Hocking, Keogh, Spelman & Hellard, 2011; Lim et al., 2010) did not specify ethnic origin; therefore these results may be of interest for future research in this area.

## 5.2 Sexual Behaviour

Self-reported sexual behaviours in this study paralleled provincial statistics from the 2008 Adolescent Health Survey (Smith, Stewart, Peled, Poon, Saewyc, & the McCreary Centre Society, 2009). Just over half of the youth surveyed reported that they used a condom the last time they had sex. According to the 2008 BC Adolescent Health Survey, 66% of high school students in BC used a condom the last time they had sex. Slight differences in these numbers could be due differences in age, since our population of youth was slightly older, with a mean age of 19. Males in this study were significantly more likely than females to report using a condom the last time they had sex. Again these findings are similar to the 2008 BC Adolescent Health Survey (Smith et al.) in that a higher percent of males reported condom use than females. Since this study's data found no difference in the STI knowledge or self-efficacy for condom use scores between males and females, possible explanations may be due to gender behaviour differences. During sexual activity, males can choose to use a condom while females must persuade their partner (in this case a male) to use a condom (Woolf & Maisto, 2008). Even if the female is comfortable talking about condoms (and this study suggests they are), this does not denote that their partner will use one. Another possible explanation for why males reported more condom use than their female counterparts is the potential differing perceptions of relationship dynamics for the different genders. Lam, Mak and Lindsay (2004) suggest that females may not be as likely to use condoms because they may have a larger focus on maintaining and retaining a relationship rather than on safe sex behaviours. Ultimately the females of this study may have believed they were jeopardizing their relationship with their partners by suggesting using a condom. However, this is not a conclusive finding of this study and further research is required.

In this study, participant's reported condom use varied by location. There was a significant association between reporting last condom use with last sex and attending the youth clinic on the east side (Location B). The youth surveyed at this clinic were less likely to use a condom during last sex than other youth from the west side youth clinic or at the university. Rationale for this discrepancy in condom use with last sex remains uncertain since there were also no reported differences in STI knowledge, self-efficacy of condom use or sexual health communication scores among the youth in the three locations. However, this east side youth clinic is located in a less affluent area of the city, so barriers such as cost and access to condoms may be a factor. Further research is required to identify the various factors that may be involved.

It is unclear how the Chlamydia (CT) rates in this study compared to provincial statistics, as the BCCDC displays their statistics as incidence by year and not by prevalence. However, the findings from this study indicated that females were more likely to have ever had CT compared to males, which is similar to provincial statistics. In 2011, the number of females in BC who were diagnosed with CT was more than twice the number of males in both the 15-19 and 20-24 age groups (BCCDC, 2012), and has been a consistent trend since at least 2002. This result is also consistent with previous research on youth in which females were diagnosed with significantly more STIs than men (Salerno, Darling-Fischer, Hawkins, Fraker, 2013). One of the likeliest explanations for this occurrence may be that females are more likely to access health care services than males and are more likely to have STI testing done routinely while having other screening tests done such as Pap tests or other gynecological assessments. In the future this discrepancy could perhaps begin to narrow with the increased awareness of urine nucleic acid antigen testing, which could lead to more males being tested. In addition, females are also

more likely to have older sexual partners, which puts them more at risk as older men are more likely to have STIs (Salerno, Darling-Fischer, Hawkins, Fraker).

### **5.3 Readiness for SMS**

The first question proposed in this study was whether youth were ready for SMS. The results indicated that similar to other North American studies (Terry, 2008), almost all of the youth in this study reported carrying a mobile phone with them always. SMS was their preferred method of communication on their mobile phones and most indicated that they were texting multiple messages every day.

Although it was clear that youth have widely adopted mobile phone and SMS technology into their lifestyles, they indicated mixed feelings in regards to sending and receiving sexual health related SMS. Youths' preference for text messaging with a nurse varied with context. Some youth preferred face-to-face contact with more personal topics such as notification about STI test results or asking a sexual health question. For the less personal topics such as reminders to use condoms or as a message to phone the nurse, many youth in this study indicated a preference for SMS. Previous studies have also found evidence that reminders for other youth health care concerns were successful in influencing behaviour (Riley, Obermayer & Jean-Mary, 2008; Franklin, Waller, Pagliariti & Greene, 2006). A recent study in the United States found that daily educational text messages sent as reminders for youth to take their oral contraceptive pills were beneficial for pill continuation and found that participants missed fewer pills (Castano, Bynum, Andres, Lara & Westhoff, 2012). SMS has also been used with success to help health care establishments remind patients about health care appointments (Neville, Reed, Boswell,



Sergeant, Sullivan & Sullivan, 2008). The outcomes of these studies indicated that when short reminder SMSs were sent, they helped increase attendance to appointments.

A few of the youth surveyed indicated a strong preference that all of the communications with a nurse to be done face-to-face. It is unclear why some of the youth in this study have this preference. In contrast, a study done in the United Kingdom (Dhar, Leggat & Bonas, 2006) found that when clients (over age 14) from a sexual health clinic were sent text messages about their STI results, client responded more quickly than traditional methods (phone calls) and generally had positive feedback regarding the messages. Of the 150 participants, “100% said they were pleased with it and the majority found it a quick, safe and confidential means of sharing information” (p.376). It should also be noted that in the current study, the survey asked students about their perceptions about receiving future text messages, while the British study measured their actual reactions to text messages they had already received. Youth in this study may react more positively once they have experience with receiving this type of SMS.

Due to the extremely personal nature of some topics (in this case notification of STI results), it is clear that many youth are still not ready to use SMS to replace personal contact with the nurse. This may be due to the relative newness of using SMS for health purposes within this study population. It should be noted that the intention of sending SMS to a client as a notification of their STI results was not meant to be the end of the communication with the nurse. This may have been a misconception for some youth that they would not receive follow up face-to-face contact with a nurse after receiving the text message. The intent was not explicitly noted in the survey that if youth received a positive diagnosis via text message, they would still need to return to the clinic for further discussion and possible treatment. Youth may have interpreted the questions regarding use of SMS for notification of STI results as the final communications with

the nurse and because it wasn't clear that the intent of the SMS was to invite the client in for further follow up, the participants may have responded differently than intended. Regardless of the rationale, these results further validate the need for sexual health clinics in the community setting, as there are many issues that youth desire face-to-face contact with a health care provider.

Since these youth believe there is much value in this relationship with the nurse, SMS has the potential to be used as a vehicle to initiate the first contact and connect the client to the nurse physically. An SMS can be sent to youth who attended health services who are difficult to reach by phone after they have left. Or an SMS can be sent to a youth who received testing at a lab and needs to be contacted by a nurse to inform them of test results. Contacting youth via telephone has often been a difficult task for PHNs because youth don't often answer their mobile phones when receiving calls from a phone number they do not recognize. Also many youth do not have voicemail on their phones, therefore PHNs cannot leave a message for the youth to call them back and must attempt calling multiple times. Using SMS would allow fast, efficient delivery of messages to inform clients of results or provide messages to visit the youth clinics. This initiating of communication with the PHN, followed by a clinic visit, could then lead to further connection with the client and nurse via text message. For PHNs, this method of reaching youth has the potential to be more efficient and effective. This would theoretically take much less nursing time and could potentially be more cost effective for the health care system. Further studies would need to be performed to demonstrate the cost effectiveness of this change in practice.

In order to get a sense of youths' readiness to communicate with a PHN about sexual health related issues, it is important to understand where most youth are acquiring their sexual

health information. Most youth in this study indicated that they get most of their sexual health information from friends and the Internet. Since the information from both of these sources may be highly unreliable, SMS sent directly from a nurse which may include credible resources may help to diminish the spread of false information. Since most of the youth indicated that they carry mobile phones that are capable of connecting to the Internet, it is possible for PHNs to send links to credible websites that they youth can then view from anywhere, thus allowing for choice of when and where to view the information.

#### **5.4 Confidentiality and Privacy**

Many youth indicated they were worried about confidentiality with sending and receiving SMS with a nurse. The fact that text messages are stored on mobile phones and can potentially be seen by others is unsettling for some youth. Youth are most often concerned about confidentiality specific to their sexual health care as it can have an impact on their life in terms of their reputation with friends (Bender & Fulbright, 2013). Also, youth are at an age where breaches in confidentiality can have effects on their family relationships, as for many parents and youth, sexual health is a distressingly difficult topic to discuss.

The fear of others seeing their mobile phone messages led to some youth indicating discomfort with communicating with a nurse in this manner. Having a mobile phone password protected could perhaps help resolve some of these concerns. Nurses may play a role in reminding youth to password protect their mobile phones. Also, as a suggestion emerged from the open-ended survey questions in which some youth recommended subtle messages from the nurse, which would be difficult for anyone else to interpret but the individual it was meant for. Subtle messages might not include any sexual terms such as “sex” or “condoms” but might

include target words to remind the youth to practice safe sex without explicitly writing it. An example might be “Just a friendly reminder to practice what we talked about”. Messages like these might ensure privacy, as others who see them would not necessarily understand them.

## **5.5 Appropriate Message/Characteristics**

The second question proposed in this study was to determine the types of text messages that the surveyed youth might desire. Determining the appropriate text message is an essential element that may affect youths’ acceptance of this method of communication. Understanding the population may lead to more relevant messages that are more likely to have an impact on the knowledge and behaviour. The results of the STI knowledge quiz demonstrated that the participants’ knowledge of STIs is at an average level. The scores on the STI knowledge quiz demonstrated no correlation with desire for SMS from a nurse. There was also no difference between knowledge scores and gender, location, STI testing history, self-efficacy or whether a condom was used with last sex. These findings suggest that the level of knowledge alone may have limited influence on behaviour. However, there still remained a small group of youth that scored very low on the STI knowledge quiz, which may indicate a need for ongoing education. Sending informative subject matter to youth in the form of SMS may still be worthwhile.

Self-efficacy scores were high for this sample of youth surveyed. However, high self-efficacy did not necessarily reflect actual behaviour. Of the youth who indicated that they did not use a condom during last sex, over half of them indicated that they believed condom use was important. Possible explanations for this include the fact that youth may be overestimating their ability to wear a condom, or lack confidence when communicating with their partners. As well, it is possible that a number of youth in this survey did not require condom use, such as those in

female same-sex relationships or those in monogamous relationships in which an alternate form of effective contraception was already being used. Unfortunately, the ability to assess these hypotheses is beyond the scope of this study. Also considering both genders in this study, perhaps these youth have an “invincibility complex” or thoughts of self-exemption and believe that ill events such as STIs will not happen to them (Bay-Cheng, Livingston & Fava, 2011). Regardless of the rationale, the survey findings suggest that large portions of youth are fairly well educated about STIs and recognize the importance of practicing safe sex. However, it is clear from their self-disclosed sexual behaviour that despite this knowledge and ability, there is may still be barriers to consistent condom use. Other measures of self-efficacy may yield better ratings and should be considered in future SMS research. Self-efficacy is an important aspect of understanding youth and their behaviour. Therefore it may still be important for nurses to employ strategies that aim to enhance self-efficacy in their sexual health teaching.

The survey results suggest that females find it significantly easier to discuss using a condom with partners than did males. Females from this study may have been more confident generally in talking about issues regarding sex. Also, females were more likely to speak with health care professionals about issue surrounding sexual health compared to males. A possible rationale for this difference in behaviour could be that females believe that they are more at risk (pregnancy, increased susceptibility to STIs) and therefore believe they have more to gain by seeking professional help.

The surveyed youth provided many good examples of text messages that could be used for sexual health education. It is interesting to note that many of them wrote popular slogans to be used to promote sexual health (eg. “no glove, no love”). It would seem that many of the participants believe that this is an effective way to reach youth. Interestingly, an Australian

study (Gold, Lim, Hocking, Keogh, Spelman & Hellard, 2011) found these types of slogan text messages to have a significant impact on health promotion. This is a noteworthy concept for future PHNs who are delivering this type of sexual health education in person or by SMS. Nurses may consider adopting this type of humorous or catchy slogans into educational text messages. Not only is the content of the messages important but according to youth in this study, the messages should be sent at opportune times such as Friday or Saturday evenings, and before major holidays or youth events where drugs and alcohol may be involved and decision making may be impaired. A reminder before these social events may be beneficial for youth so they can be prepared (carry or buy condoms). As stated by Fogg and Adler (2009), SMS have the potential to be effective at persuading youth because it has the unique ability to intervene during critical times.

## **5.6 Nurse-Client Relationship**

The last question of the study was to determine the impact of using SMS on the relationship between the youth and the nurse. The findings of this study indicate that although many of these youth prefer a face-to-face communication with the nurse for certain sexual health topics, but they also indicated that they do not believe that communication via SMS would negatively impact the nurse client relationship. Many indicated that text messaging with a nurse was a good opportunity for the nurse to establish a valuable nurse-client connection. In addition, many of these youth believed that using SMS with a nurse would make it more likely that they would contact the nurse if they had questions or concerns. This may be a powerful finding as it potentially creates a communication and trust with the nurse that the youth had not had before. This might translate into contacting the nurse when in need of sexual health services. This can create opportunities for nurses to not only answer questions and educate youth but to connect

youth to many other useful community services. If the nurse can engage with the youth and form a connection, this enables a potentially important two-way communication and opens up opportunities for health promotion and possibly behaviour change.

How technology relates to the many theories of caring in the nursing relationship is not well understood. Although the youth in this study did see a benefit to the connection between themselves and the nurse, it is difficult to interpret if these youth viewed this as a caring relationship. Although the concept of caring has the ability to be adapted into a technological world where the nurse cannot be physically present, this study cannot provide evidence of this. The relative newness of technology and its rate of rapid expansion, makes research to support this new change in nursing philosophy difficult (Nagel, Pomerleau & Penner, 2012). However, technology is becoming a necessary piece of nursing practice. Whether it is text messaging, informatics or Telehealth (Care, Gregory & Chenomas, 2010), nurses are using these types of services at rapid rates because of their efficiency, convenience and the expectations of clientele (Bernardo, 1998). Future research is needed to specifically assess youth's perception of caring by the nurse in a virtual setting.

The question of when to introduce text messaging in the provision of sexual health care for youth is an important one. The results of this study would indicate that a face-to-face relationship with a nurse is a necessary precursor for initiating sending text messages between the two. It is difficult to determine what type of face-to-face contact would satisfy this requirement, be it a nurse educator in the classroom or a one-to-one relationship in a clinic. More research is needed to determine the effect of an SMS relationship with a nurse and when to initiate it.

## **5.7 Strengths**

The strengths of this study were the inclusion of participants in three diverse areas of a large metropolitan city. Participants were recruited from youth clinics from both affluent and non-affluent areas. A university campus was included in the sample in an effort to assess a different population than those who were seeking out health services at the youth clinics.

## **5.8 Limitations**

Limitations to the study include both external and internal factors. The survey was distributed in only one metropolitan area (university campus and appointed youth clinics). This limits the generalizability of the results. Also, since the surveys were primarily distributed in a waiting room of two clinics, or at a select university campus, the sample was not randomly generated. Both of these factors may limit the ability to generalize the results to the larger youth population. Another limitation is the research design: a cross-sectional survey. It is known that self-report surveys are not particularly accurate representations of actual behaviour. Females tend to under report sexual activities, while males tend to over report (Kirby et al., 1994). Self-report may also have affected the accuracy of sharing a history of STI testing and results; self-report positive tests results are generally less accurate than actual test results due to the possibility of an individual to forget or be confused as to which STI or other health concern they had. The social desirability bias may affect this study as some of the youth involved may have a previous relationship with the nurse and research assistants involved (by chance) and may respond in an attempt to please the researchers.

Other limitations were in the survey items design. Items pertaining to sexual orientation should have been included to provide further rationale for reported condom use. Also,



relationship status of the participants would have been beneficial to include on the survey as this might have had an effect on the results of reported condom use and beliefs about condom use.

## **5.9 Recommendations for the Future**

The data from this study illustrated the possibility of SMS as an effective tool for health care and provided rationale for future pilot studies using SMS in Canada. As a few studies (Riley, Obermayer & Jean-Mary, 2008; Franklin, Waller, Pagliariti & Greene, 2006) have presented, SMS cannot only be used in sexual health education, but also in general health education. Youth in this study indicated value in receiving text messages, especially text reminders from a health care provider. If this method of communication is successful in promoting healthy behaviour in youth, then it could perhaps be beneficial for other populations and age groups as well. SMS could be used as reminders for elderly people to take their medications and reminders for people with diabetes to check their blood sugars. Adults might benefit from SMS reminders for vaccinations for themselves and their children, or to get yearly Pap or prostate exams. If youth are keen to use SMS for education, then perhaps other forms of technology can be successful as well. Social media has the potential to reach many youth at one time and may be another avenue for exploration in health education.

Further research and explanation to how technology influences youth would be beneficial. There have been many behavioural theories developed to predict and support youth's actions, however little involves the use of technology. With the changing times, perhaps existing theories need to be re-examined and new theories created that take into account how technology can be used as intervention for health behaviour change.

Also, future research is needed to determine youth's perceived connection with the nurse via SMS. Caring is an essential part of nursing practice and it would be beneficial to determine how caring is perceived by youth when the nurse is not physically present. Future studies using SMS as an intervention with a nurse as well as a survey would be helpful in indentifying this relationship.

For nurses, the findings are valuable information for consideration for the future of health education. Since technology is becoming frequently utilized in health care at expanding rates, this evolution in practice may need to be adopted into nursing schools as well as nursing regulatory bodies. The many current research studies involving nurses and technology are providing more evidence for changes in nurses' scope of practice to reflect more of a focus on technology.

## Chapter 6: Conclusion

Youth are ready for sexual health communications with a nurse via SMS on their mobile phones. Almost all the youth surveyed indicated that they always carry a mobile phone with them and text messaging is their preferred way of communicating. There was some evidence to show that youth may benefit from using SMS to communicate with a nurse. While many youth preferred a face-to-face style of communicating for more personal issues of sexual health (notification of STI results and questions of STIs), there was support for SMS communications from nurses about general sexual health and gentle reminders of condom use. Youth indicated that reminder messages that were humorous, and catchy might capture their attention and be an acceptable way for health care providers to communicate with them. It is not only the content of the messages that is important, as according to youth participants, these messages would be most valuable when they are sent at key times such as prior to social events that might include drugs or alcohol (i.e. Saturday night, graduation parties etc.). Issues of confidentiality and privacy of SMS were a concern that was expressed by the surveyed youth. A reminder that permission to use this type of communication as well as the content of the message is important to discuss with youth in the face-to-face setting prior to initiating SMS communications. Further, it is also an opportunity for health care providers to encourage youth to password protect their mobile phones and to not leave the phone unattended.

For nurses, SMS technology has the ability not only to educate, but also to engage and capture youth's attention. Something that can be difficult to accomplish with this population. SMS sent from a nurse can initiate or continue a valuable two-way communication, thus enabling the nurse to have an increased therapeutic, supportive contact with a client.

SMS can also be used in health care for a variety of different reasons beyond sexual health education such as appointment reminders and health promotion messages. It is a simple method of communicating with clients that is both replicable and scalable, making it an efficient form of communication and education. Further research in Canada, using text messaging as an intervention for health care in a controlled trial may indicate that SMS as a method of health promotion is a simple, effective and cost-saving strategy that can have a large impact on the youth of today.

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## **Appendix 1: Study Information and Consent Letter**



**University of British Columbia  
School of Nursing  
T201-2211 Wesbrook Mall  
Vancouver, B.C. V6T 2B5**

### **Study Information and Consent:**

#### **Youth's Acceptance of Mobile Phone Text Messaging for STI Health Promotion**

**Principal Investigator:** Elizabeth Saewyc

**Co-Investigator:** Lindsay Symonds

**Sponsor:** A research grant has been received from the UBC School of Nursing.

#### **Purpose:**

You are being invited to take part in this research study because young people are consistently the age group most likely to have Sexually Transmitted Infections (STIs). This study is exploring the use and acceptance of SMS text messaging to help educate youth about STI prevention. We are hoping that this research will provide key insight for future strategies to promote safer sexual behaviour.

#### **Study Procedures:**

If you agree to participate, you will be given a questionnaire to complete, which should take approximately 10 minutes to complete.

**Potential Risks:**

If you are not sexually active, or are not comfortable with reading about and answering questions about sexual activity, you may find the questionnaire difficult to complete. You might feel some embarrassment in answering some of the questions. You can choose not to answer any question, or stop at any time.

**Potential Benefits:**

There are no direct benefits to you, but there is the potential of informing sexual health education for the youth of the future. The findings of this study could provide evidence about whether young people's education needs are changing with the changing culture of technology.

**Confidentiality:**

This survey is also anonymous—do not put your name on the questionnaire, and there will be no way to connect your responses to you personally. All completed questionnaires will be kept in a locked filing cabinet. The surveys will be entered on a password-protected computer for analysis. Only the Principal Investigator, co-investigator and her thesis committee will have access to the data.

**Remuneration/Compensation:**

An honorarium will be given to all youth who complete the survey. Participants will be given a \$5 Starbucks card. Participants will be given the honorarium even if they do not completely fill out the survey.

**About the study:**

If you have any questions or desire further information with respect to this study, you may contact:

**Contact for concerns about the rights of research subjects:**

If you have any concerns about your treatment or rights as a research subject, you may contact the Research Subject Information Line in the UBC Office of Research Services at 604-822-8598 or if long distance e-mail to [RSIL@ors.ubc.ca](mailto:RSIL@ors.ubc.ca) or toll free 1-877-822-8598.

**Consent:**

Your participation in this study is entirely voluntary. You may choose whether you wish to complete the questionnaire or not. During completion of the questionnaire, if you do not wish to answer a question you may leave it blank. If you choose not to participate, it will not affect on your relationship with UBC or with youth clinics.

Your completion of this questionnaire indicates that you consent to this study.

You may keep this information letter for your records.

Thank you!

## Appendix 2: Survey Sample

### Sexual Health Attitudes Questionnaire

This is a study that will assist public health nurses understand how to help you prevent Sexually Transmitted Infections (STIs). Completing this questionnaire is voluntary and confidential. Please do not put your name on it. You will never be identified in any discussion or publication of the results of this study. You may also skip any questions that you do not want to answer.

Please answer the following questions to the best of your ability.

For this survey, the meaning of **SEX** refers to **vaginal or anal intercourse only**.

#### **Section I: Demographics and Behaviour**

1. My age is \_\_\_\_\_ years.

2. My gender is: (please circle)    Male                  Female                  Transgendered

3. Please indicate the ethnic group that best describes your family's background (eg. South Asian, Chinese, Caucasian) \_\_\_\_\_

4. Are you sexually active (ever engaged in sex)? Circle your answer.

Yes

No

If yes, how many sexual partners have you had in the past 12 months? \_\_\_\_\_

5. Which contraceptive method(s) did you use in the past 12 months? (check all that apply)

- Condoms
- Birth control Pills
- Depo Provera
- Evra Patch
- Nuva ring
- Intrauterine Device (IUD)
- Other \_\_\_\_\_
- None
- Did not have sex
- Same-sex partners only

6. Did you use a condom the last time you had sex? (please circle)

Yes

No

7. How often do you use condoms during sex? (please circle)

Always

Sometimes

Seldom

Never

8. How important is using a condom every time you have sex? (please circle)

Very important

Somewhat important

Not very important

Not at all important



**Section II: STI History**

9. When, if ever, have you been tested for an STI? (please circle)

- Past month
- Past 3 months
- Past 12 months
- Past 2 years
- Longer than 2 years
- Never

10. Have you ever been diagnosed (tested positive) with an STI? (please circle)

Yes

No

If yes, which one(s)? (check all that apply)

- Chlamydia
- Gonorrhea
- Herpes
- HPV
- Syphilis
- Hepatitis B
- HIV
- Other \_\_\_\_\_

For questions 11 to 14, circle your answer to indicate how sure you are that you would be able to perform each of the following where: **1 = not sure at all** to **5 = very sure**

11. Use a condom correctly?

1                      2                      3                      4                      5

12. Use a condom every time that you have sexual intercourse?

1                      2                      3                      4                      5

13. Insist on using a condom during sex, even if your boyfriend/girlfriend does not want to use a condom?

1                      2                      3                      4                      5

14. Refuse to have sex if your boyfriend/girlfriend will not use a condom?

1                      2                      3                      4                      5

---

**Section III: Questions about Communication.**

15. Do you have a cell/mobile phone? (please circle)

Yes

No

If no, skip to question 22.

16. Does your cell/mobile phone have voicemail? (please circle)

Yes

No

17. Which is your preferred way of communication on your phone? (please circle)

Verbal

Text

Voicemail

Email

18. How often do you have your phone with you? (please circle)

Always

Sometimes

Seldom

Never

19. Do you send text messages? (please circle)

Yes

No

20. How many times a day do you send or receive text messages? (check one)

- 0 times a day
- 1-2 times a day
- 3-4 times a day
- 5-10 times a day
- more than 10x a day

21. How likely is a text message received on your phone to be seen by someone else? (please circle)

Very likely      Somewhat likely      Somewhat unlikely      Very unlikely      N/A

22. How often do you use the internet? (please circle)

Often      Sometimes      Seldom      Never

23. If you use the internet, where do you use it the most? (check one)

- school computer
- smart phone
- work computer
- home computer
- computer in a public place
- other \_\_\_\_\_
- n/a

24. Do you look up information on the internet about sexual health topics? (please circle)

Yes      No      N/A

25. How likely is a website you are looking at to be seen by someone else? (please circle)

Very likely      Somewhat likely      Somewhat unlikely      Very unlikely      N/A

---

**Section IV: How Do You Learn about Sexual Health**

For the following questions sexual health is defined as information about such topics as: decisions to have sex, using condoms, birth control, feelings on sexual activity etc.

How often do you **talk** with the following people about **sexual health**? (please check box)

	<b>Often</b>	<b>Sometimes</b>	<b>Seldom</b>	<b>Never</b>
26. Your parents?				
27. Your friends?				
28. Your teacher or school personnel?				
29. A nurse or doctor at a clinic?				

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**Section V: Communication**

Please check the box below the choice that indicates how **easy or difficult** the following would be to occur:

	<b>Very easy</b>	<b>Somewhat easy</b>	<b>Somewhat difficult</b>	<b>Very difficult</b>

30. Have a conversation about using a condom with a partner you just met (that day/night)?				
31. Have a conversation about using a condom with a partner you are acquainted with (dating less than 3 months)?				
32. Have a conversation about using a condom with a steady partner (dating more than 3 months)?				

Circle your answer to indicate how **sure** you are that you would be able to discuss each of the following with **your sexual partner**. **1 = not sure at all to 5 = very sure**

33. Ask if he/she has ever injected drugs such as heroin or cocaine into his/her veins?

1                      2                      3                      4                      5

34. Discuss preventing sexually transmitted infections (Gonorrhea, Chlamydia etc)

1                      2                      3                      4                      5

35. Ask about sexual relationships that he/she has had in the past?

1                      2                      3                      4                      5

36. Ask if he/she has ever had anal intercourse?

1                      2                      3                      4                      5

37. Ask if he/she has ever had a sexually transmitted infection?

1

2

3

4

5

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**Section VI: Knowledge**

Please write **T for True**, and **F for False** for the following questions about STIs.

	<b>T or F</b>
38. Chlamydia is only transmitted by vaginal intercourse	
39. Untreated Chlamydia is a significant cause of infertility in women	
40. In men Chlamydia can only be tested by a penile swab	
41. There is a cure for Gonorrhea	
42. Having anal sex increases a person's risk of getting Hepatitis B	
43. Human Papilloma Virus (HPV) can cause Genital Warts	
44. Human Papilloma Virus (HPV) can lead to cancer in women	
45. STIs can lead to health problems that are usually more serious for men than women	
46. A person who has Genital Herpes must have open sores to give the infection to his or her sexual partner	

47. A woman can tell by the way her body feels if she has an STI	
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48. If a person had Gonorrhea in the past then he or she is protected (immune) from getting it again	
49. There is a vaccine that can protect a person from getting Hepatitis B	
50. A person can get an STI from intimate body contact (without having intercourse) with an infected person	
51. A condom gives 100% protection against STIs	
52. People between the ages of 16 - 24 years are at high risk of contracting an STI	

**Section VII: Self-Efficacy**

Please check the box below the choice that indicates how you feel about each question.

	<b>Strongly Agree</b>	<b>Somewhat Agree</b>	<b>Neutral</b>	<b>Somewhat Disagree</b>	<b>Strongly Disagree</b>
53. I consider myself capable of convincing my partner to use condoms each time we have sex					
54. Most people who are important to me would recommend that I use a condom every time I have sex					

**Section VIII: My Relationship with a Nurse at a Sexual Health Clinic**

The following are a list of interactions that you might have with a nurse if you ever visited a sexual health clinic. Please indicate which **conversations** with the nurse you would **prefer** to have and check the appropriate box. (check one box per question/row)



	<b>Face to Face with Nurse</b>	<b>Text Message</b>	<b>Email</b>	<b>Phone</b>	<b>Doesn't Matter</b>
55. Notification of STI test results					
56. Reminder to call the nurse					
57. Reminder to use condoms					
58. Information about STIs					
59. Clinic locations					
60. Asking a sexual health question					

Imagine that you visit a sexual health clinic because you are **worried that you may have an STI**. At the clinic you meet a nurse who gives you an examination and talks to you about STIs. You find her knowledgeable and caring. She asks you if you **would like to receive periodic text messages** from her to remind you to have safe sex, provide information or to inform you to call her when she receives your test results. Thinking about your relationship with this nurse, please answer the following questions by checking the appropriate box:

	<b>Strongly Agree</b>	<b>Somewhat Agree</b>	<b>Neutral</b>	<b>Somewhat Disagree</b>	<b>Strongly Disagree</b>
61. I think receiving text messages from this nurse would make it more likely that I would follow her instructions.					
62. I think that receiving text messages from this nurse would <b>not</b> be comfortable for me.					
63. I am worried about confidentiality when I think about receiving text messages					

from a nurse.					
64. Text messages would provide a continuing link between the nurse and me.					
65. The ability to text message the nurse would make it more likely that I would contact her in the future if I had a question or concern.					
66. I think that occasional text message reminders from this nurse would make it more likely that I would use a condom every time.					
67. There isn't much difference between a face to face OR a texting relationship with a nurse.					
68. I would be embarrassed if someone saw a sexual health text message on my phone.					

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**Section IX: Text Message Design**

**(Here is where you get to be creative). Design a text message to send to youth who have come to a clinic. The purpose of the message would be to remind them to use condoms.**

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**When would you send it?**

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**Thank you!**