CERVICAL CANCER SCREENING PRACTICES AMONG YOUNG WOMEN ATTENDING UNIVERISTY

by

Linda Duffett-Leger

Bachelor of Arts, University of New Brunswick, 1992

Bachelor of Nursing, University of New Brunswick, 1996

A Thesis Submitted in the Partial Fulfillment of
the Requirements for the Degree

Master of Nursing

in the Graduate Academic Unit of Nursing

Supervisor:	Dr. Nicole Letourneau, RN PhD, Nursing
Examining Board:	Dr. Gail Storr, RN PhD, Nursing, Chair Prof. Grace Getty, RN MN, Nursing Dr. Jim Croll, PEd.D, Education Dr. Linda Nugent, RN PhD, Nursing
External Examiner:	Heather Sears, PhD, Psychology, UNB

This thesis is accepted by the
Dean of Graduate Studies

THE UNIVERISTY OF NEW BRUNSWICK

February, 2006

Your file Votre référence
ISBN: 978-0-494-41304-3
Our file Notre référence
ISBN: 978-0-494-41304-3

Abstract

Young women are at high risk for contracting HPV, the number one risk factor for cervical cancer. However, little is know about the factors influencing young women's Pap screening behaviours. In this descriptive, correlational, cross-sectional study, the Theory of Planned Behaviour (TPB) was utilized as a framework to assess predictors of young women's intentions to be screened, and past screening behaviours. A web-based survey (WebCT) was used to survey 3000 young women (25 years of age and younger) attending the University of New Brunswick. A total of 904 young women (M = 20.7 years; SD=1.77) participated. The findings validated the utilization of the TPB as a framework to study factors influencing young university women's Pap testing intentions and behaviours. Strategies to increase young women's regular participation in Pap screening have been identified as key in the prevention of cervical cancer.

Acknowledgements

It is difficult for me to recognize certain individuals without first recognizing the entire staff at the UNB Nursing Faculty for all their support over the years. I would like to acknowledge Dr. Judy Wuest, the former Director of Graduate Studies, and Dr. Gail Storr, the Acting Director of Graduate Studies, for their constant encouragement and tireless commitment to the UNB Nursing Faculty. Also, I wish many thanks to the former Dean, Penny Ericson, and Dean Cheryl Gibson, who have inspired me and taught me the importance of having a vision. I am especially grateful to the members of my thesis committee and Rik Hall, WebCT Administrator, all of whom gave of their time to provide me with valuable support and guidance. Special thanks to Professor Grace Getty for her years of mentorship and unconditional support, and Dr. Nicole Letourneau for her generous spirit and enthusiasm for nursing research.

Lastly, and perhaps most importantly, I would like to acknowledge the support of my friends and family. I want to thank my close friends who have always been my cheerleaders. Without their constant encouragement I might have surrendered to periods of self doubt. I am also truly grateful to my family for their unwavering support. Special thanks to my mother who has always encouraged me to explore the many opportunities that the nursing profession has to offer. As well, I am eternally grateful to my husband, Rob, and three daughters, Olivia, Isabelle, and Hope, whom have stood by me and supported me through this process despite the many sacrifices.

TABLE OF CONTENTS

List of Tables

List of Figures

Chapter 1: Introduction

Despite being one of the most preventable cancers, cervical cancer continues to be the leading cause of morbidity and mortality in women worldwide (Public Health Agency of Canada, PHAC, 1998). In 2003, 1400 new cases of cervical cancer and 420 related deaths were estimated in Canada, an age-standardized rate of 7.9 per 100,000 women (National Cancer Institute of Canada, NCIC, 2003). In Canada, cervical cancer incidence rates are highest in the Atlantic provinces of Newfoundland, Prince Edward Island, and Nova Scotia (Canadian Cancer Statistics, 2000).

Cervical cancer remains the most common cancer in women and the leading cause of death by cancer in developing countries where there is limited access to screening (Wilson, Tobin & Young, 2004). Since the Papanicolaou (Pap) smear test, which screens women for pre-cancerous cervical lesions (cervical dysplasia) as well as for cervical cancer was introduced over 50 years ago, morbidity and mortality rates of cervical cancer have declined significantly. In Canada, between 1969 and 1998, incidence rates of invasive cervical cancer fell from a high of 21.8 per 100,000 to 8.3 per 100,000 of females respectively, and age-standardized mortality rates dropped from 7.4 per 100,000 females in 1969 to 2.2 per 100,000 in 1998. However, the Laboratory Centre for Disease Control (LCDC) indicates that the rate of decline in cervical cancer incidence in Canada has slowed since the mid-70s, particularly among women under 50 years of age (Coleman, 2000). Similar trends have been identified in the United States (Larsen, 1994) and Europe (Levi, Lucchini, Negri, Franceshi & Vecchia, 2000). This trend may be related to increased cancer detection rates (Franco, Duarte-Franco & Ferenczy, 2001) or it may reflect a long-term increase of this disease, and the concurrent increase of

behaviours that influence cervical cancer development (e.g., HPV infection, smoking, frequency of Pap screening) (Noller, 1996). The increase of adenocarcinomas and adenosquamous carcinomas, which account for 10% of cervical cancers in Western populations, may be another factor associated with this trend of increasing incidence (Vizcaino, et al., 1998).

Most cases of invasive cervical cancer occur in women who have never been screened or who have not been screened within the last three years (Grunfield, 1997; Stuart, McGregor, & Duggan, 1997). According to current Health Canada (1998) guidelines, annual Pap testing is recommended once a woman becomes sexually active or turns 18 years of age. After two normal Pap smears the frequency of testing may be reduced to once every three years until the age of 69 for women in monogamous relationships. According to Coleman (2000), epidemiological research reveals that an increasing number of Canadian women have never been screened for cervical cancer, or have not had a Pap test in the past three years. Among Atlantic Canadian women, 89% reported that they had been tested at least once, which is slightly higher than the national average (87%). However, only 79% of women in New Brunswick had been tested in the last three years, compared to 83% of other Canadian women, making them the least likely in the country to have been tested in the last three years (ACPH, Toward a Healthy Future, 1999).

Statement of Problem/Relevance

A number of factors have been identified in the literature that put young women at particular risk for developing cervical cancer. Oral contraceptive use, exposure to cigarette smoke (both first and second hand), history of multiple sex partners, and early

initiation of sexual intercourse may increase women's risk for developing cervical cancer (Sellors, 2000; Winer et al., 2003). Associated with these risk factors is infection with the Human Papilloma Virus (HPV), due to the sexual nature of its transmission. In fact, HPV has emerged as the most significant risk factor for cervical cancer (Burak & Meyer, 1997; Fisher, Rosenfeld & Burk, 1991; Sellors, 2000; Winer et al., 2003).

Statement of Purpose

The purpose of this study is to describe university women's knowledge, attitudes, subjective norms, perceived behavioural control, intentions toward cervical cancer screening and reported screening behaviours. Specifically, the relationships between their knowledge, attitudes, subjective norms, perceived behavioural control, intentions to be screened and reported screening behaviours were examined. Very little is yet known about the factors that influence women's attitudes toward cervical screening behaviours. This study attempts to illuminate these factors and provide new evidence to inform the development of preventative programs, and to provide future directions for study.

Research Questions

For university women 25 years of age and younger, what are:

1. The knowledge, attitudes, subjective norms, perceived behavioural control, and intentions toward cervical cancer screening, and self-reported practices of cervical cancer screening?
2. The specific relationships between: (a) knowledge and intentions to get a Pap test; (b) attitudes and intentions to get a Pap test; (c) subjective norms and intentions to get a Pap test; and (d) perceived behavioural control and intentions to get a Pap test?

3. The specific relationships between: (a) knowledge and reported screening behaviours; (b) attitudes and reported screening behaviours; (c) subjective norms and reported screening behaviours; (d) perceived behavioural control and reported screening behaviours; and (e) intentions to get a Pap test and reported screening behaviours.
4. The relationships between demographic, descriptive and risk factors variables and (a) intentions toward cervical screening and (b) reported screening behaviour.
5. The differences in the knowledge, attitudes, subjective norms, perceived behavioural control and intentions of young women who report receiving regular cervical cancer screening compared to those who do not.

Theoretical Framework

The Theory of Planned Behaviour (TPB) (Azjen & Fishbein, 1980) provides the conceptual framework for this study, and postulates that people are generally rational and that they consider the implications of their actions before making decisions on performing or not performing a specific behaviour. The TPB is comprised of five concepts, including: (a) attitudes, (b) subjective norms, (c) perceived behavioural control, (d) intentions, and (e) behaviours.

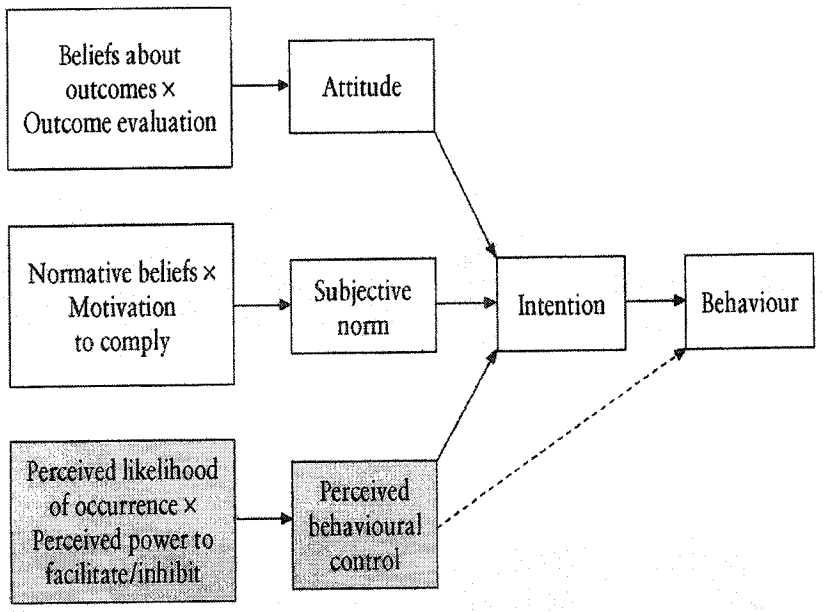


Figure 1: *The Theory of Planned Behaviour* (Rutter & Quine, 2002, p.12).

The TPB has been used in recent studies to predict behaviours, including recycling (Cheung & Chan, 1999), exercise (Courneya, Plotnikoff, Hotz & Birkett, 2000; Courneya, Bobick & Schinke, 1999; Estabrooks, 1999; Norman, Conner & Bell, 2000), drug use (Armitage, Conner, Loach & Willets, 1999), condom use (Bennett & Bozionelos, 2000; Fazekas, Senn & Ledgerwood, 2001), unethical decision-making (Chang, 1998), health-check attendance (Norman & Conner, 1996, 1993), cigarette smoking in teens (Hanson, 1997), mammography utilization (Ashing, 1999; Rutter, 2000), and health screening in general (Conner, Sheeran, Norman & Armitage, 2001; Sheeran, Norman & Connor, 2001). The TPB has been used as a conceptual framework to study the factors influencing women's cervical cancer screening intentions and behaviours (Jennings-Dozier, 1999; Jennings-Dozier, 1997; Sheeran, et al., 2001; Sheeran & Orbell, 2000; Bish, Sutton & Golombok, 2000).

The TPB is an expectancy-value model, according to which behaviour is a function of the expectancies (beliefs) one has and the value of the goal toward which one is working. Such an approach predicts that, when more than one behaviour is possible, the behaviour chosen will be the one with the largest combination of expected successes and value (Palmgreen, 1984). An extension of Fishbein and Azjen's (1975) Theory of Reasoned Action (TRA), the TPB is based on the assumption that human social behaviours are under volitional control (e.g., simple behaviours such as brushing your teeth or shaving) and thus can be predicted by the formation of intentions. Thus, the more an individual intends to perform a behaviour, the more likely they are to perform that behaviour. However, many behavioural goals are more complex and the process of attaining such goals requires that a number of steps be taken. For instance, the goal of getting a Pap test requires steps that are not always under the control of the individual (e.g., access to a doctor, making an appointment, getting transportation), and these steps may present barriers to the execution of the goal behaviour. Azjen (1988) addressed the problem of incomplete volitional control by including the measure of perceived behavioural control (PBC), thereby creating the TPB. Since the purpose of this study is to assess behavioural factors (e.g. attitudes, beliefs) associated with young university women's intentions to receive Pap testing, the TPB offers a useful conceptual framework.

Individual beliefs form the foundation for this conceptual structure, and are represented by the information an individual has about a particular phenomenon and the belief that this knowledge is true (Azjen, 1988). While beliefs form the information structure that determine attitudes, subjective norms, and intentions, the influence that beliefs have on behaviour is not always consistent since knowledge is also influenced by

normative and attitudinal factors (Azjen, 1988). In this study, the beliefs young university women hold about cervical screening may be influenced by the knowledge they have about cervical cancer, associated risk factors, and the Pap smear test, as well as past experiences and other extraneous information they may have regarding Pap screening. Young women holding strong beliefs that the behaviour (getting a Pap test) will result in positive outcomes likely hold positive attitudes towards that behaviour. However, negative beliefs about Pap screening (e.g. embarrassing, painful) may negatively affect young women's subsequent behaviour. Similarly, beliefs and practices of friends/family towards Pap testing will also influence young women's decisions to get a Pap test.

According to the literature, most young women are poorly informed about the Pap test and the fact that it is an effective screening tool in the prevention of cervical cancer. As a result, many have never been screened or are not screened regularly (Kahn, Emans, & Goodman, 2001; Kowlaski & Brown, 1994; Maxwell, Bancej, Snider, & Vik, 2001). However, while increasing knowledge is an important aspect of promoting cervical screening in young women, it is actually the influence of this knowledge on the person's evaluation of the behaviour that is most important in the development of cervical screening promotion programs. In fact, research has demonstrated that increased knowledge about risks may not be associated with lower risk behaviours in the adolescent population (Cook & Bellis, 2001). For instance, young people continue to engage in high risk sexual behaviours despite knowing that such behaviours are highly associated with the transmission of the human immunodeficiency virus (HIV) and other sexually transmitted infections (STIs) (Ratliff-Crain, Donald, & Dalton, 1999). These findings underscore the importance of not only providing information to increase young women's

knowledge regarding cervical screening, but on determining how young women evaluate this information.

Attitudes

Attitudes toward the behaviour are defined as learned predispositions to judge something in a positive or negative light (Ajzen, 1988). They are based on a set of beliefs, rather than just one specific belief, and they are learned, in the sense that they are reflections of a person's past experiences. Thus, people who believe that a behaviour will result in a positive outcome, tend to look upon it more favorably than those who have the opposite attitude. This important evaluative component of attitude sets it apart from the other concepts. In this study, cervical cancer screening attitudes are defined as the favorable or unfavorable evaluations of the Pap smear process.

A person's attitude toward a behaviour is a direct determinant of her intention to perform that behaviour (Ajzen, 1988). Also notable is the predictive role that attitudes play in corresponding behaviour. Essentially, the favorable and unfavorable evaluations associated with attitudes assist in understanding why people do or do not engage in certain behaviours. This study will examine women's attitudes toward cervical screening, and whether their attitudes are linked to their past cervical screening behaviour and their intentions to engage in this behaviour.

Subjective Norms

Subjective norms are derived from the interactions of two factors, normative beliefs and motivation. Normative beliefs relate to a person's beliefs about whether or not others support a particular behaviour. Motivation, the degree to which one wishes to please these others, interacts with normative beliefs to influence intentions to perform

this behaviour. Thus, women's subjective norms about Pap smears are influenced by their belief that others either support or oppose the use of this form of screening. Their motivation to please these people influences women's decision to either accept or reject their stance (Azjen, 1988). This study will examine the role of young women's subjective norms in forming intentions to receive Pap testing and in engaging in this behaviour previously.

Perceived Behavioural Control (PBC)

According to Azjen (1988), PBC is the perceived ease or difficulty of performing a particular behaviour and a personal sense of control over performing it, reflecting both past experiences as well as anticipated barriers or obstacles. As a general rule, the more favorable the attitude and subjective norm with respect to a behaviour, and the greater the PBC, the stronger should be the individual's intentions to perform the behaviour under consideration (Azjen, 1988). PBC is a concept that has been largely derived from Bandura's concept of self-efficacy, which suggests that behavioural change is facilitated by a personal sense of control (Bandura, 1994). Thus, an increased sense of self-efficacy will lead to an increased motivation to act, thereby increasing the likelihood of behaviour performance. Self-efficacy refers to an individual's beliefs about her own ability to affect change over events that shape her life, while PBC refers to her belief in her ability to perform a specific behaviour successfully. Both are similar in that they are concerned with an individual's perception of her ability to perform a particular behaviour or sequence of behaviours successfully (Bandura, 1994).

PBC can have direct or indirect influences on behaviour. PBC has a direct influence on behaviour when there is a greater match between an individual's PBC and

his/her actual control over the behaviour (Azjen, 1988). The more resources and opportunities individuals believe they possess, and the fewer impediments they anticipate, the greater should be their PBC and the likelihood of enacting the behaviour. In contrast, PBC can have an indirect influence on the likelihood of enacting behaviours via behavioural intentions. In this study, the associations between PBC and young women's cervical screening intentions and behaviours will be examined.

Intentions

Intention to perform a certain behaviour is a concept central to the TPB, and is affected by the person's attitude about the behaviour, subjective norms and perceived behavioural control. Thus, women's intentions to utilize cervical cancer screening are related to their attitudes about Pap smears, their beliefs about whether others support the test, their motivation to comply with societal expectations, and how difficult or easy they believe it is to have the procedure done. The strength of the intention is indicated by a person's belief that she will carry out the behaviour. Intentions are thought to directly determine corresponding behaviours, unless influenced by other intervening variables (Azjen, 1988). In this study, young women's intentions to obtain cervical cancer screening will be evaluated.

Behaviour

The final concept in the conceptual model by Fishbein and Azjen (1975), are defined as overt or observable acts. Reported past cervical screening behaviour will be evaluated in this study.

Chapter 2: Literature Review

Young women are prone to cervical dysplasia for a variety of reasons, including HPV infection, early onset of sexual intercourse, multiple sex partners, oral contraceptive use (Moreno et al., 2002; Moscicki et al., 2001; Skegg, 2002; Smith et al., 2003; Winer et al., 2003); parity (Moreno et al., 2002; Munoz et al., 2002; Skegg, 2002); poor diet (Sedjo et al., 2002; Ziegler, Weinstein & Fears, 2002); smoking (Kjellberg et al., 2000), and susceptibility of the adolescent cervix to sexually transmitted infections (Moscicki, Winkler, Irwin & Schacter, 1989; Shew, Fortenberry, Miles & Amortegui, 1994). Organized screening is recognized as a key factor in the prevention of cervical cancer through early detection of cervical dysplasia, and yet young women continue to underutilize cervical screening (Burak & Meyer, 1997; Ramirez et al., 1997; Vail-Smith & White, 1992). While the reasons young women delay or defer regular Pap testing are poorly understood, researchers have identified some of the behavioural factors associated with young women's decisions to participate in screening programs.

Risk Factors for Cervical Cancer

Human Papillomavirus (HPV)

A number of studies have demonstrated a clear relationship between infection with HPV and cervical cancer (Mayor, 1996; McNeil, 1996; Nobbenhuis & Walboomers, 1999), establishing HPV as the number one risk factor for cervical cancer. In fact, the association between HPV infection and cervical neoplasia is even greater than the association between smoking and lung cancer (Franco, 1995). That is, most women (99.7%) with cervical cancer also test positive for HPV (Walboomers et al., 1999).

HPV transmission and natural history. HPV is transmitted through sexual contact and unlike other sexually transmitted infections (STIs), which are spread through body fluids, HPV is spread through skin-to-skin contact. HPV infection has been identified in virgins, albeit at significantly lower rates than nonvirgins, providing further evidence that HPV is extremely contagious and can be transmitted through non-penetrative sexual activities (Winer et al., 2003). Moreover, the regular use of a male condom during intercourse has not been found to be completely protective against HPV infection (Cothran & White, 2002; Ho et al., 1998; Koutsky, 1997; Winer et al., 2003).

More than 80 types of HPV have been identified (Herrero, 1996), and while some strains present as cauliflower-like growths in a small proportion (3%) of the population (Ferenczy, 1995), most cases of HPV infections are asymptomatic (Mao et al., 2003). Most HPV infections are transient in nature, spontaneously regressing within 12 to 24 months after infection (Franco et al., 1999, Patrick et al., 2000), during which time women may become infected with another strain of HPV or experience a reactivation of a latent or previously existing infection (Patrick et al., 2000). It is the highly persistent types of HPV (e.g., HPV-16, HPV-18) that are thought to be associated with cervical dysplasia (precancerous changes) and cervical cancer (Cannistra & Niloff, 1996; Herrero, 1996; Ho et al., 1995).

Cervical dysplasia and pap testing. After initial infection with HPV, it can take more than 20 years to progress to cervical cancer, which is typically diagnosed in women 35 years of age and older. The Pap smear is useful in detecting abnormalities in cervical tissue as it progresses through more malignant stages of dysplasia. The Bethesda system, currently used in Canada to report cancer precursors, consists of the following

classifications: low-grade SIL (Squamous intraepithelial lesion) - mild dysplasia; high-grade SIL- moderate dysplasia; ASCUS (atypical squamous cells of undetermined significance) (Canadian Cancer Society, 2003). When precancerous cervical tissue is detected, cryotherapy, laser vaporization, and excision are used to treat affected cells in order to prevent further progression into cervical cancer (Canadian Cancer Society, 2003).

Incidence and prevalence of HPV in young women. Despite strong evidence linking HPV to cervical cancer, HPV has never been notifiable (a disease requiring reporting to Medical Officer of Health) in Canada. Only recently have we begun to learn about the rates of HPV in Canada, and the particular vulnerability of certain populations, such as Aboriginal (Healey et al., 2001) and HIV-infected women (Hankins et al., 1999).

Young women appear to be increasingly at risk for developing gynecological cancers, such as vulvar cancer (Al-Ghamdi et al., 2002), and cervical cancer (Bauer et al., 1991; Beuhler & Parson, 1997; Fisher et al., 1991; Kahn, 1999; Moscicki et al., 1998; Roye & Nelson, 2003), both of which are strongly associated with HPV and have historically been more prevalent in older populations. HPV prevalence rates are high in young women, many of whom become infected with strains highly associated with cervical cancer. Woodman et al. (2001) reported a 44% three-year cumulative risk of HPV infection in female teens (15 to 19 years age) with HPV-16 being the most commonly detected strain. As many as 60% of adolescent females have been found to be infected with one or more cancer-related strains of the virus (Moscicki, Burt, Kanowitz, Darragh & Shiboski, 1999). Rates of HPV have been found to peak between the ages of 22 and 25, both in American (National Institute for Health, 1996) and Canadian women

(Ratnam, Franco, & Ferenczy, 2000; Sellors et al., 2000), becoming progressively lower in the older age groups and reaching the lowest rates in women 45 to 49 years of age (Sellors et al., 2000). Reflected in this trend, Mount and Papillo (1999) reported higher incidences of Pap smears with SIL in adolescents compared to adult women, and while rates of squamous cell carcinoma are on the decline, rates of adenocarcinoma are on the rise in young women, the later of which is associated with a more virulent and deadly form of the disease (Liu, Semenciw, Probert & Mao, 2001).

Studies of women attending college health centers have revealed that as many as 11% to 46% tested positive for HPV (Bauer, Ting & Greer, 1991; Cothran, 1996; Ho, Bierman, Beardsley, Chang & Burk, 1998; Koutsky, 1997; Wheeler, Parmenter & Hunt, 1993). A sample of young women attending one Canadian university was found to have a HPV prevalence rate of 22% (Richardson, et al., 2000), compared to a prevalence rate of 32% found among students enrolled at one American university (Winer et al., 2003). The most common pathogen identified in both studies was HPV-16, indicating that a significant number of sexually active women may become infected at some point in their lives with an oncogenic (cancer causing) strain of HPV. *Associated Risk Factors*

It is clear that young women are at high risk of becoming infected with HPV because of the sexual mode of transmission (Ho et al., 1998). While the natural history of HPV infection remains somewhat unclear (Sellors et al., 2000), evidence suggests that early coitus, coital frequency, and number of partners significantly enhance viral persistence (Shew, 2003).

Early coitus. Several studies have demonstrated a significant association between early age of first intercourse and subsequent HPV infection (Burkett et al., 1992; Kahn,

Goodman, Slap, Huang & Emans, 2002; Ley et al., 1991). However, little is known about the biological and behavioural variables mediating this relationship. Some researchers have identified that early coitus is associated with behavioural risk factors, such as multiple sex partners and sexual intercourse with risky partners (Beuhler & Parsons, 1997; Greenberg, Magder & Aral, 1992), as well as other risk behaviours like alcohol and drug use (Coker et al., 1994). Others have suggested that young women are biologically vulnerable to STIs due to the inadequate production of cervical mucous, which appears to provide a protective barrier against infectious agents (Apter, Butzow, Laughlin & Yen, 1993). As well, the cervix of a young woman is composed of immature columnar cells, which may be susceptible to STIs such as HPV (Lovejoy, 1987; Moscicki et al., 1989; Moscicki et al., 1999).

Many young women become sexually active during their mid to late teenage years. Results of the 1996 Canadian Population Health Survey (NPHS), the most recent nationally representative data on the sexual behaviour of Canadian youth, revealed that the average Canadian teen initiates sexual intercourse between the ages of 16 and 17. In Canada, more than 50% of high school students have had sexual intercourse (King et al., 1988; Thomas, DiCenso & Griffith, 1998). Results from an ongoing study indicate that over 60% of adolescent girls (16-19 years) attending New Brunswick schools are sexually active (Mitra & Easley, 2003). According to the New Brunswick Student Drug Use Survey (2002), 51% of sexually active high school students engaged in unplanned sex, of whom 55% were under the influence of drugs or alcohol.

Multiple sex partners. Having multiple sex partners is strongly associated with genital HPV infection in young women (ACS, 1995; Edwards, 1994). A study from

Finland showed that women who had five or more partners during a recent two-year period were 12 times more likely to be infected with HPV than those who had one or no partners (Kataja et al., 1993). The Alan Guttmacher Institute (AGI) (1995) reported that approximately 10% of single non-cohabitating adolescent and young adult women have had two or more sexual partners in a three-month period. A study by the American Social Health Association (ASHA, 1995) found that half of the female university student participants had four or more sex partners, and 7% reported having more than 21 partners. In Canada, 8% of young women between 18 and 19 years of age, and 6% of those 20 to 24 years of age reported having more than three sexual partners in the last year (Health Canada, 1999). A limitation of this research is that it has focused on heterosexual sex (sexual intercourse between a man and a woman). Thus, sexual orientation was asked of participants in this survey.

Co-Factors Associated with Cervical Cancer

Since HPV is extremely prevalent but only a small percentage of HPV infections progress to cervical cancer, co-factors are hypothesized to facilitate oncogenic transformation of the cervix (Shiffman et al., 1993). Schneider, Kay and Lee (1983) identified immunosuppression as an important cofactor for HPV and progression to cervical cancer. Consequently, women infected with the Human Immunodeficiency Virus (HIV) are particularly at risk for HPV infection and abnormal changes in the cells on the surface of the cervix (SIL) (Hankins et al., 1999). Young women who partake in smoking, alcohol consumption, and poor eating habits also may have compromised immune systems, increasing their risk of oncogenic transformation (Cothran & White, 2002).

Oral contraceptives and parity. The relationship between oral contraceptives and HPV infection is somewhat unclear. While a number of studies have found no significant correlation between oral contraceptive use and HPV infection, Moscicki et al. (2001) found a significant protective effect, and Winer et al. (2003) found a significant association between current oral contraceptive use and HPV infection. However, this significant finding may be due to detection bias, since women using oral contraceptives require annual screening and thus may be screened more frequently than non-users. On the other hand, parity, or number of live births, has consistently been documented in the literature as a risk factor for cervical cancer. A linear relationship between parity and risk has been established in studies from North America as well as Central and South America (Brinton et al., 1987).

Diet. Nutrition is another coexisting factor identified in the literature. Research indicates that diets rich in beta carotene and Vitamin C and A are associated with a decreased risk of cervical cancer (Herrero et al., 1991; Sedjo et al., 2002; Ziegler et al., 2002). Thus, high rates of cervical cancer in developing countries may be attributed to the combination of high parity and nutrient deficient diets. An assessment of dietary habits is beyond the scope of this study.

Smoking. The Atlantic Provinces have the highest smoking rates in Canada, and rates have increased dramatically in teenage girls, from 24% in 1966 to 37% in 1995 (New Brunswick Student Drug Use Survey, 2002). There is conflicting evidence with respect to the relationship between smoking and HPV infection. Many earlier studies did not find a significant association between cigarette smoking and HPV infection (Burk et al., 1996; Fairley et al., 1994; Wheeler et al., 1993). However, more recent research has

identified an increased incidence of HPV infection in women exposed to tobacco smoke, both actively and passively (Coker, Bond, Williams, Gerasimova & Pirisi, 2002; Winer et al., 2003). While there is also some evidence that women's risks may increase if their partner smokes (Tokudome, 1997), since semen may contain carginogens, an assessment of partner smoking is beyond the scope of this study.

A clear connection has been established in the literature between behavioural trends and the biological vulnerability of young women and their resultant susceptibility to HPV infection and the risk of developing cervical cancer. Key to minimizing this disturbing trend is young women's participation in cervical cancer screening programs.

Primary and Secondary Prevention

Since HPV infection often occurs in adolescence and young adulthood, behaviours that increase the risk of acquiring HPV during this period may have devastating consequences on women's health as they mature. The combination of increased incidence of HPV infection and changing sociosexual trends (e.g., multiple sex partners) underscores the importance of recruiting as many young women as possible for cervical screening (Buehler & Parsons, 1997). Interventions need to target young women in order to reduce the incidence of cervical cancer across the life span (Cothran & White, 2002). However, recent research has focused on the epidemiology and natural history of HPV, and to a much lesser extent on interventions designed to reduce the incidence and prevalence of HPV by increasing screening behaviours (Patrick et al., 2000).

According to the Health Services Utilization and Research Commission (1997), research has consistently shown that regions with organized screening programs that include a recall system (e.g., mailed reminders) have lower mortality rates related to

cervical cancer than do regions with no systematic recall. In Newfoundland, the Cervical Screening Initiative (CSI), an organized screening program, was implemented in the western region of the province. Since its inception five years ago, screening rates in western Newfoundland have increased from 28% to 42% (Cervical Cancer Prevention Network, 2001).

Organized screening programs have been shown to be cost effective through the early detection of pre-cancerous lesions and by ensuring that women are not screened more often than necessary (Seller, 1999). However, to date, organized screening programs have only been adopted in the provinces of British Columbia, Nova Scotia, Prince Edward Island (Health Canada, 1998), and Ontario (Black, Yamada & Mann, 2002). Without organized screening programs, Pap testing continues to be conducted in an unsystematic fashion, resulting in inadequate testing of many women. While some women are over screened (e.g., screened more frequently than Health Canada's guidelines), many more do not receive screening in line with recommended guidelines (Rochon & Ford, 2002).

While a vaccine against HPV is currently under development, and young women appear to have positive attitudes towards HPV vaccination (Hoover, Carfioli & Moench, 2000), it could be some time before a vaccine will be available on the market. Until such time, the best defense against cervical cancer will be theoretically grounded (Fisher, 1997) and evidence-based prevention programs promoting regular Pap tests and smoking reduction (Patrick et al., 2000) and safer sexual behaviours (e.g., a low number of sex partners and later age at first coitus).

Underutilization of Pap Screening

While cervical cancer is almost completely preventable through regular cervical screening, studies consistently show that the Pap test continues to be underutilized (Rolnick, La Ferla & Wehrle, 1996; Stuart et al., 1997), particularly by specific sub-groups of Canadian women. The National Population Health Survey (NPHS) is conducted by Statistics Canada on an ongoing basis and involves the collection of cross-sectional and longitudinal data on the health of Canadians. Data collected from the NPHS (1996-97) confirms that Pap testing continues to be underutilized by young women ages 18 to 24, as well as those over 65. Findings indicate that both cohorts are more likely to have never been screened or are not being screened regularly for cervical dysplasia, in comparison to their middle-aged counterparts. In one study, 53% of young women revealed that they had not received regular Pap screening because they did not feel it was important (Maxwell et al., 2001).

Understanding the barriers to screening is paramount in designing programs that effectively promote cervical cancer screening. A large body of evidence shows that older women underutilize Pap testing for reasons such as inadequate referral by family physicians, and mobility and economic issues (e.g., limited means for transportation and poor insurance coverage) (Blair, 1998; Brooks, 1996; Guiltz, Bustillo-Hernandez & Kent, 1998; Resnick, 1998; Ruchlin, 1997; Weinrich, Coker, Weinrich, Eleazer & Greene, 1995). However, little research exists to explain the variable screening patterns of young women. Findings to date indicate that screening rates may be negatively influenced by poor access to healthcare, discriminatory referral practices of healthcare providers, and

limited patient knowledge regarding risk factors for cervical cancer and purpose for screening (Burak & Meyer, 1997; Ramirez et al., 1997; Vail-Smith & White, 1992).

Fitch, Greenberg, Cava, Spaner and Taylor (1998) examined women's perceptions of the barriers to cervical screening in an urban Canadian setting through focus groups. Four broad themes emerged from this study including: the importance of being able to talk with doctors, being treated like a person, finding answers to questions about cancer, and the discomfort of having a Pap test. Money was not identified as a barrier despite the low economic status of study participants. This finding directly contrasts results from American studies (i.e., ability to afford health insurance strongly influences women's access to Pap screening in the U.S.) and is reflective of the universality of the Canadian healthcare system.

Unfortunately, failure of young women to receive time-appropriate Pap screening can lead to serious consequences. Roye and Nelson (2003) completed a medical chart review of 270 sexually active, high school aged girls (13-20 years) attending a school-based clinic in New York City. The purpose of the study was to ascertain the percentage of adolescent girls presenting with abnormal Pap results and to identify how many had been screened by other providers in the past. Only those receiving a Pap test at the clinic were included in the study sample, and only 25% of these had ever had a Pap test prior to attending the clinic. Findings indicate that 13% (n=35) of the girls sampled had an abnormal Pap smear result, and 9.6% (n=26) of the girls who tested positive for dysplasia, or a higher grade lesion, had never been previously screened.

Most Pap testing is done opportunistically when young women attend their physician's office. Research indicates that women who do not have a regular physician or

regular consultations with a health care provider, are less likely to have ever had a Pap test or be tested in a time-appropriate manner (Maxwell et al., 2001). While regular visits with a physician is an important factor in the promotion of cervical screening, studies show that young women often do not discuss their sexual health with their health care provider. Dell and colleagues (2000) studied high school aged girls from the Toronto area and discovered that while 82% had visited their doctor's offices in the last year, only 21% actually talked to their doctor or a nurse about sexual health issues. These findings are consistent with previous research that has found that health care providers often miss opportunities to discuss sexual health issues (Linnehan & Groce, 1999).

Research indicates that the nature of the communication between a health care provider and his/her patient has an impact on Pap smear and treatment compliance. Kahn et al. (2001) developed and tested the Provider-Adolescent Communication scale (PACS) to measure adolescent and young adult women's perceptions of communication with the healthcare provider regarding Pap smears. The scale was developed from the theoretical framework of the Expectancy-Value Theory, which is the basis for the Theory of Reasoned Action (TRA) and the Theory of Planned Behaviour (TPB). Central to this theory is the notion that attitudes are derived from beliefs regarding the nature of an object or action, and by the evaluations of those attributes. Four hundred and ninety young women (534 eligible; 92% participation rate), between the ages of 12 and 24 (mean age of 18.2 years) who were attending a hospital-based adolescent clinic, were asked to complete the self-administered, written PACS questionnaire during a regular clinic visit. Results indicated that this tool is a reliable and valid measure of young women's communication with providers regarding Pap smears (Cronbach α of 0.95).

Participants who had a consistent provider were more likely to report good communication with their provider regarding Pap smears. They also were more apt to report that the provider had recommended a Pap smear, and to have some knowledge about Pap smears and HPV. In addition, they had positive attitudes about Pap smear follow-up and were more likely to have intentions to return for follow-up Pap smears.

Lavin, Goodman, Perlman, Kelly and Emans (1997) completed a retrospective chart review of 888 adolescent women attending a hospital-based adolescent clinic. One hundred nineteen (13.4%) of those sampled had an abnormal Pap smear during the research year and 60 patients were referred for colposcopy. Results indicated that only 37 (61%) of those women who were referred kept the appointment despite out-reach attempts. Factors such as race, insurance status, age, Pap smear result, previous referral to colposcopy, or number of reminders with recommendations for repeat Pap smears or colposcopy did not significantly influence compliance. In fact, the only factor that reached significance ($p = 0.007$) was whether or not the adolescent had visited the clinic after being notified about the abnormal Pap smear and prior to the colposcopy appointment. That is, 79% of those who visited the clinic kept the colposcopy appointment, compared to 45% who did not make a visit, suggesting that communication with the care provider can positively influence compliance.

Intentions to be Screened

There is limited research available on the factors that influence young women's practices of cervical cancer screening. Thus, little is known about what influences the intentions and behaviours of young women regarding cervical cancer screening.

Knowledge about cervical cancer screening. Cervical cancer is largely preventable through proper screening, treatment, and follow-up. However, many young women fail to return for Pap screening or follow-up appointments as recommended (Kahn et al., 2002; Lavin et al., 1997). Existing literature suggests that young women are: (1) poorly informed about cervical cancer, including associated risk factors; (2) are unclear about the purpose of cervical cancer screening (Jubelirer et al., 1996; Hasenyager, 1999), and; (3) hold negative or inaccurate beliefs about Pap testing (Burak & Meyer, 1997), all of which contribute to their lack of compliance with recommended testing and follow-up (Biro et al., 1997; Burak & Meyer, 1997; Gerhardt, Pong, Kollar, Hillard & Rosenthal, 2000; Hasenyager, 1999; Jennings, 1997; Nugent & Tamlyn-Leaman, 1992; Ramirez et al., 1997).

Research indicates that both high school (Dell, et al., 2000; Gerhardt et al., 2000; Svenson, Varnhagen, Godin & Salmon, 1992) and university students (Burak & Meyer, 1997; Hayseyager, 1999; Nadeau et al., 1993; Ramirez et al., 1997) have been poorly informed about STIs and the associated risks. Many sexually active young women have limited knowledge about HPV, despite the fact that they are at considerable risk of contracting the virus (Biro et al., 1997; Burak & Meyer, 1997; Gerhardt et al., 2000; Hasenyager, 1999; Hoover et al., 2000; Jennings, 1997; Mays, et al., 2000; Ramirez et al., 1997; Vail-Smith & White, 1992) and are not practicing behaviours that would limit their risk of HPV infection and associated disease. According to Dell et al. (2000), 87% of 523 students surveyed from an inner city high school in Toronto, Canada had never heard of HPV, and only 39% of sexually experienced girls knew the purpose of the Pap test. Ramirez et al. (1997) reported that 35% of sexually active college women did not

perceive themselves to be at risk for HPV, and yet tested positive for infection. In fact, most young women are better informed about HIV than they are about HPV and other STIs (Dell et al., 2000; Langille, Andreou, Beazley & Delaney, 1998).

Haysenyager (1999) assessed university women's knowledge about cervical cancer and the Pap test. One hundred fifty-four women, attending a university health center for a routine annual Pap smear, a procedure required to get a prescription for oral contraceptives renewed, completed a 43-item, self-administered, multiple-choice questionnaire regarding cervical cancer screening. The average age of the respondents was 23.5 years, 53% were undergraduates and 47% were graduate students. One might assume that this convenience sample of educated women, who were seeking annual cervical screening, would be familiar with the purpose of a Pap smear, related procedures, and risk factors for cervical cancer. However, while 90% of participants knew that the Pap test screened for precancerous lesions of the cervix, more than half (56%) erroneously believed that it also screened for ovarian cancer and a variety of STIs. Almost half of the respondents were unaware of necessary preparations for the test, such as avoiding sexual intercourse and intravaginal contraceptive application the night before, and most did not know what risk factors are associated with cervical cancer.

Gerhardt et al. (2000) examined adolescents' knowledge of HPV and cervical dysplasia in a study of 50 African-American females, ages 15-23, attending a university-based adolescent dysplasia clinic. Interviews were conducted at an average of 2.5 years following the diagnosis of HPV/Cervical Dysplasia (CD), and medical charts were reviewed to obtain relevant demographic and medical information. Results indicated that most of these young women (88%) responded correctly to questions assessing their

knowledge of HPV/CD and treatment. However, some items were consistently answered incorrectly. For instance, 22% did not know that condom use can help prevent the spread of HPV, 42% did not realize that HPV infection can be asymptomatic, and 52% lacked the knowledge that cigarette smoking increases the risk that HPV/CD may develop into cervical cancer. In fact, 41% of the sample who were smokers at the time of diagnosis reported that they had since increased the frequency and amount of their smoking. In addition, only 62% told their boyfriends about their diagnosis, and only 40% reportedly used a condom most of the time. However, they did appear to understand that they would require more frequent screening as a result of their diagnosis, as 90% ($n = 45$) had either maintained or increased the frequency with which they were receiving Pap screening. Caution must be exercised in interpreting these results due to the small sample size, lower response rate (67%), high-risk characteristics of the sample, and reliance on self-report and chart review for data collection. At the same time, these results are consistent with previous research pertaining to adolescents' knowledge of STIs (Biro, Rosenthal & Stanberry, 1994).

Knowledge regarding cervical cancer is important to the success of cervical cancer screening and follow-up; however, it is not necessarily associated with protective behaviours. While recent efforts to educate young people about the risks of STIs have resulted in improved knowledge levels, sexual behaviours remain relatively unchanged, suggesting that improved knowledge does not necessarily translate into behaviour change (Pluhar, Frongillo, Stycos & Dempster-McClain, 2003; Voss & Kogan, 2001). Kowalski and Brown (1994) assessed knowledge about cervical cancer in a sample of 82 female, Caucasian, college students (18-26 years of age). While 94% knew that the Pap test was

the most important test for the detection and prevention of cervical cancer, 28% of the participants indicated that they had never received a Pap test, underscoring the discrepancy between knowledge and behaviour.

Psychosocial barriers to cervical cancer screening. Studies of the sociodemographic factors influencing women's participation in cervical cancer screening, such as income, level of education, age, and immigrant status, have dominated the literature (Lantz, Weigers & House, 1997; Lawson, Lee, Thames, Henson & Miller, 1998; Paskett, Rushing, D'Agostino, Tatum & Velez, 1997; Solomon & Gotlieb, 2001). However, in recent years there has been a growing number of researchers interested in the utility of social cognitive variables, such as attitudes, beliefs and social norms, to explain this phenomenon. According to Conner and Norman (1996), this shift is very useful since psychological variables are potentially more open to change than are sociodemographic variables. Evidence suggests that health practitioners need to consider knowledge, beliefs, attitudes, and practices of populations when developing strategies to promote breast and cervical screening practices (Steven et al., 2004). Indeed, many researchers have used psychosocial theories, such as the Transtheoretical Model, the Health Belief Model, the Health Promotion Model, the Protection Motivation Theory, the Theory of Reasoned Action and the Theory of Planned Behaviour to examine predictors or intentions and screening behaviour.

A growing number of research studies are focusing on the psychological barriers affecting young women's intentions to participate in cervical screening. Kowalski and Brown (1994) assessed college women's (n=82) intentions to seek a gynecological exam, history of Pap smear behaviour and frequency of cervical screening, and found that

personality variables, such as social anxiety (e.g., fear of making a bad impression) and physique anxiety (e.g., concerns regarding physical appearance), significantly predicted women's intentions to get a Pap test and the frequency with which they were screened. That is, women higher in social anxiety had significantly lower intentions to be screened and were less likely to be screened within the next year, resulting in significantly fewer exams than their counterparts who were less socially anxious. Lack of knowledge did not appear to play a role in the relationship between anxiety and behavioural intentions.

Eiser and Cole (2002) surveyed a convenience sample of 70 female college students (20-25 years of age), classifying each participant according to Prochaska-DiClemente (1982) definitions of "stages of change" (pre-contemplation, contemplation, action and maintenance) according to their previous and intended screening behaviour. They found that most participants rated themselves below average for risk of contracting cervical cancer in the future (p=<.001), a finding unrelated to knowledge of behavioural risk factors or previous/intended screening behaviours. Those participants categorized as pre-contemplaters perceived the greatest number of barriers to screening (p <.001).

To date, a number of social cognitive theories have been utilized to explain women's cervical cancer screening practices. Motivational models like the Health Belief Model (HBM) (Becker, 1974), Protection Motivation Theory (PMT) (Rogers, 1983), and the Theory of Planned Behaviour (Ajzen & Fishbein, 1980) have allowed researchers to assess the psychological factors underlying women's decisions about cervical cancer screening, and to predict their screening behaviours (Armitage & Conner, 2000).

The HBM includes six determinants of behaviour, all of which are considered to independently influence behaviour. The main components of the HBM are perceived

susceptibility, perceived severity, and perceived benefits minus perceived barriers. Essentially, the HBM is based on the premise that feeling vulnerable to a condition is a motivating factor, prompting an individual to take action to prevent the condition. The PMT is based on the assumption that "protection motivation" determines two forms of coping which represent health behaviours (adaptive coping-beneficial to health; maladaptive coping-harmful to health), and is contingent on two appraisal processes: threat and coping. Similar to the HBM, the PMT contends that motivation to perform preventative behaviours is influenced by an appraisal of threat, which is derived from an individual's beliefs about disease risk and disease severity. Coping appraisal is determined by personal beliefs about the effectiveness of the response and self-efficacy, or the belief in one's ability to perform the response. Thus, protection motivation increases when an individuals assess that a particular response is efficacious and is within their ability to perform, unless they determine that the costs of performing the behaviour are too great (Armitage & Conner, 2000).

Researchers using the HBM have had little success explaining cervical cancer screening behaviours in women. Sheeran and Abraham (1996) argued that the HBM has poor predictive ability because the constructs of the model are poorly defined and the theory lacks rules for interchange between these components, allowing for only weak correlations between variables and behaviour. Burak and Meyer (1997) examined the beliefs and intentions of 400 undergraduate women about gynecological screening using the constructs of the HBM. However, the constructs of the HBM only accounted for 15% of the variance in women's screening behaviour and 11% of the variance in intentions. Nonetheless, the findings provided some important information regarding the beliefs of

college-aged women. Notably, a majority of the study participants did not believe that they were susceptible to STIs. In addition, fewer than 6% of those surveyed reported that they had ever had a STI, despite the fact that more than 80% described themselves as sexually active. Since a number of STIs are asymptomatic, particularly in women, many of these women may have unknowingly contracted a STI. Consequently, a limitation of this study was the fact that participants were asked if they had ever had a STI, but were not asked whether they had ever been tested for STIs. Results also indicated that four times as many respondents believed themselves to be more likely to get cervical cancer than a STI, suggesting that they were unaware of the link between HPV and cervical cancer. As well, women who had not had Pap tests were significantly more likely to believe that these exams are both embarrassing and painful compared to those who had been screened.

Orbell (1996) argued that neither the HBM nor the PMT contain the social motivational processes to fully explain cervical screening intentions and behaviours of women, suggesting that individuals may be more motivated to respond to screening invitations out of a sense of moral obligation, rather than a belief of personal threat and a decision to try to reduce disease risk. Orbell and Sheeran (1998) used the PMT as a theoretical framework to predict motivation to undergo cervical screening and screening uptake in a longitudinal study of never-screened women (n = 166). They found that the variables of the PMT were successful in predicting individuals' willingness to receive a Pap test and subsequent behaviour. However, the relationship between willingness to be tested and subsequent testing was described by the researchers as "far from perfect", in that only 43% of those women who had stated that they were willing to be tested were

actually tested within the designated one-year period.

The TRA and the TPB have recently emerged in the literature as useful models for considering women's intention to obtain a Pap smear. The TRA has been used in three studies examining cervical cancer screening intentions and behaviour. Burnett, Steakley and Tefft (1995) sampled 229 African American and Latina women and found that attitudes (p =.0007) and subjective norms (p =.0001) were positively related to women's intention to get a Pap test. In contrast, cervical cancer knowledge was negatively associated with women's intentions to get screened, and no relationship was found between demographic variables and women's screening intentions. Using the same theoretical framework, Barling and Moore (1996) sampled 72 women from Australian universities and assessed relationships among attitudes, social norms, intentions, and behaviours related to cervical cancer screening. The intention of women to obtain a Pap test within the next two years was significantly associated with positive attitudes towards Pap testing and stronger social norms (F =7.74; p <.001; R^2 =.36). In addition, intentions and age were predictive of actual Pap screening behaviour (F =3.45; p <.001; R^2 =.24). That is, older women were significantly more likely to have had regular Pap smears than were their younger counterparts. While other studies have relied upon women's self-reported past behaviours as the determinant of future actions, Armstrong (2002) assessed the utility of the TRA in predicting a sample of college women's cervical screening intentions to obtain a Pap test and subsequent behaviours. Findings indicated that screening behaviour was successfully predicted by intentions. Factors such as Pap smear history, perceived number of barriers to obtaining a Pap test, and level of Pap smear knowledge were all related to women's intentions to obtain a Pap test, while actual

behaviour was associated with Pap smear history and level of Pap smear knowledge. Contrary to previous findings (Barling & Moore, 1996; Hennig & Knowles, 1990), attitudes and subjective norms were found to have little to no effect on predicting screening intentions. However, a significant effect may have been undetected due to limited statistical power.

Bish et al. (2000) compared the HBM and the TPB in a prospective study aimed at predicting uptake of routine cervical screening among a population of inner city London women. Subjects (n =241) were selected from two general practices in south-east London, and were chosen on the basis that they were due to be invited to receive a routine Pap test in the six weeks following contact by the researchers. One hundred and forty-two of the women sampled completed the questionnaire (response rate of 58.9%). Only those women who had ever had a Pap smear were included in the final analysis (n =133), since there may be a difference between factors which predict first visits for Pap screening compared to subsequent visits (Norman & Conner, 1996). In an attempt to address the criticism that social cognitive theories do not adequately consider how emotional factors may influence behaviour, Bish et al. (2000) included a measure in their study referred to as anticipated affect. Anticipated affect was measured with four items that assessed how women anticipated they would feel if they did not attend for a Pap smear when invited to do so. Computerized medical records were used to assess whether or not the women received a Pap test within the three months after completing the questionnaire. Results indicated that 85.7% (n =114) of those women studied stated that they "would probably" or "definitely intended" to get a Pap test, while 9.8% (n =13) reported that they would "probably not" or "definitely not" attend screening. Medical

records indicated that 51.9% (n=69) of these women actually attended for Pap testing, while 48.1% (n =64) abstained. However, anticipated affect was found to have no significant independent effect.

Bish et al. (2000) found that the HBM was far less predictive of intentions (4% of the variance) than the TPB, which explained 51% of the variance, and none of the HBM variables were significantly correlated with subsequent behaviour. Attitudes towards the behaviour- whether women had positive or negative attitudes towards Pap tests- were most strongly associated with reported intentions (r =0.67), and there was a significant relationship between attitudes towards Pap tests and actual screening behaviour (r =0.22). While attitudes about the Pap test had a significant influence on women's intentions to get a Pap test, subjective norms did not have a noteworthy effect on Pap screening intentions or behaviours. This suggests that getting a Pap test is a very personal practice and not observable by friends and others, and as such, women's behaviours may not be influenced by their perception of what other people are doing (Bish et al., 2000). Notably, no relationship was found between women's intentions to attend for screening and PBC. Thus, researchers concluded that the TRA would have been an adequate substitute for the TPB in this study. These findings are contrary to those by Jennings-Dozier (1999) and may be reflective of the way in which the construct PBC was measured.

Some researchers have combined the constructs of multiple theories in attempts to better explain the factors influencing women's intentions to get a Pap test. Kahn, Goodman, Slap, Bin Huang and Emans (2001) assessed young women's intentions to return for a Pap smear by using a theory-based model, which incorporated four theories proven useful in predicting cancer prevention behaviours, including TPB, HBM, Social

Cognitive Model, and Transtheoretical Model. Results of this cross-sectional study of 558 young women, 12 to 24 years of age, indicated that knowledge of HPV and Pap smears and previous behaviours were not associated with intention to return for a Pap test. Conversely, women's attitudes predicted their intentions to return, which included personal and normative beliefs about return, as well as perceived control over return and cues to obtain Pap smear (e.g., reminder notice). Several factors may have limited the results of this study, including a lack of a representative sample, a new instrument being tested, and limited ability to detect significant associations between some variables and intentions to return. However, an important finding of this study was that theories used to predict adult behaviour are also useful in predicting adolescent behaviour. Further, interventions guided by behavioural theories may effectively increase young women's intentions and actual cervical screening behaviours.

Kahn, Goodman, Huang, Slap and Emans (2003) used the findings from their previous study to revise the theoretical model, and found that while 82% of the 439 young participants intended to return, only 30% actually returned for a Pap smear screening or follow-up appointment. Although intention to return was not associated with return, a number of variables were independent predictors of Pap return including the belief that the Pap test prevents cervical cancer, belief that the health care provider is likely to be honest, no family history of cervical cancer, and no history of impulsive behaviour. According to Sheeran and Orbell (2000), intentions to return for a Pap test are not always predictive of actual behaviour in some populations. Studies that have found intentions to be a strong predictor of subsequent behaviour have typically used adult populations (Godin & Kok, 1996), which may explain the variation in this study.

However, significant associations have been found between intention to initiate sexual intercourse and subsequent sexual behaviour in adolescent populations (Kinsman, Romer, Furstenberg & Schwarz, 1998).

A main criticism of using motivational models to predict health behaviours is that they rely on a direct relationship between intentions to perform a specific behaviour and subsequent behaviour. Evidence indicates that these models are moderate (e.g. TPB) to poor (e.g. HBM, PMT) predictors of behaviour. They do not acknowledge processes or factors that affect whether or not intentions translate into behaviours (Armitage & Conner, 2000; Orbell & Sheeran, 1998). In response to this limitation, Sheeran and Orbell (2000) extended the TPB to include implementation intentions (Gollwitzer, 1993) in their longitudinal study designed to increase women's attendance for cervical screening. Implementation intentions are argued to facilitate the movement of goal intentions into action because they allow individuals to plan how they will execute the goal. One hundred fourteen women, ages of 20 to 67, due for cervical screening in three months and registered at a single medical practice in rural England, were randomly assigned to an experimental or control group. Women in the experimental group were asked to form an implementation intention by identifying specifically when, where and how they would make an appointment for a Pap test. Investigators accessed medical records to assess whether or not participants received a Pap test within the following three months. Results of this study indicated that 92 (81%) of participants actually attended for a Pap smear within the following three-month period, compared to 69% from the control group, suggesting that the formation of implementation intentions increases the likelihood that individuals will be screened. Delay behaviours (e.g. canceling

appointment) were also correlated with screening behaviour, although, the strength of the relationship was less significant within the experimental group ($r = -.29, p < .05$) compared to the control group ($r = .70, p < .001$; $z = 2.95, p < .004$, 2-tailed), providing support that implementation intentions can reduce delay behaviours. While history of past/delaying behaviours will be assessed in this study, behaviour subsequent to formed intentions and the use of implementation intentions will not be tested. It is recognized that this is a limitation of the proposed study and a possible avenue for future study.

Conclusion

While there are a number of risk factors associated with cervical cancer, HPV is clearly established as the number one risk factor. The Pap test is the most effective screening tool for cervical dysplasia, However, it is consistently underutilized by women under the age of 25, who are most susceptible to HPV infection. This study may help illuminate the many factors influencing young women's intentions to receive Pap screening. The TPB provides the best framework for the planned method and analysis.

Chapter 3: Method

In this descriptive, correlational, cross-sectional study, university women's knowledge, attitudes, subjective norms, perceived behavioural control (PBC), intentions toward cervical cancer screening and self-reported screening behaviour were examined. The methods for this examination are described in this chapter and include population, and setting, measure, rigor and evaluation, data collection, data analysis, and ethical considerations.

Population and Setting

Women who are 25 years of age and younger and enrolled in full-time study at a university campus in Eastern Canada were surveyed. The population sample and power analysis are discussed first.

Sampling. Female students enrolled in full-time undergraduate studies at the University of New Brunswick (UNB), Fredericton campus, were asked to participate. Eligible participants were 25 years of age or younger, literate in English and had not had a hysterectomy. Approximately 3000 female undergraduate students attending UNB Fredericton on a full-time basis (personal communication, Associate Registrar Jean Fisher, January 24, 2005) were invited to complete the survey.

Power Analysis. The appropriate sample size to support study findings was determined using power analysis. According to Polit and Hungler (1999), "power analysis represents a method for reducing the risk of Type II errors and for estimating their occurrence" (p. 490). Type II errors occur when a false null hypothesis is wrongly accepted. The power analysis for this study was based on entering a set of five predictor (independent) variables and a set of five significant covariates (demographic, descriptive,

and risk factor variables) into a regression model. Entering variables (significant demographic, descriptive, and risk factor variables) into the regression subsequent to the set of interest (predictor variables) serves to reduce the error term in the significance test. Each variable is predicted to yield an increment change (effect size) of 0.01 to R^2. This effect was selected as the smallest effect that would be clinically or substantively significant to detect. It is also assumed that an effect size of this magnitude could be reasonably anticipated in this field of research (Borenstein, Rothstein & Cohen, 2001). With this effect size, a projected sample size of 1268 will have a power of .80, with alpha set at .05. To account for a projected 37% response rate (Sheehan, 2001), all of the approximately 3000 female students 25 years of age and younger were sampled to achieve the required sample size to support study findings.

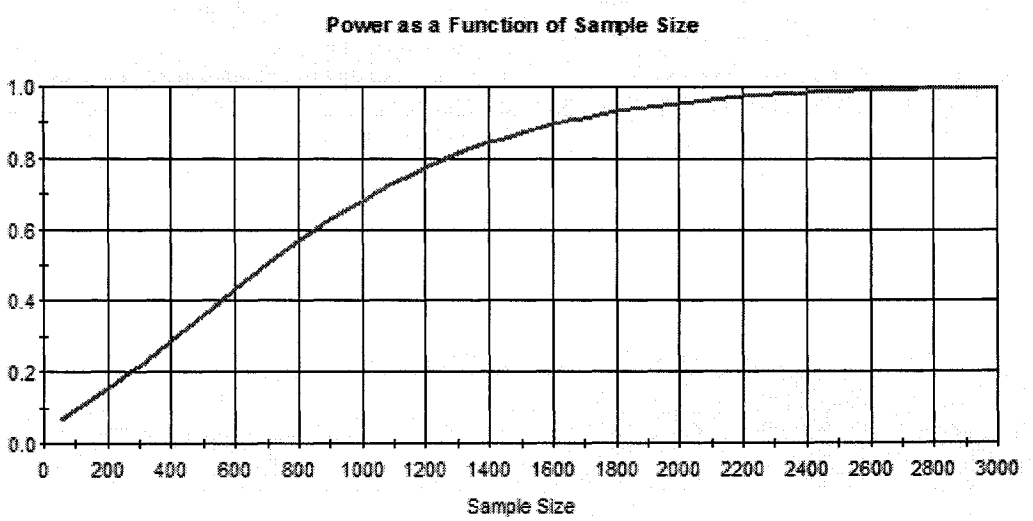


Figure 2: *Power as a function of sample size* (Borenstein, Rothstein & Cohen, 2001)

Measure

A structured questionnaire was used to collect data for the proposed study. The questionnaire is one of the main methods for collecting data using a survey design, and was appropriate in this study since a large number of participants were surveyed simultaneously. Given written permission to use (see Appendix A, p. 117) and adapt (see Appendix B, p. 118) the 73-item "Pap Smear Questionnaire" (see Appendix C, p. 119) created by Armstrong (2001), considerable modifications were made to the survey tool. The final instrument, renamed the "The Student Pap Test Survey", can be found in Appendix D (p. 136). Modifications to the instrument are reflected in Appendix E (p. 148). Some of the questions from the original "Pap Smear Questionnaire" were beyond the scope of this study and were deleted from the revised version, while questions deemed more relevant were added to the revised tool. In addition, the questions relating to knowledge about cervical cancer and knowledge about HPV were combined into one scale. Since the "Pap Smear Questionnaire" was based on the TRA, three questions relating to PBC were included in the new tool to reflect the theoretical framework of the TPB. Thus, all the constructs of the TPB (i.e., Knowledge, Attitudes, Subjective Norms, PBC, Intentions, and Behaviour) were reflected in the revised instrument. One of the questions from the Fagerstrom Tolerance Questionnaire (Fagerstrom & Schneider, 1989) was also added to the modified tool to better address smoking behaviours in the study population (see question #7, Appendix D, p. 137). The term "Pap smear" was replaced with "Pap test" throughout the revised version of the tool since it was thought to be more recognizable to the study population, and the term "Sexually Transmitted Disease" was replaced with "Sexually Transmitted Infection" in keeping with the current literature. Issues of consistency were addressed by using a standardized Likert scale throughout the adapted tool. In addition, discrete options replaced the "fill in the blank" format of the original tool, and discrete ranges were used to provide continuous data for analysis.

Sample questions relating to demographic/risk factor data and the theoretical constructs are outlined in Table 1.

Table 1. *Tool Categories and Sample Questions*

Tool Categories	Sample Questions
Demographic	• What is your current age? • In which faculty are you currently studying? • What is your sexual orientation?
Risk Factors	• Have you ever smoked cigarettes? • Have you ever had sexual intercourse? • At what age did you first have sexual intercourse? • With how many partners have you had sexual intercourse in your lifetime? • Do you currently use the birth control pill? • Have you ever had a sexually transmitted infection?
TPB: Knowledge	Rate level of agreement with following statements about cervical screening: • Pap tests can detect the presence of cancer of the uterus. • Pap tests can detect the presence of cancer of the cervix. • Pap tests also test for the presence of sexually transmitted infections. Rate level of agreement with the following statements about HPV: • Having HPV increases your chances of getting cervical cancer. • HPV transmission can be decreased by wearing condoms. • HPV may have no symptoms.
TPB: Attitudes	Level of Agreement • I don't have time to get a Pap test. • I think having a Pap test is embarrassing. • I think Pap tests are an important preventative health measure.
TPB: Subjective norms	Level of Agreement • Most people who are important to me think I should have a Pap test. • My mother gets regular Pap tests. • My family does not want me to get a Pap test.
TPB: Perceived Behavioural Control	Level of Agreement • It would be difficult for me to get a Pap test within the next year. • I would be too busy to get a Pap test within the next year. • I am able to get a Pap test when I need one.
TPB: Intentions	• Do you intend to get regular Pap test in the future? • If yes, how often do you intend to get a regular Pap tests in the future?
TPB: Behaviour	• Have you ever had a Pap test? • How often do you have a Pap test? • When was your last Pap test? • How old were you when you had your first Pap test? • Have you ever delayed or avoided getting a Pap test in the past?

As indicated, the revised survey includes Likert scales. Originally developed by Rensis Likert (1932), Likert scales provide a method to sum item scores in ratings scales and have become one of the most popular and reliable methods of measuring attitudes. The Likert scale structure provides a means to measure the constructs of the TPB. Attitude scores produced by Likert scales will yield data that may be analyzed by parametric statistics, providing a useful and uncomplicated method of obtaining data on people's attitudes. Table 2 describes the level of data and scoring for all questionnaire items. The range of possible scores are also tabulated for each TPB construct in Table 2. The values for the questions related to the scales representing the variables Knowledge, Attitudes, Subjective Norms, and Perceived Behavioural Control were expressed using summative scores (continuous data). Scores were assigned to the Likert scales in each case accordingly (Strongly Agree = 5; Agree = 4; Not Sure = 3; Disagree = 2; Strongly Disagree = 1) and a range was established from lowest possible score to highest possible score. Scores that fall above the mean of each range reflected more positive Attitudes, Subjective Norms, Perceived Behavioural Control and increased Knowledge. The contrary is true for those scores falling below the mean. Thus, questions that were worded negatively (Attitudes- "I think having a Pap test is embarrassing"; Subjective Norms- "My family does not want me to have the test", and; Perceived Behavioural Control- "It would be difficult for me to get a Pap test within the next year") or are incorrect (Knowledge- "Pap tests can detect the presence of cancer of the uterus") were reverse scored.

Table 2. *Data Type, Questions, Level of Data and Scoring*

Data	Question #	Level of Data	Scoring
Demographic	1-4	Categorical or Continuous	Descriptive
Risk Factors	5-19, 26-28	Categorical or Continuous	Descriptive
Previous Behaviour (DV) Descriptors	20 21-25, 29-30, 33	Categorical Categorical	Descriptive
Intentions (DV) Descriptors	31 32	Categorical Categorical	Descriptive
Attitudes (IV)	34 (a-k)	Continuous	Likert scale Summative Score Range (11-55) *a, b, d, e, f, h, i, j
Knowledge (IV)	35 (a-v)	Continuous	Likert scale Summative Score Range (22-110) *a, c-l
Subjective Norms (IV)	36 (a-g)	Continuous	Likert scale Summative Score Range (7-35) *g
Perceived Behavioural Control (IV)	37 (a-c)	Continuous	Likert scale Summative Score Range (3-15) *a, b

**Reverse scoring*

Rigor and Evaluation

Reliability and validity of the measure are the two most important criteria for assessing the adequacy and merit of research utilizing a quantitative research design. Polit and Hungler (1999) suggested that the reliability of an instrument is the degree of stability, consistency, or dependability with which it measures the attribute it is supposed to be measuring.

The original tool for the proposed survey was written in simple terms and tested for content validity, but not reliability (Armstrong, 2001). In this study, both validity and reliability were considered. According to Polit and Hungler (1999), there is no truly objective way of measuring content validity, since it is a matter of judgment by a panel of experts in the area under investigation. Thus, prior to data collection, the new instrument was reviewed for face (appearance of the attributes under measurement) and content validity (questions reflect and adequately sample the content area) by those considered experts in adolescent sexual health (G. Getty), developmental psychology (N. Letourneau), and survey construction (J. Croll). In addition, the instrument was piloted via a Web survey by members of the supervisory committee. To determine the internal consistency of the revised instrument, Guttman split-half, Cronbach's Alpha, item-to-item total correlations, and Pearson Moment correlations were conducted within each of the constructs (Knowledge, Attitudes, Perceived Behavioural Control, and Subjective Norms).

Data Collection

Questionnaires pertaining to sensitive questions about sex may yield lower response rates (Wadsworth, et al., 1996), and it has been hypothesized that lower response rates may be associated with a selection bias. Osmo Kontula (2001) tested the validity of this hypothesis by analyzing retrospective questions in three national population sex surveys conducted in Finland. Results showed that lower response rates did not have a major impact.

Research indicates that respondents are more likely to be honest about their sexual behaviours if they believe that their answers will remain anonymous. For this reason,

telephone surveys have been more popular than face-to-face interviews, and researchers have responded by developing computer assisted self-interviewing (CASI) and audio-CASI (survey questions presented via headphones). These techniques provide privacy for respondents and have been shown to result in increased reporting of sexual activity and other underreported behaviours such as drug use (Tourangeau & Smith, 1996; Turner, et al., 1998).

Data for the present study were collected via a web-based survey. Web-based surveys are becoming widely used in social science research largely because of the ease of accessibility to populations, which allows for larger samples and greater statistical power (Watt, 1999). Cost-effectiveness of implementation has also made Internet surveys very desirable since the cost of postage can be great in mailed surveys, particularly with a large sample.

According to Solomon (2001), there are several advantages of using HyperText Markup Language (HTML) forms. First, they are a relatively easy and efficient means of collecting large amounts of data. Second, HTML forms allow for the streamlining of data collection, since responses can go directly into a database for statistical analysis, and reduce data entry error. Third, the formatting capabilities of HTML forms allow for the creation of easy-to-read and attractive presentation of questionnaire forms that may improve response rates. However, web-based surveys are not without methodological challenges. For instance, not everyone has access to the Internet and some may choose not to use the Internet, which raises the concern of coverage bias. However, this is less of a concern among university and college students in Canada, the U.S., and Western Europe, since Internet access is extremely high amongst these populations (Solomon,

2001). The target population in the current study was familiar with this form of communication since it is an integral aspect of their academic life. All students enrolled at the university have free email accounts and their addresses are available through the university's website.

Another potential drawback of email surveys may be poor response rates. A number of studies on Internet surveys have found response rates to be equal to or lower than response rates for mailed surveys (Cooper, Blair & Tripplett, 1999; Medin, Roy & Ann, 1999). In fact, a review of email survey response rates indicates that as the number of email surveys increased, response rates have steadily declined from a high of 61.5% in 1986 to a low of 24% in 2000. Of the 31 studies reviewed, the mean response rate was 36.83%. It appears that response rates have been negatively affected by the sheer number of Internet surveys which have flooded the web (Sheehan, 2001).

Response rates can be improved with pre-notification of an email survey (Cook, Heath & Thompson, 2000; Sheehan, 2001), follow-up reminders (Kittelson, 1997), clear indication of university affiliation (Sheehan, 2001), and a simple survey format (Dillman, Tortora, Conrad & Bowker, 2001). In the present study, a LISTSERV was created (ccs@unb.ca) by a member of Internet Technology Services (ITS) on campus to simultaneously communicate information (i.e., invitation to participate, information letter, reminder notices, and thank-you letter) to the entire study population. As recommended by Solomon (2001), an email cover letter was sent to all eligible young women explaining the purpose of the survey, who was conducting it, and how the survey results will be used to benefit other university students. They were also provided a universal resource locator (URL) or web-address for WebCT, which could be accessed

simply by double-clicking on to the hyperlink. Once on WebCT, participants could access the survey by double-clicking on the icon labeled "Cervical Cancer Survey" (see Appendix H., p.156), and were then instructed to respond to each question by selecting the most appropriate "radio button". Radio buttons are used when there is a list of two or more options that are mutually exclusive and the user must select exactly one choice. In other words, clicking a non-selected radio button will de-select whatever other button was previously selected in the list. Participants completed the survey by selecting the "submit" button.

Cook et al. (2000), in a meta-analysis of web-based surveys, found that topic salience is an important factor associated with increasing response rates. That is, the more relevant the topic is to the target population, the greater the chances are that they will respond. Cervical cancer screening is very relevant to the sample population since it is recommended for all young women once they become sexually active. Moreover, given the reported high rates of HPV in this particular population, they are at increased risk for cervical dysplasia. Thus, the relevance and importance of this topic to young women was emphasized in the cover letter as well (see Appendix F, p. 151). A simple survey design was also used to maximize response rates, as suggested by Solomon (2001).

Solomon (2001) says that participants may not respond to surveys if they feel too constrained by time; conversely, if too much time is allowed, individuals may plan to complete the survey later but then forget to respond. As such, respondents were told in the cover letter that it would take them approximately 10 minutes to complete the survey, and that the data collection would be completed in two weeks. Two reminders were sent via email, the first a few days after the survey commenced and the second a few days

before the survey was set to end. A follow up message was sent after the data collection period ended to thank participants and share highlights of the study findings.

The cover letter addressed the issue of confidentiality and anonymity. Participants were made aware that the survey could not be linked to them in any way. Using Web Course Tools (WebCT), only those who meet the inclusion criteria were granted access to a secured site and all responses were completely anonymous. WebCT also effectively prevents members of the sampled population from submitting more than one form (personal communication, WebCT Administrator Rik Hall, January 19, 2005).

Guidance was obtained from the WebCT Administrator regarding the appropriate configuration for the questionnaire and how to download the electronic survey data directly into a Statistical Package for the Social Sciences (SPSS) file for data analysis. This approach eliminated the need for time-consuming data entry and virtually eliminated coding error (Medin, Roy & Ann, 1999).

Data Analysis

As identified in Table 3, the independent variables were derived from the TPB and included (a) Knowledge, (b) Attitudes, (c) Subjective Norms, and (d) Perceived Behavioural Control. The dependent variables were (a) young women's Intentions to obtain a Pap smear, and (b) self-reported practices of cervical cancer screening Behaviour. Assurance that assumptions were met (e.g., normality and homogeneity of variance) were obtained prior to conducting any statistical tests. The SPSS software, version 12, was used to conduct all statistical tests.

Table 3. *Variables, Statistical Tests, and Rationale*

Variables	Statistical Tests	Rationale
Dependent Variables (DV): 1. Intention to Obtain Pap Smear 2. Previous Behaviour	-Descriptive -Multiple Regressions (logistic)	-Describes/summarizes data. -Tests the effects of the IVs in Models 1-6 (Knowledge, Attitudes, Subjective Norms, PBC, demographic, descriptive and risk factors) on the DVs (Intentions, Behaviour)
Independent Variables (IV): 1. Attitude 2. Subjective Norm 3. Perceived Behavioural Control 4. Knowledge 5. Intentions (when Behaviour is the DV)	-Descriptive -Multiple Regressions (logistic)	-Describes/summarizes data. -Tests the effects of the IVs on the DVs: **Model 1**: IVs (Knowledge, Attitudes, Subjective Norms & PBC) on DV (Intentions) **Model 2:** IVs (Knowledge, Attitudes, Subjective Norms, PBC & Intentions) on DV (Behaviour)
Other Independent Variables: 1. Demographic/Descriptive (e.g. age, faculty of study) 2. Risk Factors	-Descriptive -Multiple Regression (logistic)	-Describes/summarizes data. -Tests the effects of IVs on the DVs: **Model 3:** IVs (demographic, descriptive, and risk factors) on DV (Intentions) **Model 4:** IVs (demographic, descriptive, and risk factors) on DV (Behaviour)

Analysis was completed in four steps. First, the demographic, descriptive, risk factor, independent, and dependent variable data were described with measures of central tendency (i.e., mean) and variability (i.e., variance) for continuous data. For categorical data, percentages, proportions or frequencies were tabulated, as fits the data. Chi-square tests for categorical data using cross-tabulations were also conducted as appropriate. Second, two stepwise multiple regression (logistic) models were performed. **Model 1** had Intentions as the dependent variable regressed on Knowledge, Attitudes, Perceived Behavioural Control, and Subjective norms. **Model 2** regressed Behaviour on Knowledge, Attitudes, Subjective Norms, PBC, and Intentions. It is important to note that when Behaviour was the dependent variable, Intentions became an independent variable. Partial correlations (i.e., the correlation between a dependent variable and an independent variable, while controlling for the effect of other independent variables), and odds ratios

(the probability of occurrence over the probability of nonoccurrence of the dependent variable) were automatically generated when the logistic multiple regressions were calculated. Partial correlations and odds ratios were examined to identify statistically significant independent variables in each model. Third, the dependent variables were regressed on appropriate demographic, descriptive, and risk factor data[1] in stepwise (logistic) regression **Model 3** and **Model 4**. Again partial correlations and odds ratios were examined to determine significant predictor variables. Finally, **Model 5** and **Model 6** used stepwise (logistic) regression of the dependent variables on all significant predictors identified in the preceding models (Polit, 1996). Partial correlations, odds ratios, and estimates of model fit (e.g., Chi Square, -2 Log Likelihood, and Nagelkerke R Square) are reported for each model in the Findings section of this thesis. See Table 3 for more details of the regression models.

Assumptions for conducting logistic multiple regression are less strict than for multiple regression (Polit, 1996). First, the sample selected must be representative of the population. In this study, the entire population was surveyed, increasing the likelihood that the sample thus generated was representative of the population. In logistic multiple regression, the independent variables must be measured at the interval or ratio level (continuous data) and the dependent variable must be categorical with two binary response categories, as occurs in this study. Further, in contrast to multiple regression, variables do not need to have bivariate normal distributions (i.e., scores on variable *X* are normally distributed for each value for variable *Y*) or be homoscedastic (i.e., for each

[1] For the dependent variable of Behaviour, appropriate descriptive, demographic and risk factor variables for inclusion in the analysis are: age, faculty, year of study, smoking, sexual behaviour, birth control, and history of STIs. For the dependent variable Intentions, additional variables related to *past* Pap testing behaviour are also included in the logistic regression.

value of *X* the variability of the *Y* scores must be about the same), due to the nature of the categorical dependent data. However, the independent variables (*X*) must be normally distributed and this will be determined by examining indices of skewness (symmetry of distribution) and kurtosis (flatness of distribution), and their standard errors, and by plotting data. Skewness and kurtosis indices were calculated and data were plotted within the descriptives function of SPSS. As a symmetric curve results in a skewness coefficient of 0, data were considered skewed if above .2 or below -.2 (Hildebrand, 1986), and data were considered kurtotic if the value of the kurtosis index divided by the standard error was above 1.96 or below -1.96 (Munro & Page, 1993). Graphed data were also visually examined to determine if results for specific variables were normally distributed.

Ethical Considerations

Ethical approval for this study was obtained from the University of New Brunswick's Research Ethics Board prior to data collection. Careful consideration was given to protecting the participants in this study as well as in the written report, consistent with the *Tri-Council Guidelines*, the ethical standard for research at UNB. The research process was guided by the ethical principles of respect for person, beneficence and justice (CNA, 1994). Specifically, the purpose of the study was fully explained in the email document informing potential participants about the online survey (see Appendix F, p.145). It was made clear that participation in this study was completely voluntary, and that failure to do so would not impact them academically or otherwise. To ensure that ethical considerations were met, the statement welcoming participants included the following: (a) name and contact information of the investigator, supervisor, and Director of the Graduate Program in Nursing; (b) introduction and purpose of the study; (c)

description of the procedure and time required to complete the survey; (d) possible risks; (e) potential benefits; (f) assurance that participation is voluntary; (g) assurance that withdrawal may occur at any time without penalty; (h) contact number for additional questions or information, and; (i) discussion of confidentiality. Privacy and confidentiality were maintained in this study. The data collected via WebCT were anonymous since there was no identifiable personal information. Participants were advised that the findings of this study may be reported at health conferences and in journal publications and that they will receive an email invitation to read the summary of the findings on WebCT at the conclusion of this study. The data from the completed questionnaires were stored on the principal investigator's personal computer secured with a password (collected data were backed up on WebCT), and triplicate copies were stored on diskette in a locked file cabinet.

Chapter 4: Findings

The UNB Registrar's Office filtered out the eligible sample population according to age and full-time enrollment at the Fredericton campus. A total of 3,190 female students were eligible for study, and their email information was uploaded into the secured survey site by the WebCT Administrator. A LISTSERV containing the email addresses of all eligible participants was created by a consultant at Internet Technology Services (ITS), and an invitation to participate in the study was sent via an email message. Daily error monitoring reports from ITS indicated that email addresses for 322 of the cases were not valid. Thus, a total of 2868 of the sample received the email invitation to participate in the online survey. At the completion of data collection, a total of 1071 young women submitted the on-line survey. The raw alphabetic data were downloaded from WebCT into an Excel spreadsheet, where it was converted into numerical data and imported into a SPSS data analysis package. Cases with incomplete or invalid data (less than 50% complete) were eliminated from the data set (n=167) for a final sample size of 904 and a response rate of 31.5%.

Value labels and missing values were assigned and data were reverse coded as necessary. Descriptive and frequency data were run on every variable, checking for errors and making corrections as warranted. Four new variables (Attitudes; Subjective Norms; Knowledge; and Perceived Behavioural Control) were created by adding together the questions constituting each scale. Finally, pairwise data analysis was completed in five separate steps.

Step I: Demographic, descriptive and risk factor variables

Descriptive analysis. In the first step of the data analysis, the demographic,

descriptive, risk factor, independent, and dependent variable data were analyzed by measures of central tendency (i.e., mean, median, mode) and variability (i.e., standard deviation, variance) for continuous data and percentages and frequencies were tabulated for categorical data. Demographic characteristics of the sample are presented in Table 4.

The average age of the young women who participated in the study was 20.7 years of age (Range=17-25; SD=1.77) and almost half were enrolled in the Faculties of Arts (22.7%) or Science (22.5%). They were evenly distributed by first (23%), second (25.2%), third (22.9%) and fourth or greater (25.5%) year of study of their undergraduate degree program, and only a small percentage (3.4%) of the sample was engaged in graduate study. A vast majority of the participants (96.7%) were heterosexual, while only 0.8% identified themselves as homosexual and 2.2% bisexual.

Table 4: *Demographic Characteristics of the Sample*

Variable	*Descriptive Statistics*
Current Faculty of Study:	n (%)
Arts	178 (22.7%)
Science	177 (22.5%)
Business Administration	95 (12.1%)
Nursing	87 (11.1%)
Engineering	67 (8.5%)
Forestry	65 (7.9%)
Education	60 (7.6%)
Kinesiology	51 (6.5%)
Law	19 (2.4%)
Computer Science	6 (0.8%)
Year of Study:	n (%)
First	195 (23%)
Second	214 (25.2%)
Third	194 (22.9%)
Fourth or greater	216 (25.5%)
Graduate student	29 (3.4%)
Sexual Orientation:	n (%)
Heterosexual	828 (96.7%)
Homosexual/Lesbian	7 (0.8%)
Bisexual	19 (2.2%)

The risk factor characteristics of this sample are described in Table 5. Forty-three percent of the young women surveyed indicated that they had smoked at least once in their lifetime, and a similar percentage (41.4%) reported weekly or daily exposure to second hand smoke. Only 80 (8.8%) reported that they currently smoke, the majority of whom smoke less than 10 cigarettes per day. Most of the young women surveyed (82%) have been sexually active at least once and half them first engaged in sexual intercourse between the ages of 16 and 19 (48.7%). One quarter (24.9%) of those who are sexually active reported one sexual partner in their lifetime, while 28.7% reported two to four sexual partners; the same proportion reported more than five partners, of which 13% have had sex with more than eight partners. Almost half of those who were sexually active (49%) indicated that they often (7.4%) or almost always (41.6%) used condoms during sexual intercourse. On the other hand, more than one third (33.3%) of the sample never used condoms (8.9%) or did so inconsistently (rarely: 14.0%; sometimes: 10.4%). A majority of the young women surveyed (69.3%) were using the birth control pill and many had been doing so for two to four years (30.6%) or five to seven years (23.9%). A total of 363 young women (41.3%) had been tested and 59 (6.7%) had been diagnosed with a STI, most commonly, Chlamydia (n=20) and HPV (n=16). A small percentage (1.9%) of these young women reported that they had had partners with genital warts. Since the literature suggests that both virgins and non-virgins can contract HPV, the entire study population was examined for their responses to the questions regarding cervical irregularities and treatment interventions. Nearly one in five of the surveyed women (18.9%) responded that they had abnormal cells of the cervix, 183 (20.8%) had been asked by their healthcare provider to be screened again within six months, and 111

(12.6%) had received colposcopy treatment.

Table 5: *Risk Factor Characteristics of Study Population*

Variable	*Descriptive Statistics n (%)*
Ever smoked?	857
Yes	370 (43.2%)
No	487 (56.8%)
Currently smoke?	860
Yes	80 (8.8%)
No	780 (90.7%)
Number of cigarettes/day?	86
10 or less	75 (87.2%)
11-20	0
21-30	11 (12.8%)
31 or more	0
Exposure to second hand smoke?	876
Daily	146 (16.7%)
Weekly	216 (24.7%)
Monthy	130 (14.8%)
Rarely	384 (43.8%)
Ever had sexual intercourse?	873
Yes	716 (82%)
No	157 (18%)
Age at first sexual intercourse?	715
<12 years of age	1 (0.1%)
12 years of age	6 (0.8%)
13 years of age	17 (2.4%)
14 years of age	52 (7.3%)
15 years of age	79 (11.0%)
16 years of age	119 (13.6%)
17 years of age	160 (16.6%)
18 years of age	147 (16.8%)
19 years of age	73 (8.4%)
>19 years of age	61 (7.0%)
Number of different partners in lifetime?	717
One partner	217 (24.9%)
2-4 partners	250 (28.7%)
5-7 partners	137 (15.7%)
8-10 partners	56 (6.4%)
> 10 partners	57 (6.6%)

Variable	*Descriptive Statistics n (%)*
How long used birth control pills?	611
1 year or less	104 (12.0%)
2-4 years	266 (30.6%)
5-7 years	208 (23.9%)
8-10 years	31 (3.6%)
11 or more years	2 (0.2%)
Tested for a STI?	880
Yes	363 (41.3%)
No	423 (48.1%)
I don't know	94 (10.7%)
Diagnosed with a STI?	880
Yes	50 (6.7%)
No	821 (93.3%)
Sexual partner with genital warts?	722
Yes	17 (1.9%)
No	705 (80.1%)
Abnormal Pap test results?	632
Yes	165 (18.9%)
No	467 (53.4%)
Asked to have Pap test within 6 months?	640
Yes	183 (20.8%)
No	457 (51.9%)
Ever had colposcopy?	882
Yes	111 (12.6%)
No	771 (87.4%)

In Table 6, previous Pap screening behaviours and Pap screening intentions of the study sample are described. Seventy-two percent of the young women in this study reported that they had had a Pap test. The majority had their first Pap test at 18 years of age or older (68%), and about one third (31%) of the sample population had had five or more Pap tests in their lifetime. Almost half of the young women responded that they had received a Pap test less than six months prior to participation in the study, and another 39% indicated that it had been less than one year since their last Pap test. In total, 97% of the young women who have had a Pap test received their last test within the last two years, while only 2.7% reported that more than two years had passed since their last Pap

test. The majority of the young women (76%) reported they received annual Pap tests and 59% were required to have an annual Pap to receive the birth control pill. Most of the young women first heard about Pap tests between the ages of 14 and 16 (58%), and most commonly learned about the screening test from a parent (40%) or friend (22%). Only 12% of the participants indicated that they first learned about the Pap test from a doctor or nurse. Most of the young women surveyed intended to get regular Pap tests in the future (94%), typically once a year (81%), and half of the sample (51%) admitted that they had avoided or delayed having a Pap test in the past.

Table 6: *Description of Previous Behaviours and Intentions*

Variable	Descriptive Statistics *n* (%)
Age at first Pap test?	633
16 years of age or younger	134 (22.2%)
17 years of age	125 (19.7%)
18 years of age	166 (26.2%)
19 years of age	114 (18.0%)
20 years of age or older	94 (14.8%)
Number of Pap tests in lifetime?	630
Once	148 (23.5%)
Twice	94 (14.9%)
Three times	104 (16.5%)
Four times	90 (14.3%)
Five or more times	194 (30.8%)
Time of last Pap test?	633
Less than 6 months ago	293 (46.3%)
6 months to 1 year ago	247 (39.0%)
Between 1 and 2 years ago	76 (12.0%)
More than 2 years ago	17 (2.7%)
How often Pap test?	621
Every two years	39 (6.3%)
Every year	472 (76.0%)
Every 6 months	53 (8.5%)
More than once, but not regularly	57 (9.2%)

Variable	Descriptive Statistics *n* (%)
Pap test required for BCP?	667
Yes	393 (58.9%)
No	274 (41.1%)
Age when first learned about Pap test?	890
13 years of age or younger	190 (21.3%)
14 years to 16 years of age	508 (57.1%)
17 years to 19 years of age	162 (18.2%)
20 years of age or older	5 (0.6%)
I never heard about Pap tests before today	25 (2.8%)
How learned about Pap tests?	868
Parent	351 (39.8%)
Friend	191 (21.6%)
Teachers	143 (16.2%)
Doctor/Nurse	104 (11.8%)
Mass Media	56 (6.3%)
Other	23 (2.6%)
Never heard of them before today	15 (1.7%)
How often intend to get Pap test in future?	887
Every 6 months	57 (6.9%)
Every 12 months	663 (80.1%)
Every 18 months	43 (5.2%)
Every 24 months	55 (6.6%)
Less often than every 24 months	10 (1.2%)
Ever delayed or avoided Pap test	847
Yes	431 (50.9%)
No	416 (49.1%)

A description of the independent and dependent variables in the Theory of Planned Behaviour (TPB) model are presented in Table 7, as well as results of the internal consistency reliability estimates. Item-to-total correlations for the IV constructs were as follows: (1) Attitudes (-.233 - .516), (2) Knowledge (-.057 - .559), (3) Subjective Norms (.088 - .631), and (4) PBC (.418-.664). Pearson product moment correlations among the IV constructs revealed significant correlations ranging from .226 (Knowledge and PBC) to .478 (PBC and Attitudes).

Almost 72% of the sample indicated that they had had a Pap test at least once in

their lifetime and approximately 94% intended to get a Pap test sometime in the future. The mean Attitude score (39.09; SD= 5.61; Range= 11-55) indicates that this sample of young women had relatively positive attitudes about the Pap test. While the mean Knowledge score (82.13; SD = 7.03; Range= 22-110) indicates that the women were moderately knowledgeable about the Pap test, their knowledge about the significance of HPV was poor. However, the mean score on the Subjective Norms scale (26.32; SD = 3.66; Range= 7-35) indicates that they put a high value on the beliefs and behaviours of those close to them (i.e., family, friends) about Pap testing, and the mean score on the PBC scale (12.6; SD = 2.08; Range= 3-15) indicated a high personal sense of empowerment about getting a Pap test in the future.

Table 7: *Variables in TPB Model Test*

Variable	*Descriptive Statistics* n *(%)*	*Guttman Split-Half*	*Cronbach's Alpha*
Ever had a Pap test? (Behaviour) Yes No	884 636 (71.9%) 248 (28.1%)	---	---
Intend to get a Pap test in the future? (Intentions) Yes No	887 832 (93.8%) 55 (6.2%)	---	---
Attitudes Mean (Standard Deviation) Range (Normal Range)	776 39.09 (5.606) 21-54 (11-55)	.445	.671
Knowledge Mean (Standard Deviation) Range (Normal Range)	706 82.13 (7.034) 63-108 (22-110)	.462	.728
Subjective Norms Mean (Standard Deviation) Range (Normal Range)	801 26.32 (3.661) 10-35 (7-35)	.626	.694
Perceived Behavioural Control (PBC) Mean (Standard Deviation) Range (Normal Range)	850 12.6 (2.079) 3-15 (3-15)	.544	.743

Cross-tabulations. Pearson's Chi-square tests for categorical data were conducted using cross-tabulations to examine the relationships between the dependent variables, Pap testing Behaviour and Intentions, and each one of the possible demographic and descriptive variables listed in Table 8. Only four of the 24 risk factor and demographic variables were significantly associated with young women's Intentions to get a Pap test. Young women were more likely to intend to get a Pap test in the future if they were enrolled in the Faculties of Nursing (100%), Law (100%), Education (98%) and Kinesiology (98%), and least likely to intend to be tested in the future if enrolled in the Faculties of Engineering (82%) and Computer Science (83%). While the young women in this population who reported using condoms (exclusively or in combination with other forms of contraceptives) were least likely to have had a Pap test, they were more likely to intend to get a Pap test in the future than those who used "other" forms of contraception. And those who had been tested for a STI in the past were more likely to intend to get a Pap test in the future (98%) compared to those who had never been tested for a STI (89%). Despite the fact that the greatest proportion of young women in this population learned about the Pap test from a parent, those who had learned about the test from a healthcare professional (i.e., doctor, nurse) were more likely to intend to get a Pap test in the future (98%) compared to those who had learned about the test from other sources, such as teachers (94%), friends (94%), parents (97%), and the media (89%). Age at first sexual intercourse and diagnosis of an STI were not found to be significantly associated with behavioural intentions.

Six of the 24 demographic and risk factor descriptive variables were significantly different on the dependent variable of previous Pap screening Behaviour, including

faculty of study, age at first sexual intercourse, other forms of birth control, whether they have ever been tested for an STI, previous diagnosis of an STI, and how they first learned about the Pap test. Young women were less likely to have had a Pap test if they were enrolled in the Faculties of Engineering (58%), Science (57%), Computer Science (67%) than their counterparts who were enrolled in Faculties such as Nursing (84%), Business (80%), Education (78%), Kinesiology (78%) and Arts (77%). Young women who first engaged in sexual intercourse at a younger age (12 to 15 years of age) were more likely to have had a Pap test than those who delayed sexual activity until their later teens. Those who used oral contraceptives were more likely to have had a Pap test compared to those who used other forms of birth control. As well, young women were far more likely to have had a Pap test if they had been tested for a STI in the past (96%) compared to those who had never been tested for an STI (46%), and all of those who had ever been diagnosed with a STI have had a Pap test in the past. While young women in this sample were more likely to have learned about the Pap test from a parent, they were more likely to have had a Pap test if they had learned about the test from a healthcare professional (12%), compared to a teacher (65%), friend (69%), or the media (63%).

Table 8: *Significant Pearson Chi-Square Results*

Dependent Variable	*Independent Variable*	Pearson Chi-Square		
		Value	Df	Sig.
V20. Ever had a Pap test? (Behaviour)	V2. Faculty of study?	42.62	10	.000
	V10. Age at first sexual intercourse?	27.02	9	.001
	V15. Other forms of birth control?	207.55	32	.000
	V16. Ever tested for STI?	263.37	2	.000
	V18. Name all diagnosed STIs?	24.52	10	.006
	V30. How learned about Pap test?	22.77	5	.000
V31. Intend to get a Pap test? (Intentions)	V2. Faculty of study?	9.46	10	.001
	V15. Other forms of birth control	66.06	33	.001
	V16. Ever tested for STI	27.618	2	.000
	V30. How learned about Pap test?	18.168	5	.003

Step II: Intentions and Behaviours regressed on TPB constructs

In the second step of the analysis, two stepwise multiple regression (logistic) models were performed. Partial correlations and odds ratios were examined to identify statistically significant IVs in each model (see Table 9). Nagelkerke's R-square was selected over Cox and Snell's R-Square to measure the Model Fit, or strength of the associations. The Nagelkerke, a modification of the Cox and Snell, is the most-reported of the R-squared estimates (Hosmer & Lemeshow, 2000). In Model 1, Intentions (DV) was regressed on Knowledge (IV), Attitudes (IV), PBC (IV), and Subjective Norms (IV). While Subjective Norms and PBC were significantly associated with young women's Intentions to get a Pap test in the future, Attitudes and Knowledge were found to have no significant relationship. In Model 2, Behaviour (DV) was regressed on Knowledge (IV), Attitudes (IV), PBC (IV), Subjective Norms, and Intentions (IV) using a stepwise procedure. Results indicated a significant relationship between young women's past Pap screening Behaviour (DV) and all of the other constructs (IVs), except for Knowledge.

Table 9: *Significant Variables in the Equation: Models 1 & 2*

Dependent Variable (Intentions)	*B*	*S.E.*	*df*	*Sig.*	*Exp(B)*
Model 1: Intend to get a Pap test in the future?					
Subjective Norms	.390	.065	1	.000	1.477
PBC	-.486	.115	1	.000	.615
Constant	-1.886	1.563	1	.227	.152
	Chi-Square	*df (Sig.)*	*-2LL*	*Nagelkerke R Square*	
Model Fit	64.947	2 (.000)	197.414	.292	

Dependent Variable (Behaviour)	B	S.E.	df	Sig.	*Exp(B)*
Model 2:					
Ever had a Pap Test?					
Attitudes	-.070	.030	1	.022	.932
Subjective Norms	.202	.039	1	.000	1.223
PBC	-.431	.086	1	.000	.650
Intentions	1.952	.524	1	.000	7.042
Constant	-.025	1.432	1	.986	.976
	Chi-Square	*df (Sig.)*	*-2LL*	*Nagelkerke R Square*	
Model Fit	126.779	4 (.000)	547.596	.289	

Step III: Intentions and Behaviours regressed on demographic, descriptive and risk factor variables

The dependent variables (Pap Test Intentions = Model 3; Pap Test Behaviour = Model 4) were regressed on appropriate demographic, descriptive, and risk factor variables in a stepwise (logistic) regression. These variables included age, faculty of study, age at first intercourse, number of sexual partners, history of smoking behaviour, exposure to second hand smoke, use of oral contraceptives, condom use, use of other forms of contraception, and a history of cervical dysplasia and colposcopy treatment. In Model 3, only one variable was found to be significantly associated with Pap test Intentions (see Table 10). There was a significant negative relationship between the age at which young women learned about the Pap test (V29) and their Intentions to get a Pap test in the future. That is, the younger the age at which these young women first learned about the Pap test, the greater were their Intentions to get a Pap test in the future.

Table 10: Significant *Variables in the Equation: Models 3 & 4*

Dependent Variable (Intentions)	*B*	*S.E.*	*Df*	*Sig.*	*Exp(B)*
Model 3: Intend to get a Pap test in the future?					
V29	-3.000	1.185	1	.011	.050
Constant	12.140	3.514	1	.001	187197.86
	Chi-Square	*df (Sig.)*	*-2LL*	*Nagelkerke R Square*	
Model Fit	8.986	1 (.003)	25.244	.273	
Dependent Variable (Behaviour)	*B*	*S.E.*	*Df*	*Sig.*	*Exp(B)*
Model 4: Ever had a Pap Test?					
V19	-.026	.008	1	.001	.974
Constant	1.016	.078	1	.000	2.761
	Chi-Square	*df (Sig.)*	*-2LL*	*Nagelkerke R Square*	
Model Fit	15.683	1 (.000)	1033.564	.025	

Similarly, in Model 4, only one of the independent variables was found to be significantly related to Pap test Behaviour. A significant negative relationship was identified between the item "Have you ever had sexual intercourse with a partner who had genital warts?" (V19; where yes=0 and no=1) and Pap test Behaviour (where 1= Behaviour; 0= no Behaviour). Thus, the young women who responded that they had had sex with a partner infected with genital warts were more likely to have had a Pap test.

Step IV: Intentions and Behaviour regressed on significant predictors from preceding models

Finally, using a stepwise process, the dependent variables (Pap Test Intentions =

Model 5; Pap Test Behaviour = Model 6) were regressed on all the significant predictors identified in the preceding models. In Model 5, Subjective Norms, PBC, and age at which participants first learned about the Pap test (explaining 39% of the variance) all remained significantly associated with young women's Intentions to get a Pap test. While Attitudes, Subjective Norms, PBC, and history of sexual intercourse with a partner infected with HPV continued to be significantly associated with past screening Behaviour in Model 6, Intentions to get a Pap test was no longer significantly related (see Table 11). This Model explained 23% of the variance in Behaviour.

Table 11: *Variables in the Equation: Models 5 & 6*

Dependent Variable (Intentions)	*B*	*S.E.*	*Df*	*Sig.*	*Exp(B)*
Model 5: Intend to get a Pap test in the future?					
V29	-.630	.164	1	.000	.533
Subjective	.382	.061	1	.000	1.465
Norms	-.439	.109	1	.000	.645
PBC	-.487	1.521	1	.749	.615
Constant					
	Chi-Square	*df (Sig.)*	*-2LL*	*NagelkerkeR Square*	
Model Fit	116.863	3 (.000)	235.146	.385	
Dependent Variable (Behaviour)	*B*	*S.E.*	*Df*	*Sig.*	*Exp(B)*
Model 6: Ever had a Pap Test?					
V19	-.029	.011	1	.008	.971
Attitudes	-.054	.027	1	.044	.948
Subjective	.201	.033	1	.000	1.223
Norms	-.412	.076	1	.000	.662
PBC	1.278	1.212	1	.292	3.588
Constant					
	Chi-Square	*df (Sig.)*	*-2LL*	*Nagelkerke R Square*	
Model Fit	118.134	4 (.000)	678.390	.233	

To summarize, while 82% of the young women sampled in this study reported that they were sexually active, only 72% of the sample have had a Pap test. While almost all the young women responded that they intend to get a Pap test in the future, half of them revealed that they delayed or avoided getting a Pap test in the past. At the same time, almost 13% of the sample responded that they have had colposcopy treatment, indicating a high incidence of disease in this student population. While this sample of young women had relatively positive attitudes about Pap tests and were moderately knowledgeable about the Pap test, their knowledge level about the significance of HPV was relatively poor. However, neither Attitudes nor Knowledge were found to be significant predictors of Intentions in the current study (see Figure 3). On the other hand, a significant relationship was found between Subjective Norms and young women's Intentions to be screened, indicating that they place high importance on the values and beliefs of those close to them with regard to Pap testing. In addition, PBC was significantly associated with young women's intentions to get a Pap test, suggesting that perceived resources and barriers significantly influenced their intentions. Similarly, Knowledge was not significantly associated with previous Pap testing behaviours. More importantly, all the constructs of the TPB (i.e., Attitudes, Subjective Norms, and PBC), except for Intentions, were found to be significantly associated with previous screening Behaviour (see Figure 4).

Figure 3: *Model 5- Significant Predictors of Screening Intentions (Shaded)*

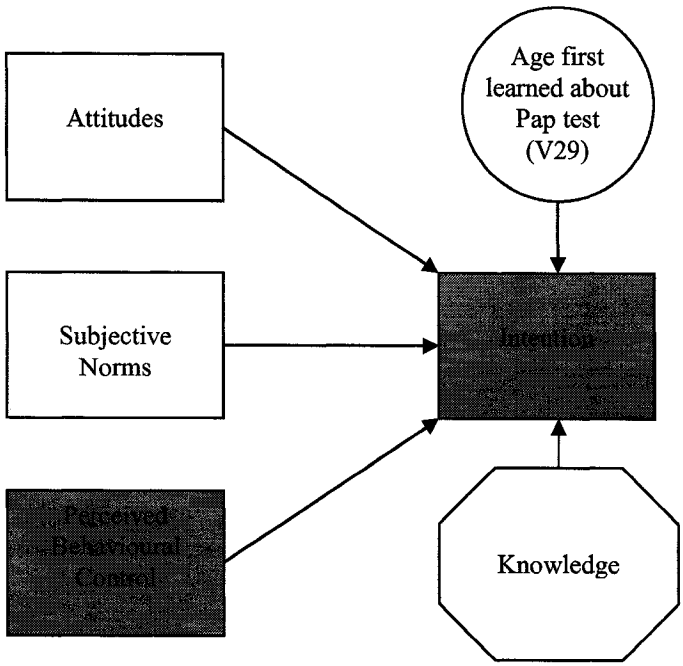
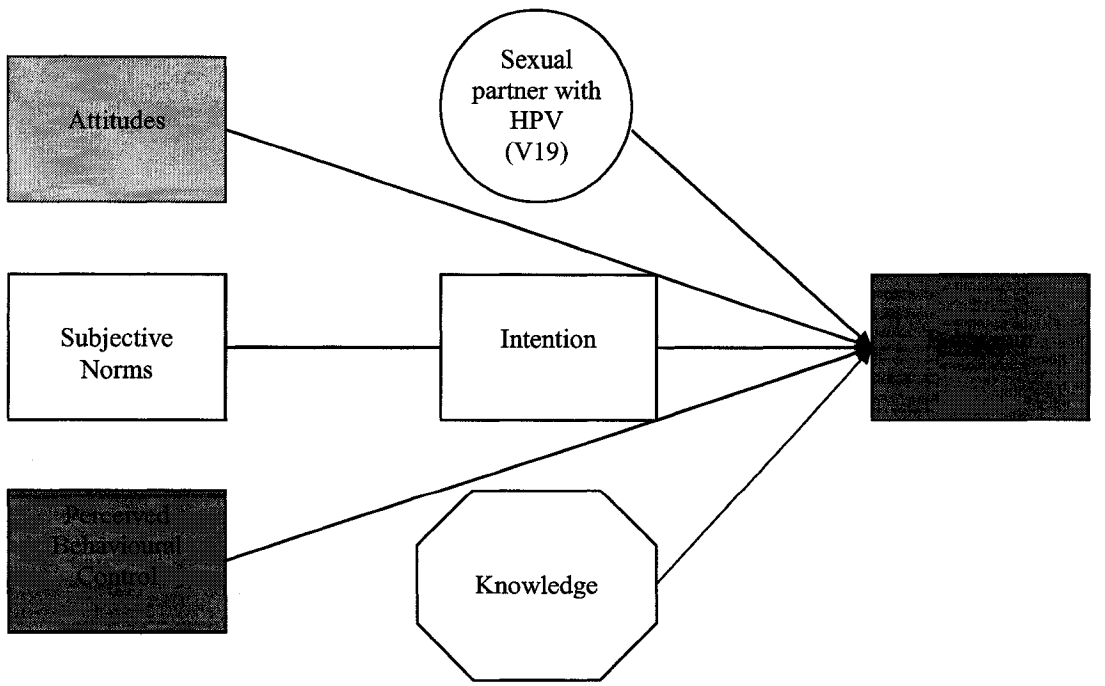


Figure 4: *Model 6- Significant Predictors of Screening Behaviour (Shaded)*



Chapter 5: Discussion

Ninety percent of new cases of invasive cervical cancer are directly related to HPV infection and the prevalence of HPV has reached epidemic levels on academic campuses (Bauer, Ting & Greer, 1991; Cothran, 1996; Ho, Bierman, Beardsley, Chang & Burk, 1998; Koutsky, 1997; Richardson, et al., 2000; Wheeler, Parmenter & Hunt, 1993; Winer et al., 2003). Strategies to increase young women's regular participation in Pap screening have been identified as key in the prevention of cervical cancer, and development of such intervention strategies is contingent on the identification of factors influencing young women's intentions to get a Pap test and subsequent screening behaviours. The current study provides new information about these factors in an attempt to inform the development of prevention programming and provides future directions for study.

The purpose of this study was to use the Theory of Planned Behaviour (TPB) to investigate young women's Knowledge, Attitudes, Subjective Norms, Perceived Behavioural Control (PBC), Intentions and past Behaviours as they relate to Pap testing. More specifically, the purpose was to examine the relationships between Knowledge, Attitudes, Subjective Norms, PBC and (1) Intentions to be screened; and (2) reported screening Behaviours. Both the Theory of Reasoned Action (TRA) and TPB have been used by other investigators to explore women's perceptions that influence their intentions and subsequent Pap testing behaviours. The survey instrument for this study was adapted from previous research in which the TRA was utilized to explore Pap screening behaviours amongst a sample of young college women in the U.S. (Armstrong, 2001). Modifications to the tool included adding questions to test the construct of PBC.

Associated Risk Factors

Age at first intercourse and number of sexual partners. A significant relationship has been established between early age of first intercourse and subsequent HPV infection (Burkett et al., 1992; Kahn, et al., 2002; Ley, et al., 1991), and is related to behavioural risk factors, such as multiple sex partners, sex with risky partners (Beuhler & Parson, 1997; Greenberg et al., 1992), and other risk behaviours such as alcohol and drug use (Coker et al., 1994). Most of the young women in the current study (82%) were sexually active and a majority of those first engaged in sexual intercourse between the ages of 16 and 19 (48.7%), consistent with findings from the NPHS (2001). One quarter (24.9%) of those who have been sexually active reported one sexual partner in their lifetime. Almost one third (28.7%) reported 2 to 4 sex partners, which is significantly higher than findings from the *Children and Youth, Sexual Health and HIV/AIDS Study* (1999) that only 9% of young Canadians (20 to 24 years of age) had had three different sex partners. Moreover, one third of these sexually active young women had sex with more than 5 partners, of which 13% have had sex with more than 8 partners, suggesting that this population of young women are at high risk for contracting STIs such as HPV.

Sexually transmitted infections. Forty-one percent of the women in this study reported that they had been tested for an STI. However, these findings should be considered cautiously since 81% of the respondents in the current study either agreed/strongly agreed (55%) or were unsure (26%) that the Pap test also detects the presence of STIs, suggesting that many of these young women may have been under the false impression that they were tested for STIs. In the current study, only 6.7% of the

population had reportedly been diagnosed with an STI, of which Chlamydia (2.2%) was the most commonly diagnosed followed by HPV (1.8%). Similarly, according to the CCHS national data, only 4% of young Canadians (15 to 24 years of age) who have had sex at least once reported having been diagnosed with a STI. These rates of reported infections should be considered very conservative estimates of the actual infection rates in this population given the typically asymptomatic nature of these types of infection and apparent lack of understanding regarding the differences between the Pap test and STI screening. According to the Canadian Public Health Agency, in the "*Canadian Sexually Transmitted Infections Surveillance Report - 2002: Canada*" (August, 2005), rates of the three nationally reportable STIs (i.e., chlamydia, gonorrhea, and syphilis) have been on an increase since 1997. There were 56,241 cases of genital chlamydia in 2002 (179.3/100,000), an 11.1% increase compared with the rate of 161.4/100,000 in 2001 and a 57.5% increase above the rate in 1997. Rates of HPV infection are difficult to determine since it is not a notifiable communicable disease, although, research indicates that HPV infection has reached epidemic proportions on college/university campuses in North America.

Condom use. In the current study, condom use was relatively high (60% often or almost always used a condom). Nonetheless, a significant number of the young women (40%) reported never having used or irregularly using condoms during sexual intercourse. This proportion is similar to the findings of the CCHS (2003) that 44% of sexually active 20- to 24- year olds reported sex without a condom, and suggests that this age group is susceptible to a variety of STIs including HPV. While research suggests that regular condom use may not offer complete protection against the transmission of HPV,

consistent use of condoms may reflect engagement in other health protective behaviours, such as regular cervical screening.

Smoking. Only 8.8% of the study population reported that they currently smoke. This rate is lower than the smoking rates found in the Canadian Campus Survey (CCS) (1998), which reported a smoking rate of 13% among students attending universities in Atlantic Canada, and the Canadian Tobacco Use Monitoring Survey (CTUMS), which reported a smoking rate of 30% among Canadian youth (20-24 years of age)(CTUMS, 2003). A much greater percentage (43%) of young women in the current study revealed that they had smoked at some point in the past, a troubling finding given evidence in the literature that women are at increased risk for cervical cancer if they have ever smoked in their lifetime (Coker, Bond, Williams, Gerasimova & Pirisi, 2002; Winer et al., 2003). Only 16.4% of respondents agreed or strongly agreed that there is a relationship between smoking and cervical cancer, suggesting that this population is poorly informed about this risk associated with cigarette smoking and that young women need more accurate information in order to make informed decisions about limiting their risks for cervical cancer. Programs aimed at smoking prevention/cessation need to begin well before women enter university, particularly given evidence from Health Canada that smokers in the 20 to 24 years age group are the most resistant to quitting, with 55% of each of male and female smokers not even contemplating quitting (Health Canada, 2005).

Subjective Norms

Results of this study were similar to those described by Armstrong (2001) in that the social normative component of the TPB (Subjective Norms) was a significant predictor of behavioural intentions. While Subjective Norms were most highly associated

with both Intentions and Behaviour, PBC was also associated with Pap screening Intentions, and both PBC and Attitudes were significantly related to past Pap screening Behaviours. Comparatively, study findings have been somewhat inconsistent amongst other researchers who have utilized either the TRA or TPB to examine women's Pap screening intentions. For example, Hill et al. (1985) used the TRA and found that attitude had the most significant influence on women's intentions to get a Pap test, compared to a number of researchers who found that both attitudes and social norms were significantly associated with women's intentions to get a Pap test (Barling & Moore, 1996; Burnett et al., 1995; Hennig & Knowles, 1990).

Similar inconsistencies have been noted in the research conducted using the TPB to explore factors influencing women's Pap screening intentions and behaviours. Jennings-Dozier (1999) found that women's attitudes about the Pap test were the most significant predictor of behavioural intentions, followed by PBC. Similarly, Kahn et al. (2001), who used a novel framework based on four models including the TPB, found that attitudinal factors, such as personal beliefs and the perceptions of others' beliefs, were associated with intentions to return for a Pap test or follow-up exam. While Bish et al. (2001) also found that women's attitudes about the behaviour to be the most important factor influencing their intentions to be screened, both subjective norms and PBC were not found to be associated with intentions or behaviour.

Possible explanations for these discrepancies may relate to the age and culture of the different study samples. The mean age of this study population (20.71 years; SD=1.77), similar to the previous study by Armstrong (M=20.89 years), was significantly lower than other related studies and may account for some of the variability in the

findings. Other research in which the TRA or the TPB has been utilized to explore women's Pap screening intentions and behaviours has sampled a much broader age range of women, with a mean around middle age (e.g., Hill= 34 years; Bish et al. = 38 years; Jennings-Dozier= 36 years) or older (Henning & Knowles= 54 years). Barling and Moore (1996) used a sample closest in age to this population sample, with a mean age of 24.4 years.

Culture may also explain the findings that contrast with previous related studies. While other studies using the TRA or TPB to explore women's practices were conducted in Australia, the US or UK, this is the first study to use the TPB to study Pap screening behaviours of young Canadian women attending university. Similar to Armstrong (2001), the university population selected for this study is predominately of Caucasian ethnicity. In comparison, most of the research conducted using the TRA or TPB as a theoretical framework have typically studied more ethnically diverse or immigrant samples (Jennings-Dozier, 1999) attending medical or sexual health clinics (Bish et al., 2001). As research indicates, lower cervical screening rates accompanied by increased rates of cervical cancer are significantly higher in African-American, Latina (Arrendondo, 2004; Bazargan, Bazargan, Faroog & Baker, 2004; Gorin & Heck, 2005), and Mexican (Watkins, Gabali, Winkleby, Gaona & Lebaron, 2002) women compared to Caucasian populations. In contrast to this study's largely educated and homogeneous Caucasian sample, other studies demonstrate significant disparities in screening for cervical cancer among underserved minorities, particularly Hispanic, uninsured and older women.

Knowledge

In the current study, knowledge was not found to be significantly associated with university women's intentions to get a Pap test, contrary to Armstrong's (2001) findings. While no significant relationship was found between knowledge and intentions, the findings indicated that knowledge levels were above the mean, suggesting that this population of young women was moderately knowledgeable about cervical cancer. However, mean scores on items about Pap tests were higher than the mean responses to items about HPV, suggesting that a majority of the participants in the current study did recognize that the Pap test is used to detect the presence of cancer of the cervix (82.8%), however, over half of the sample did not know (59.3%) or disagreed (1.6%) that having HPV increased their risk for cervical cancer. This finding is consistent with similar research conducted with young university women in the US (Gerhardt et al., 2000; Hasenyager, 1999; Ramirez et al., 1997) and the UK (Phillips, Johnson, Avis & Whynes, 2003), revealing that while young women are relatively familiar with the Pap screening test (i.e., reason for test, protocols), they are less knowledgeable about how HPV is transmitted (Baer, Allen & Braun, 2000), and about the causal ties between the highly prevalent human papillomavirus and cervical cancer (Burak & Meyer, 1997).

Attitudes

Similar to most of the research that has been conducted utilizing the TRA or the TPB as the guiding theoretical framework, attitudes were found to be a significant predictor of Pap screening behaviours in the current study. However, these findings are not consistent with Armstrong (2001), who found that the attitudes of young women attending university are a poor predictor of their Pap screening intentions. A premise of

the TPB is that women develop their attitudes about a particular behaviour over time. Thus, young women's attitudes about Pap testing may be considered unstable and not as firmly entrenched as the attitudes of older women who have a history of Pap testing behaviour. While the practice of getting a regular Pap test was new or somewhat foreign to a large segment of the study population - 28% had never had a Pap test and 24% had only one Pap test - almost half had more than two Pap tests in their lifetimes, of which one third (31%) had five or more.

Behaviour and Intentions

Statistical analysis revealed a significant negative relationship between having had sexual intercourse with a partner known to have genital warts and past Pap screening behaviour. That is, women who had had sex with a partner infected with genital warts were significantly more likely to have had a Pap test. This finding might be expected given the strong association between HPV and cervical cancer. At the same time, many young women do not perceive themselves to be susceptible to STIs. Less than one in ten young women (6.7%) revealed that they had ever been diagnosed with an STI. Forty-one percent reported that they had been tested in the past for an STI, which may be inaccurate as described earlier. Research suggests that many young women do not view themselves as susceptible to STIs (Banikarim, Chacko & Wiemann, 2003). While most young women recognize the importance of STI screening, those at increased risk for STIs are often not tested for STIs. Further analysis of the data, beyond the scope of this study, is required to determine if those at greatest risk for STIs are actually being tested.

While 83% of the young women in this study reported that they had been sexually active, only 72% of the sample had had a Pap test in the past. This rate is lower compared

to the findings of the NPHS (1996-97) which reported that 89% of women living in New Brunswick had at least one Pap test in the past, and suggests that a significant proportion of this population may not be screened according to CCS guidelines. A statistically significant association was found between the age at which young women first learned about the Pap test and Pap screening intentions. This suggests that participants who learned about the screening test at a younger age were more likely to intend to get a Pap test compared to their counterparts who learned about the test at an older age. Thus, providing young women with accurate information at a younger age may have a positive influence on their intentions to get a Pap test.

Women's intentions to be screened in the future may also be strongly linked to a history of cervical abnormalities and/or colposcopy treatment. Colposcopy rates were calculated for the entire population given evidence in the literature that both virgins and non-virgins are at risk for HPV and subsequent cervical abnormalities (Winer, et al., 2003). The findings indicated that approximately 29% of the population had been recalled for a follow-up screen due to abnormal findings and 12.6% had received colposcopy in the past, suggesting significant dysplasia and disease in this population of young women. These reported rates of abnormalities are likely conservative estimates given the disparity between those who are sexually active (83%) and those who have received a Pap test (72%). That is, 10% of the population who are sexually active have never been screened and may have an undetected abnormality. In addition, cervical DNA testing is not yet widely adopted in Canada and may be responsible for a percentage of false negative test results. In the current study, colposcopy rates appear to suggest a significant potential for disease in this population of young women, however, it is

difficult to compare with other jurisdictions given limited access to national data on colposcopy rates.

Perceived Behavioural Control

The TPB was selected over the TRA in this study of young women attending university, largely to explore the influence of PBC on women's Pap screening intentions and behaviours. While Jennings-Dozier (1999) found a significant relationship between PBC and women's Pap screening intentions, similar to the findings in the current study, Bish et al. (2001) did not find a significant relationship between the two constructs. The fact that PBC was found to be predictive of Pap screening behaviour in this study of Canadian women attending university raises some interesting questions since these women were more highly educated and had fewer barriers to accessing healthcare, compared to the study sample utilized by Jennings-Dozier (1999) of African-American and Latina women living in the U.S., and suggests that other barriers to Pap screening exist.

Predictive Adequacy of TPB

The TPB has emerged in the literature as superior to other models (i.e., HBM) for explaining behavioural intentions, despite claims by some researchers that the TPB is not empirically adequate for the study of some ethnic groups (Jennings-Dozier, 1999), and that PBC is not predictive of behavioural intentions (Bish et al., 2001). In the current study, all three constructs (i.e., Attitudes, Subjective Norms, and PBC) were significantly related to young women's past Pap screening behaviours, suggesting that the TPB is a good theoretical framework for exploring the factors that influence young women's cervical cancer screening behaviours.

Limitations of the Study

In this study, women's self-reported past cervical screening behaviours and their intentions to seek cervical screening in the future were explored as determinants of future actions. One limitation of the study may be the reliance on young women's self-reported history of screening behaviours. The majority of women in this population reported regular testing. However, since this information could not be validated by a chart audit, reliability of their self reports of the cervical screening histories may be questioned.

Another limitation of this study was the inability to fully test the main assumption of the TPB framework that intentions are closely related to behaviour since subsequent behaviour was not examined. A longitudinal study of repeated cervical examinations over a period of time would be needed to adequately test the utility of the TPB in predicting women's Pap screening behaviour. However, such studies are expensive and attrition may be an important factor with this particular population. In addition, it is difficult to determine and test appropriate Pap screen behaviours for young women based on Canadian Cancer Society (CCS) standards. These standards suggest that women should initiate testing when they become sexually active or when they turn 18 years of age, and after two normal annual exams they may revert to testing every three years if they are in a low-risk monogamous relationship. A detailed assessment of women's Pap testing history would be necessary to determine if women have had appropriate Pap screening over time, and may not be feasible given the time and expense of collecting such data.

The response rate of 31.5% was lower than the projected response rate of 37% used in the power analysis. While a number of techniques identified in the literature were employed in an attempt to optimize the participation response rate, including pre-

notification of an email survey (Cook, Heath & Thompson, 2000; Sheehan, 2001), follow-up reminders (Kittelson, 1997), clear indication of university affiliation (Sheehan, 2001), and a simple survey format (Dillman, Tortora, Conrad & Bowker, 2001), the fact that the data collection took place a few weeks before the end of the winter term may largely account for the lower than anticipated number of responses. Data collection earlier in the term, prior to midterm exams, may have resulted in a greater participant response rate. However, given the sensitive nature of some of the questions on this survey (Wadsworth, et al., 1996) and response rates as low as 24% in reported in other on-line surveys (Sheehan, 2001), the response rate in the current study is considered acceptable.

Future Research

It is difficult to compare the findings from this study with similar studies conducted in the U.S. since the Canadian system of publicly-insured healthcare is vastly different from the privately-funded system of healthcare in the U.S. Health insurance has been shown to be the strongest predictor of Pap screening in uninsured recent immigrants and uninsured U.S.-born women living in America (Carrasquillo & Susmita, 2004). Women's failure to be screened, despite access to comprehensive healthcare, is commonly associated with increased age, increased poverty, and lower education levels (Leyden et al., 2005). Research indicates that women living in the wealthiest neighborhoods in Canada are twice as likely to have a mammogram compared to those living in the poorest neighborhoods, suggesting socioeconomic barriers to preventative measures such as health screening (Menec, Sirski & Attawar, 2005). Results from the current study raise many questions about the Pap screening behaviours of other young women in New Brunswick who are not engaged in higher education and have less access

to accurate information regarding Pap screening and cervical cancer. Further study with a more culturally and socio-economically diverse population of young Canadian women is warranted to explore these variables.

The population utilized in the current study was selected largely because of their accessibility via the internet. They may be more inclined to receive regular screening compared to young women who are less educated and disenfranchised. According to the literature there are considerable knowledge deficits among socioeconomically disadvantaged and immigrant women (Hislop et al., 2004), who are typically poorly educated about the Pap test (i.e., purpose, procedures, abnormal test results, and prognosis), and the risk factors associated with cervical cancer, such as HPV infection (Breitkopf, Pearson & Breitkopf, 2005). However, there is considerable disagreement in the literature about the relationship between knowledge of cervical cancer screening and Pap testing behaviour. Hislop et al. (2004) found that Chinese Canadian women with the highest levels of knowledge about cervical cancer risks were significantly more likely to have ever had a Pap test compared to their less educated counterparts. However, in the current study, knowledge was not found to be significantly associated with previous Pap testing behaviour and future screening intentions, suggesting that while many young women recognize that the Pap test is an important preventative health measure (91% in the current study), a significant proportion of them (28% in the current study) had never had a Pap test. As identified in the research (Cook & Bellis, 2001; Ratcliff-Crain et al., 1999), knowledge about associated risks may be less important than how women evaluate that information. Future research is needed to further explore the relationship between knowledge and young women's intentions to obtain a Pap test.

Despite the fact that the majority of women in the current study were sexually active (83%), only 72% had had a Pap test in their lifetime, which is consistent with the findings of the NPHS (1996-97) that the Pap test continues to be underutilized in women aged 18 to 24 years (Maxwell, 2001). The literature reveals that the ability to predict cervical screening intentions and behaviours in women who have never received a Pap test is different from those who are returning for a Pap test. Eaker (2001) found that non-attendance was positively associated with nonuse of oral contraceptives, inconsistent healthcare providers, frequent condom use, living in rural/semirural areas, and not knowing the recommended screening interval, whereas socioeconomic status was not associated with nonattendance. Armstrong (2001) hypothesized that women who required cervical exams for oral contraceptive pills had stronger intentions to get screened than those women who were not on the pill, since they were required to obtain an annual Pap test from their physicians for a prescription for birth control. As a result, she separated the two groups in her data analysis. More than two-thirds of the young women in the current study (69%) revealed that they were using birth control as a form of contraception, and 59% reported that a Pap test was required to obtain birth control pills. While a full analysis of these data is beyond the scope of this thesis, further analysis is warranted to examine the differences between these two naturally occurring groups of women and how the factors which affect their intentions to get a Pap test influence their decision making.

While results of this study provide useful information about young women's attitudes toward cervical screening, it reveals little about the root of negative attitudes toward the exam and why a segment of the population choose not to receive

gynecological exams. Some evidence suggests that women who have been sexually violated as children or young adults, reported to be as many as 30% of the female population, are apt to experience health-related and gynecological problems (Carlson, 2002), and increased rates of HPV infection (Kahn, Huang, Rosenthal, Tissot & Burk, 2005). However, sexually abused women are less likely to undergo preventative health screening, and are more likely to view the procedure as painful, embarrassing, anxiety provoking and intrusive than other young women (Carlson, 2002). The fact that attitudes predicted young women's behavioural intentions in the current study highlights the need for researchers to assess the factors influencing young women's attitudes and subsequent Pap screening behaviours, the findings of which could be incorporated into a comprehensive screening program.

Research indicates that the highest rates of cervical cancer are in areas where there is limited access to Pap screening. Students can obtain Pap tests at health centres on college and university campuses, although, often students do not know that these resources exist. In the current study, almost 40% of the population was unaware that they could obtain a Pap test at Student Health Services on the university campus, suggesting a need to better educate young women about the college and university health promotion services available to them. Providing young women with accurate information about the risks associated with cervical cancer will also promote more favorable attitudes toward Pap testing and limit perceived barriers to screening. While the current study has provided useful insights regarding factors influencing young women's intentions to get a Pap test, further analysis would inform the development of a campus-based program aimed at promoting regular Pap testing.

Recommendations

The future holds numerous possibilities for technological advances in the enhancement of HPV detection and prevention of cervical cancer. Hybrid Capture may replace the Pap test in the future; instead of looking for abnormal cells, it detects the presence of HPV by searching for its DNA (Becker, Longacre & Harper, 2004). Development of a vaccine, which may ultimately negate the need for Pap testing, may take a decade or more of development before it is available to the public (Hoover et al., 2000). In the meantime, self-testing is closer to development and would enable women to test themselves in the privacy of their own homes, eliminating some of the common complaints or barriers that women report, such as difficulty getting an appointment (i.e., lack of doctors), busy schedules, and feelings of discomfort sometimes associated with the procedure. Since it will be years before these alternative tests/interventions are available on the market, a comprehensive approach is needed to promote cervical screening practices in the interim.

Recall systems are already in place in most Canadian provinces, including the eastern provinces of Newfoundland, Nova Scotia, and Prince Edward Island, where they have been experiencing a trend of increasing cervical cancer incidence. Recall systems have been shown to increase Pap testing rates of unscreened and under-screened women in Cape Breton Island and mainland Nova Scotia (Johnston, Boyd, MacIsaac, Rhodes & Grimshaw, 2003). However, a comprehensive cervical screening program, including a recall system, has yet to be established in New Brunswick. Pap testing in New Brunswick is primarily conducted by family physicians, and the shortage of doctors in the province has forced many women to obtain Pap tests in emergency rooms and after-hours clinics in

their communities. An ongoing pilot study was conducted in four New Brunswick communities, wherein women with limited access to screening services (i.e., lack family physician) were able to receive Pap tests from properly trained nurses (The New Brunswick Cancer Network, 2003). Given the success of this pilot, expanding these screening programs to include the entire province and development of a comprehensive recall system would remove many of the barriers to Pap Screening, promoting regular Pap screening among women in all New Brunswick communities.

The internet can be a cost-effective tool for collecting valuable information about the health behaviours of populations, as shown in the current study. In this study, data was collected from 904 young women in a brief period of time, and their responses were easily downloaded into a statistical analysis package without the need for time consuming and costly data entry. The author was able to receive feedback about the survey from participants, in the form of email replies, including the following comments: lack of relevant questions for lesbian/bisexual women, feedback on survey wording/construction, and interest in doing similar research and creating a web-based survey.

The internet has also become an increasingly popular tool for retrieving health promotion information, and is the most rapidly growing health information source of cancer risk information for women (Unruh, Bowen, Meischke, Bush & Wooldridge, 2004). This online information resource is particularly amenable to the younger age groups. Escoffery et al. (2005) found that 53% of 743 undergraduates surveyed on two academic campuses in the US indicated that they would like to get health information online, and 28% agreed that they would like to attend a health program online. In the current study, participants were sent a final email thanking them for their participation.

The email also highlighted findings from the study. In order to educate participants about the risks associated with cervical cancer and encourage them to obtain regular Pap tests, the email provided useful internet resources about cervical screening.

Internet reminders provide anonymity to women who might otherwise be too shy or embarrassed to speak to the healthcare provider about HPV and other STIs. According to the American College of Pathologists (2001), women who received a reminder to schedule a Pap test were much more likely to undergo the test than were those who did not receive a reminder (78% vs. 47%, respectively). In response to this disparity, a website was created by the College of American Pathologists (www.MyHealthTestReminder.com) that enables women to receive a reminder when it is time for their regular screening tests for cancer and other diseases. Private email reminders for Pap tests are sent to participants on any date they choose. To register, participants complete a short online form, and a "Spread the Word" feature enables the online visitors to send e-mail messages to other people urging them to visit the site and sign up for screening reminders. The site also offers information on why screenings are important, and it details the screening techniques. Links to the Website of the College of American Pathologists offer comprehensive fact sheets on such topics as *"America's Women: In Pursuit of Health"*, and *"Have a Pap Test: Do It Today for Your Health and for Your Family"*.

An innovative method to promote cervical cancer screening on university and college campuses would be the development of a web-based health promotion program, including a website with easy access to health promotion materials and a reminder registry enabling women to receive Pap test reminders through their email service.

Development and implementation of a recall system on a university campus using the university's internet/email services could be done in collaboration with Health Services and Information Technology Services. A prospective chart review could be used to study the effects of the recall system on actual Pap testing behaviours. While this form of internet-based recall system may be less effective in the general population, dependent on internet usage rates, it may be a cost-effective tool for Student Health Services to use on university and college campuses as email accounts are provided to all registered students at no additional cost and programming a computer to send out regular reminders negates the need for administrative costs and expensive postage.

Nursing Implications

Results of the current study indicate that young women are more likely to learn about Pap tests from friends and family rather than from healthcare providers, such as a nurses or physicians. This may in some way help to explain the significance of social norms found in this study, although, it also raises some questions about the accuracy of the information young women are receiving about Pap testing and HPV. While knowledge levels about cervical cancer were relatively high in the study population, knowledge about HPV was poor. These results highlight a missed opportunity by health professionals to inform women about the importance of Pap screening, particularly since most women in Canada access Pap screening through their healthcare provider.

The literature also underscores an important role for nurses to communicate accurate information to young women about their risks related to HPV and cervical cancer and to help young women establish a lifelong habit of regular Pap screening by promoting positive attitudes about the Pap test (Kahn et al., 2001). Pap testing in New

Brunswick is primarily conducted by family physicians opportunistically during regular office visits. However, most young women are healthy and do not see their physicians regularly and a shortage of doctors in the province has further impeded women's timely access to Pap screening. Providing alternative service providers, such as specially trained nurses, in a supportive environment for screening services and heath promotion education will undoubtedly encourage young women to get regular cervical screening.

As nurses move more into the communities in a health promotive capacity with the continued development of community health centers in New Brunswick, there is an ever expanding role for nursing to promote positive attitudes about Pap testing in young women. There is an opportunity for nurses to use theoretically based intervention programs to target those women who have yet to establish Pap screening behaviours in health centers on college and university campuses. However, there is much evidence to suggest that young women need to be informed about their risks related to cervical cancer well before they go to university, underscoring the need for comprehensive sexual education programs in our public schools.

Nurses can make a significant impact on the health of young women by initiating the development of alternative and comprehensive services tailored to the specific needs of this population. For instance, Well Women's clinics which offer both cervical and mammography screening services have been shown to be an effective way of recruiting older women for Pap screening (Maritime Centre of Excellence of Women's Health, 2001). However, younger women may need services that are located in their high schools, university/college campuses, and shopping malls. Recent research involving young men suggests nurses also need to target young women's male counterparts.

McPartland, Weaver, Shu-Kuang and Koutsky (2005) found that young men, 18 to 25 years of age attending university, will modify their own behaviours (e.g., wear a condom during intercourse) if they know that they themselves are infected with HPV. In addition, given accurate information about the risks associated with HPV and the potential for severe consequences in women, young men are significantly more likely to intend to reduce their number of sex partners and encourage their sexual partner to get a Pap test. The significant finding of an association between young women's intentions to get screened and social norms (i.e., their beliefs about whether or not those close to them want them to get a Pap test) is supported by McPartland et al.

This study also has implications for nursing education. Nursing curriculums, at both the baccalaureate and graduate levels, should promote the use of theoretical frameworks in the development of health promotion programs. Health promotion programs based on our best guess, and often times faulty assumptions, may or may not result in the desired target outcomes. Theoretical frameworks, such as the TPB, can help researchers identify important factors influencing human behaviour. Encouraging new practitioners to integrate this knowledge into interventions that target these factors will undoubtedly promote their critical thinking skills and result in more effective health outcomes for their target population. As such, nursing students should be encouraged to utilize theory-based nursing interventions to prevent and or manage chronic illnesses in diverse populations and throughout the lifespan.

Conclusion

Getting a regular Pap test is the best defense against invasive cervical cancer. Young women are particularly vulnerable to cervical dysplasia, the precursor to cervical

cancer, due to the sexually transmitted nature of HPV. The results of this study suggest that young women are poorly informed about the risks associated with HPV and that a subset of them underutilize Pap screening programs. Thus, they need to be better informed about the risks associated with HPV and cervical cancer. Moreover, education must begin well before they are ready to go away to college or university. As community health centers continue to develop throughout the province of New Brunswick, there is an ever expanding role for nurses to promote regular Pap testing behaviours. Nurses and other healthcare providers can help young women establish lifelong Pap screening habits, by using innovative methods to educate them about their risks for cervical cancer and by developing supportive screening services customized to their needs. As revealed in this study, strategies that promote positive attitudes about the Pap test, recognize the importance of social norms for young women's behaviour, and limit their perceived barriers to screening are expected to have a positive influence on Pap screening in this population. An opportunity also exists for researchers to identify segments of this study population who have never been screened or who underutilize Pap screening programs, and to develop and test innovative strategies that will motivate the adoption of regular health screening. Canadian women serve to benefit from screening behaviours that contribute to optimal health throughout their lifespan.

References

Alan Guttmacher Institute. (1995). Facts in brief. New York: Author.

Al-Ghamdi, A., Freedman, D., & Miller, D. (2002). Vulvar squamous cell carcinoma in young women: A clinicopathologic study of 21 cases. *Gynecologic Oncology, 84*(1), 94-101.

American Cancer Society. (1995). Cancer facts and figures– 1995. Atlanta, GA: Author.

American Social Health Association (1995). ASHA study: Most college women sexually active but don't use precaution against STIs (News Release). Research Triangle Park, NC: Author.

Apter, D., Butzow, T., & Laughlin, G. (1993). Gonadotropin-releasing hormone pulse generator activity during pubertal transition in girls: Pulsatile and diurnal patterns of circulating gonadotropins. *Journal of Clinical Endocrinol Metab., 76*, 940-949.

Armitage, C., & Conner, M. (2000). Social cognition models and health behaviour: A structured review. *Psychology and Health, 15*(2), 173.

Armitage, C., Conner, M., & Loach, J. (1999). Different perceptions of control: Applying an extended theory of planned behaviour to legal and illegal drug use. *Basic and Applied Social Psychology, 21*(4), 301-316.

Armstrong, L. (2002). Predicting cervical screening in college women: A test of the theory of reasoned action. *Dissertation Abstracts International, 67*(7-B), 3367.

Arredondo, E. (2004). Evaluating a stage model in predicting Latinas' cervical cancer screening practices: The role of psychosocial and cultural predictors. *Dissertation Abstracts International: Section B: The Sciences & Engineering, 64*(12-B): 6314.

Ashing, G.K. (1999). Health behaviour change models and their socio-cultural relevance for breast cancer screening in African American women. *Women and Health, 28*(4), 53-71.

Azjen, I. (2002). Perceived behavioural control, self-efficacy, locus of control, and the theory of planned behaviour. *Journal of Applied Social Psychology, 32*, 665-683.

Azjen, I. (1988). *Attitudes, personality, and behaviour*. Milton Keynes, UK: Open University Press.

Azjen & Fishbein (1980). *Understanding attitudes and predicting social behaviour.* Engelwood Cliffs, NJ: Prentice-Hall.

Baer, H., Allen, S., & Braun, L. (2000). Knowledge of human papillomavirus infection among young adult men and women: Implications for health education and research. *Journal of Community Health: The Publication for Health Promotion & Disease Prevention, 25*(1), 67-78.

Bandura, A. (1994). Self-efficacy. In V. S. Ramachaudran (Ed.), *Encyclopedia of human behaviour* (Vol. 4, pp. 71-81). New York: Academic Press. (Reprinted in H. Friedman [Ed.], *Encyclopedia of mental health*. San Diego: Academic Press, 1998).

Banikarim, C., Chacko, M., Wiemann, C., & Smith, P. (2003). Gonorrhea and chlamydia screening among young women: Stage of change, decision balance, and self-efficacy. *Journal of Adolescent Health, 32*(4), 288-295.

Barling, N. & Moore, S. (1996). Prediction of cervical cancer screening using the theory of reasoned action. *Psychological Reports, 79*(1), 77-80.

Bauer, H.M., Ting, Y., Greer, C.E. Chambers, J.C., Tashiro, C.J., & Chimera, J., et al.

(1991). Genital human papillomavirus infection in female university students as determined by a PCR-based method. *Journal of the American Medical Association, 265*, 472-477.

Bazargan, M., Bazargan, S., Farooq, M., & Baker, R. (2004). Correlates of cervical cancer screening among undeserved Hispanic and African-American women. *Preventive Medicine: An International Journal Devoted to Practice & Theory, 39*(3), 465-473.

Beazley, R. (1989). Canada Youth and AIDS Study. Newfoundland report. Kingston, Ontario: Queen's University.

Bennett, P., & Bozionelos, G. (2000). The theory of planned behaviour as predictor of condom use: A narrative review. *Psychology, Health & Medicine, 5*(3), 307.

Beuhler & Parsons (1997). Effectiveness of a call/recall system in improving compliance with cervical cancer screening. *Canadian Medical Association Journal, 157*(5), 521.

Biro, F., Rosenthal, S., Rymarquis, L., Kollar, L., & Hillard, P. (1997). Adolescent girls' understanding of Papanicolaou smear results. *Journal of Pediatric Adolescent Gynecology, 10*, 209.

Biro, F., Rosenthal, S., & Stanberry, L. (1994). Knowledge of gonorrhea in adolescent females with a history of STI. *Clinical Pediatrics, 33*, 601.

Bish, A., Sutton, S., & Golombok, S. (2000). Predicting uptake of a routine cervical smear test: A comparison of the health belief model and the theory of planned behaviour. *Psychology and Health, 15*(1), 35.

Black, M., Yamada, J., & Mann, V. (2002). A systematic literature review of the effectiveness of community-based strategies to increase cervical cancer screening. *Canadian Journal of Public Health, 93*(5), 386-393.

Blair, K.A. (1998). Cancer screening of older women: A primary care issue. *Cancer Practice, 6*(4), 217-22.

Borenstein, M., Rothstein, H., & Cohen, J. (2001). *Power and precision*. Englewood, NJ: Biostat.

Boyce, W., Doherty, M., MacKinnon, D., & Fortin, C. (2003). Canadian youth, sexual health and HIV/AIDS study: Factors influencing knowledge, attitudes and behaviours. Toronto, ON: Council of Ministers of Education, Canada. Retrieved from www.cmec.ca/publications/aids

Brinton, L., Hamman, R., Huggins, G., Lehman, H., Levine, R., & Mallin, K., et al. (1987). Sexual and reproductive risk factors for invasive squamous cell cervical cancer. *Journal of National Cancer Institute, 79,* 23-30.

Brooks, S.E. (1996). Cervical cancer and the older woman: Obstacles and opportunities. *Cancer Practice, 4*(3), 125-9.

Burak, L., & Meyer, M. (1997). Using the health belief model to examine and predict college women's cervical cancer screening. *Health Care for Women International, 18*(3), 251-263.

Burk, R.D., Ho, G., & Beardsley, L. (1996). Sexual behaviour and partner characteristics are the predominant risk factors for genital human papillomavirus infection in young women. *Journal of Infectious Disease, 174*(4), 679-689.

Burkett, B., Peterson, C., & Birch, L. (1992). The relationships between contraceptives, sexual practices, and cervical human papillomavirus infection among a college population. *Journal of Clinical Epidemiology, 45*, 1295-1302.

Burnett, C., Steakley, C., & Tefft, M. (1995). Barriers to breast and cervical cancer screening in underserved women of the District of Columbia. *Oncology Nursing Forum, 22*(10), 1551-1558.

Byrd, T., Peterson, S., Chavez, R., & Heckert, A. (2004). Cervical cancer screening beliefs among young Hispanic women. *Preventive Medicine: An International Journal Devoted to Practice & Theory, 38*(2), 192-197.

Cannistra, S. & Niloff, J. (1996). Cancer of the uterine cervix. *New England Journal of Medicine, 334*(16), 1030-1038.

Carlson, K. (2002). *Barriers to cervical screening experienced by victims/survivors of sexual assault- Pilot study*. CASA House: The Royal Women's Hospital.

Centre for Addictions and Mental Health (1998). *Canadian campus survey*. McMaster University, Hamilton, Ontario: Canada. Retrieved October 17, 2005. http://www.mcmaster.ca/health/hwc/Reality%20Check/canadian_campus_survey_1998.html

Cervical Cancer Prevention Network (2001). CCPN Meeting Report, Jan. 19, 2001: 20.

Cheung, S.F., & Chan, D. (1999). Reexamining the theory of planned behaviour in understanding wastepaper recycling. *Environment and Behaviour, 31*(5), 587-612.

Coker, A., Bond, S., & Williams, A. (2002). Active and passive smoking, high-risk papillomavirus and cervical neoplasia. *Cancer Detection and Prevention, 26*(2), 121-128.

Coker, A., Richter, D., & Valois, R. (1994). Correlates and consequences of early initiation of sexual intercourse. *Journal of School Health, 64*, 372-377.

Coleman, R. (2000). *Women's Health in Atlantic Canada: A Statistical Report.* Halifax, NS: Maritime Centre of Excellence for Women's Health.

Conner, M., & Armitage, C. (1998). Extending the theory of planned behaviour: A review and avenues for further research. *Journal of Applied Social Psychology, 28*(15), 1429-64.

Conner, M., & Norman, P. (Eds.) (1996). *Predicting health behaviour.* Buckingham, UK: Open University Press.

Conner, M., Sheeran, P., & Norman, P. (2001). Temporal stability as a moderator of relationships in the Theory of Planned Behaviour. *British Journal of Social Psychology, 39*, 469-93.

Cook, C., Heath, F., & Thompson, R. (2000). A meta-analysis of response rates in web or Internet-based surveys. *Educational and Psychological Measurement, 60*, 821-836.

Cothran, M., & White, J. (1996). Update on human papillomavirus. *Journal of the American Academy of Nurse Practitioners, 7*(12), 584-589.

Cothran, M., & White, J. (2002). Adolescent behaviour and sexually transmitted diseases: The dilemma of human papillomavirus. *Health Care for Women International, 23*, 306-319.

Couper, M.P., Blair, J., & Triplett, T. (1999). A comparison of mail and email for a survey of employees in federal statistical agencies. *Journal of Official Statistics, 15*, 39-56.

Courneya, K., Bobick, T., & Schinke, R. (1999). Does the theory of planned behaviour mediate the relation between personality and exercise? *Basic and Applied Social Psychology, 21*(4), 317-324.

Courneya, K., Plotnikoff, R., & Hotz, S. (2000). Social support and the theory of planned behaviour in the exercise domain. *American Journal of Health Behaviour, 24*(4), 300-308.

Dell, D.L., Chen, H., & Ahmad, F. (2000). Knowledge about human papillomavirus among adolescents. *Obstetrics and Gynecology, 96*(5), 653-656.

Diekhoff, G. (1992). *Statistics for the Social and Behavioural Sciences: Univariate, Bivariate, Multivariate.* Dubuque, IA: Wm. C. Brown Publishers.

Dillman, D., Tortora, R., & Conradt, J. (2001). *Influence of plain vs. fancy design on response rates for web surveys.* Washington State University, PO Box 644014, Pullman, WA 99164-4014.

Edelman, M., Fox, A., Alderman, E., Neal, W., Shapiro, A., & Silver, E., et al. (2000). Cervical Papanicolaou smear abnormalities and chlamydia trachomatis in sexually active adolescent females. *Journal of Pediatric Adolescent Gynecology, 13*, 65-69.

Edwards, A. (1957). *Techniques of attitude scale construction.* New York: Appleton, Century and Crofits.

Eiser, R. & Cole, N. (2002). Participation in cervical screening as a function of perceived risk, barriers, and need for cognitive closure. *Journal of Health Psychology, 7*(1), 99.

Escoffery, C., Miner, K., Adame, D., Butler, S., McCormick, L., & Mendell, E. (2005).

Internet use for health information among college students. *Journal of American College Health, 53*(4), 183-189.

Estabrooks, C. (1999). The influence of the group with elderly exercisers. *Small Group Research, 30*(4), 438-453.

Fagerstrom, K. (1978). Measuring degree of physical dependence to tobacco smoking with reference to individualization of treatment. *Addictive Behaviours, 3*, 235-241.

Fairley, C., Chen, S., & Ugoni, A. (1994). Human papillomavirus infection and its relationships to recent and distant sexual partners. *Obstetrics and Gynecology, 84*, 755-9.

Fazekas, A., Senn, C., & Ledgerwood, D. (2001). Predictors of intention to use condoms among university women: An application and extension of the theory of planned behaviour. *Canadian Journal of Behavioural Science, 32*(2), 103-17.

Federal/Provincial/Territorial Advisory Committee on Population Health. (1999). *Toward a Healthy Future: Second Report on the Health of Canadians*. Ottawa: Report prepared for the Ministers' of Health.

Ferenezy, A. (1995). Epidemiology and clinical pathophysiology of condylomata acuminate. *American Journal of Obstetrics & Gynecology, 172*(4), 1331.

Fishbein, M. & Azjen, I. (1975). *Belief, attitude, intention, and behaviour: An introduction to theory and research*. Reading, MA: Addison-Wesley.

Fisher, M., Rosenfeld, W., & Burk, R. (1991). Cervicovaginal human papillomavirus infection in suburban adolescents and young adults. *Journal of Pediatrics, 119*, 821-825.

Fisher, W.A. (1997). A theory-based framework for intervention and evaluation in STI/HIV prevention. *The Canadian Journal of Human Sexuality, 6*, 105-111.

Fitch, M., Greenberg, M., & Cava, M. (1998). Exploring the barriers to cervical screening in an urban Canadian setting. *Cancer Nursing, 21*(6), 441-449.

Franco, E.L. (1995). Cancer causes revisited: Human papillomavirus and cervical neoplasia. *Journal of the National Cancer Institute, 87*, 779-80.

Franco, E., Duarte-Franco, E., & Ferenczy, A. (2001). Cervical cancer: Epidemiology, prevention, and the role of human papillomavirus infection. *Canadian Medical Association Journal, 164*(7), 1017-1025.

Franco, E.L., Villa, L.L., Sobrinho, J.P., Prado, J.M., Rousseau, M.C., Desy, M., et al. (1999). Epidemiology of acquisition and clearance of cervical human papillomavirus infection in women from a high-risk area for cervical cancer. *Journal of Infectious Disease, 180*, 1415-23.

Gerhardt, C., Pong, K., & Kollar, L. (2000). Adolescents' knowledge of human papillomavirus and cervical dysplasia. *Journal of Pediatric Adolescent Gynecology, 13*, 15-20.

Godin, G. & Kok, G. (1996). The theory of planned behaviour: A review of its applications to health-related behaviours. *American Journal of Health Promotion, 11*(2), 87-98.

Gollwitzer, P.M. (1993). Goal achievement: The role of intentions. *European Review of Social Psychology, 4*, 141-185.

Gorin, S., & Heck, J. (2005). Cancer screening among Latino subgroups in the United States. *Preventive Medicine: An International Journal Devoted to Practice & Theory, 40*(5), 515-526.

Grunfield, E. (1997). Cervical cancer: Screening hard to reach groups. *Canadian Medical Association Journal, 157*(5), 543.

Gulitz, E., Bustillo-Hernandez, M., & Kent, E. (1998). Missed cancer screening opportunities among older women: A provider survey. *Cancer Practice, 6*(6), 325-32.

Hankins, C., Coultee, F., & Lapointe, N. (1999). Prevalence of risk factors associated with human papillomavirus infection in women living with HIV. *Canadian Medical Association Journal, 160*(2), 185-91.

Hanson, M.J. (1997). The theory of planned behaviour applied to cigarette smoking in African-American, Peurto Rican, and Non-Hispanic white teenage females. *Nursing Research, 46*(3), 155.

Hasenyager, C. (1999). Knowledge of cervical cancer screening among women attending a university health center. *Journal of American College Health, 47*(5), 221-225.

Health Canada (1999). *Statistical Report on the Health of Canadians*. Ottawa: Health Canada (Cat. No. H39-467/1999E).

Health Canada. (2002). *Programmatic Guidelines for Screening for Cancer of the Cervix in Canada*. Quality Management Working Group, Cervical Prevention Network: 5.

Health Services Utilization and Research Commission (1997). *A Comprehensive Approach to Cervical Cancer Screening*. Summary Report No. 8, Saskatoon, HSURC.

Healey, S.M., Aronson, K.J., Mao, Y., Schlect, N.F., Mery, L.S. & Ferenczy, A. et al. (2001). Oncogenic human papillomavirus infection and cervical lesions in aboriginal women of Nunavut, Canada. *Sexually Transmitted Disease, 28*(12), 694-700.

Hennig, P., & Knowles, A. (1990). Factors influencing women over 40 years to take precautions against cervical cancer. *Journal of Applied Social Psychology, 29*(19), 1612-1621.

Herrero, R. (1996). Epidemiology of cervical cancer. *Journal of the National Cancer Institute Monographs, 21*, 1-6.

Herrero, R., Potischman, N., Brinton, L., Reeves, W., Brenes, N., & Tenorio, F., et al. (1991). A case-control study of nutrient status and invasive cervical cancer. I. Dietary indicators. *American Journal of Epidemiology, 134*, 1335-46.

Hildebrand, D. (1986). *Statistical thinking for behavioural scientists*. Boston: Duxbury Press.

Hislop, G., The, C., Lai, A., Ralston, J., Shu, J., & Taylor, V. (2004). Pap screening and knowledge of risk factors for cervical cancer in Chinese women in British Columbia, Canada. *Ethnicity & Health, 9*(3), 267.

Ho, G., Bierman, R., & Beardsley, L. (1998). Natural history of cervicovaginal papillomavirus infection in young women. *New England Journal of Medicine, 338*, 423-428.

Ho, G., Burk, R., Kelin, S., Kadish, A., Chang, C., & Palan, P., et al. (1995). Persistent genital human papillomavirus infection as a risk factor for persistent cervical dysplasia. *Journal of the National Cancer Institute, 87*(18), 1365-1371.

Hoover, D., Carfioli, B., & Moench, E. (2000). Attitudes of adolescent/young women toward human papillomavirus vaccination and clinical trials. *Health Care for Women International, 21*(5), 375-388.

Hosmer, D., & Lemeshow, S. (2000). *Applied logistic regression* (2nd edition). New York: Wiley.

Jennings-Dozier, K. (1999). Predicting intentions to obtain a Pap smear among African American and Latina women: Testing the theory of planned behaviour. *Nursing Research, 48*(4), 198-205.

Jennings-Dozier, K. (1999). Perceptual determinants of Pap test up-to-date status among minority women. *Oncology Nursing Forum, 26*(8), 1327-1333.

Jennings, K.M. (1997). Getting a Pap smear: Focus group responses of African American and Latina women. *Oncology Nursing Forum, 24*(5), 827-835.

Jennings, K.M. (1997). Predicting intention to obtain a Pap smear among African American and Latina women. *Dissertation Abstracts International, 58*(7-B), 3557.

Jubelirer, S., Blanton, M., Blanton, P., Zhang, J., Foster, D., & Monk, J., et al. (1996). Assessment of knowledge, attitudes, and behaviours relative to cervical cancer and the Pap smear among adolescent girls in West Virginia. *Journal of Cancer Education, 11*(4), 230-237.

Kahn, J., Emans, J., & Goodman, E. (2001). Measurement of young women's attitudes about communication with providers regarding Papanicolaou smears. *Journal of Adolescent Health, 29*, 344-51.

Kahn, J., Goodman, E., & Huang, B. (2003). Predictors of Papanicolaou smear return in a hospital-based adolescent and young adult clinic. *Obstetrics & Gynecology, 101*(3), 490-499.

Kahn, J., Goodman, E., & Kaplowitz, R. (2000). Validity of adolescent and young adult self-report of Papanicolaou smear results. *Obstetrics and Gynecology, 96*(4), 625-31.

Kahn, J., Goodman, E., & Slap, G. (2001). Intention to return for papanicolaou smears in adolescent girls and young women. *Pediatrics, 108*(2), 333-341.

Kataja, V., Syrjansen, S., Ylishoski, M., Hippelinen, M., Vayrynen, M., & Saarikoski, S., et al. (1991). Risk factors associated with cervical human papillomavirus infection: A case-control study. *American Journal of Epidemiology, 138*(9), 735-745.

King, A., Beazley, R., & Warren, W. (1988). *The Canada Youth and AIDS Study.* Kingston: Queen's University.

Kinsman, S., Romer, F., & Furstenberg, F. (1998). Early sexual initiation: The role of peer norms. *Pediatrics, 105*, 1185-1192.

Kittleson, M. (1997). Determining effective follow-up of email surveys. *American Journal of Health Behaviour, 21,* 193-196.

Kjellberg, L., Hallmans, G., Ahren, A., Johansson, R., Bergman, F., & Wadell, et al. (2000). Smoking, diet, pregnancy and oral contraceptives use as risk factors for

cervical intra-epithelial neoplasia in relation to human papillomavirus infection. *British Journal of Cancer, 82*, 1332-1338.

Koutsky, L. (1997). Epidemiology of genital human papillomavirus infection. *American Journal of Medicine, 102*(4S), 3-8.

Kowalski, R., & Brown, K. (1994). Psychosocial barriers to cervical cancer screening: Concerns with self-presentation and social evaluation. *Journal of Applied Social Psychology, 24*(11), 941-958.

Langille, D.B., Andreou, P., & Beazley, R.P. (1998). Sexual health knowledge of students at high school in Nova Scotia. *Canadian Journal of Public Health, 89*(2), 85-89.

Langille, D., Graham, J., & Marshall, E. (1999). *So Many Bricks in the Wall: Developing Understanding from Women's Experiences with Sexual Health Services and Education in Amherst, Nova Scotia*. Halifax: Maritime Centre of Excellence for Women's Health.

Larsen, N. (1994). Invasive cervical cancer rising in young white females. *Journal of the National Cancer Institute, 86*(1), 6-7.

Lavin, C., Goodman, E., & Perlman, S. (1997). Follow-up of abnormal Papanicolaou smears in a hospital-based adolescent clinic. *Journal of Pediatric and Adolescent Gynecology, 10*(3), 141-45.

Lee, J., Parsons, G.F., & Gentleman, J.F. (1998). Falling short of Pap test guidelines. *Health Report, 19*(1), 9-19.

Levi, F., Lucchini, F., & Negri, E. (2000). Cervical cancer mortality in young women in Europe: Patterns and trends. *European Journal of Cancer, 36*, 2266-2271.

Ley, C., Bauer, H., & Reingold, A. (1991). Determinants of genital human papillomavirus infection in young women. *Journal of the National Cancer Institut, 83*, 997-1003.

Leyden, W., Manos, M., Greiger, A., Weinmann, S., Mouchawar, J., Bischoff, K., et al. (2005). Cervical cancer in women with comprehensive health acre access: Attributable factors in the screening process. *Journal of the National Cancer Institute, 97*(9), 675-684.

Linnehan, M. & Groce, E. (1999). Psychosocial and educational services for female college students with genital human papillomavirus infection. *Family Planning Perspectives, 31*, 137-141.

Liu, S., Semenciw, A., & Probert, A. (2001). Cervical cancer in Canada: Changing patterns in incidence and mortality. *International Journal of Gynecological Cancer, 11*(1), 24.

Lovejoy, N. (1987). Precancerous lesions of the cervix: Personal risk factors. *Cancer Nursing, 10*(1), 2-14.

Mao, C., Hughes, J., Kiviat, N., Kuypers, J., Lee, S., & Adam, D., et al. (2003). Clinical findings among young women with genital human papillomavirus infection. *American Journal of Obstetrics and Gynecology, 188*, 677-84.

Maxwell, C., Bancej, C., & Snider, J. (2001). Factors important in promoting cervical cancer screening among Canadian women: Findings from the 1996-97 National Population Health Survey (NPHS). *Canadian Journal of Public Health, 92*(2), 127-133.

Mays, R., Zimet, G., & Winston, Y. (2000). Human papillomavirus, genital warts, pap smears, and cervical cancer, knowledge and beliefs of adolescent and adult women. *Health Care for Women International, 21*(5), 361-374.

McPartland, T., Weaver, B., Shu-Kuang, L., & Koutsky, L. (2005). Men's perceptions and knowledge of human papillomavirus (HPV) infection and cervical cancer. *Journal of American College Health, 53*(5), 225-231.

Medin, C., Roy, S. & Ann, T. (1999) World Wide Web versus mail surveys: A comparison and report. Paper presentation at ANZMAC99 Conference, Marketing in the Third Millennium, Sydney, Australia, available from http://www.anzmac99.unsw.edu.au/anzmacfiles/ papers.htm [Accessed 6/04]

Menec, V., Sirski, M., & Attawar, D. (2005). Does continuity of care matter in a universally insured population. *Health Services Research, 40*(2), 389-400.

Mitra, K. & Easley, J. (2003). Young women's health awareness: Perceptions of risk factors for cervical cancer among high school and university students of New Brunswick.

Moreno, V., Bosch, F., & Munoz, N. (2002) Effect of oral contraceptives on risk of cervical cancer in women with human papillomavirus infection: The IARC multicentric case-control study. *Lancet*, 359(9312), 1085-1092.

Moscicki, A.B., Burt, V., & Kanowitz, S. (1999). The significance of squamous metaplasia in the development of low grade squamous intraepithelial lesions in young women. *Cancer, 85*, 1139-1144.

Moscicki, A.B., Hills, N., & Shiboski, S. (2001). Risks for incident human papillomavirus infection and low-grade squamous intraepithelial lesion

development in young females. *Journal of American Medical Association, 285*, 2995-3002.

Moscicki, A.B., Winkler, B., & Irwin, C. (1989). Difference in biologic maturation, sexual behaviour, and sexually transmitted diseases between adolescents with and without cervical intraepithelial neoplasia. *The Journal of Pediatrics, 115*, 487-493.

Moscicki, B., Shiboski, S., & Broering, J. (1998). The natural history of human papillomavirus infection as measured by repeated DNA testing in adolescent and young women. *The Journal of Pediatics, 132*, 277-284.

Mount, S.L., & Papillo, J.L. (1999). A study of 10,296 pediatric and adolescent papanicolaou smear diagnoses in northern New England. *Pediatrics, 103*, 539-545.

Munoz, N., Franceschi, S., & Bosetti, C. (2002). Role of parity and human papillomavirus in cervical cancer: The IARC multicentric case-control study. *Lancet, 359*(9312), 1093.

Munro, B., & Page, E. (1993). *Statistical methods for healthcare research* (2nd ed.). J.P. Philadelphia, PA: Lippincott.

Nadeau, D., Boyer, R., & Godin, G. (1993). Knowledge and beliefs about STIs and condom use among undergraduate students. *Canadian Journal of Public Health, 84*(3), 181-185.

National Cancer Institute of Canada. (2003). *Canadian cancer statistics*. Toronto, Canada (ISSN 0835-2976).

National Institute of Health. (1996, April 1-3). Consensus development conference statement- cervical cancer (on-line). Available: http://text.nlm.nih.gov/nih/uploadv3/CDC

New Brunswick Cancer Network (2003). *A Cancer Control Accountability Framework.* Department of Health and Wellness. Available: http://www.gnb.ca/0051/pdf/2452e.pdf.

Nobbenhuis, M., Walboomers, J., Helmerhorst, T., Rozendaal, L., Remmink, A., & Risse, B. (1999). Relation of human papillomavirus status to cervical lesions and consequences for cervical-cancer screening: A prospective study. *Lancet, 354*(9172), 20-31.

Noller, K. (1996). Incident and demographic trends in cervical dysplasia. *American Journal of Obstetrics and Gynecology, 175*(4), 1088-1090.

Norman, P. & Conner, M. (1993). The role of social cognition models in predicting attendance at health checks. *Psychology and Health, 8*(6), 447-462.

Norman, P., & Conner, M. (1996). Predicting health-check attendance among prior attenders and nonattenders: The role of prior behaviour in the theory of planned behaviour. *Journal of Applied Social Psychology, 26*(11), 1010-1026.

Norman, P., Conner, M., & Bell, R. (2000). The theory of planned behaviour and exercise: Evidence for the moderating role of past behaviour. *British Journal of Health Psychology, 5*(3), 249-61.

Nuggent, L. & Tamlyn-Leaman, K. (1992). The colposcopy experience: What do women know? *Journal of Advanced Nursing, 17*, 514-520.

Olveen, C., & Susmita, P. (2004). The role of health insurance on Pap smear and mammography utilization by immigrants living in the United States. *Preventive Medicine: An International Journal Devoted to Practice & Theory, 39*(5), 943-950.

Orbell, S. (1996). Cognition and affect after cervical screening: The role of previous test outcome and personal obligation in future uptake expectations. *Social Science Medicine, 43*(8), 1237-1243.

Orbell, S., & Sheeran, P. (1998). 'Inclined abstainers': A problem for predicting health-related behaviour. *British Journal of Social Psychology, 37*, 151-65.

Orbell, S., & Sheeran, P. (2000). Motivational and volitional processes in action initiation: Field study of the role of implementation intentions. *Journal of Applied Social Psychology, 30*(4), 780-97.

Palmgreen, P. (1984). Uses and gratifications: A theoretical perspective. In R.N. Bastrom (Ed.), *Communication Yearbook 8 (61-72)*. Beverly Hills, CA: Sage Publications.

Paskett, E.D., Rushing, J., & DíAgostino, R. (1997). Cancer screening behaviours of low-income women: The impact of race. *Women's Health, 3,* 203-226.

Patrick, D. M., Wong, T., & Jordan, R.A. (2000). Sexually transmitted infections in Canada: Recent resurgence threatens national goals. *The Canadian Journal of Human Sexuality*, 9(3), 149–165.

Phillips, Z., Johnson, S., Avis, M., & Whynes, D. (2003). Human papillomavirus and the value of screening: Young women's knowledge of cervical cancer. *Health Education Research, 18*(3), 318-328.

Pluhar, E., Frongillo, E., & Stycos, J.M. (2003). Changes over time in college students' family planning knowledge, preference, and behaviour and implications for contraceptive education and prevention of sexually transmitted infections. *College Student Journal, 37*(3), 420-435.

Polit, D. (1996). *Data analysis and statistics for nursing research.* Saratoga Springs, N.Y.: Humanalysis Inc.

Polit, D. & Hungler, B. (1999). *Nursing research: Principles and methods* (6th ed.). Philadelphia. J.B. Lippincott.

Prochaska, J. & DiClemente, C. (1982). Transtheoretical therapy: Toward a more integrative model of change. *Psychotherapy: Theory, Research and Practice,* 19(3), 276-288.

Provincial Epidemiology Service (2002). *New Brunswick Student Drug Use Survey: Highlights report.* Fredericton: New Brunswick Department of Health & Community Services.

Public Health Agency of Canada (1998). *Cervical cancer in Canada.* Cancer Updates. Ottawa, Canada: Government of Canada. Retrieved March 21, 2004. http://www.phac-aspc.gc.ca/publicat/updates/cervix-98_e.html

Public Health Agency of Canada (2003). Effectiveness of letters to Cape Breton women who have not had a recent Pap smear. *Chronic Diseases in Canada, 24*(2/3). Ottawa, Canada : Government of Canada. Retrieved September 1, 2005. http://www.phac-aspc.gc.ca/publicat/cdic-mcc/24-2/a_e/html

Public Health Agency of Canada (2005). *Canadian sexually transmitted infections surveillance report.* Infectious Diseases News Brief. Ottawa, Canada:

Government of Canada. Retrieved September 5, 2005. http://www.phac-aspc.gc.ca/bid-bmi/dsd-dsm/nb-ab/2005/nb3305_e.html

Radecki Breitkopf, C., Pearson, H., & Breitkopf, D. (2005). Poor knowledge regarding the Pap test among low-income women undergoing routine screening. *Perspectives on Sexual and Reproductive Health, 37*(2), 78-84.

Ramirez, J.E., Ramos, D.M., & Clayton, L. (1997). Genital human papillomavirus infections: Knowledge, perception of risk, and actual risk in a nonclinic population of young women. *Journal of Women's Health, 6*, 113.

Ratcliff-Crain, J., Donald, K., & Dalton, J. (1999). Knowledge, beliefs, peer norms, and past behaviours as correlates of risky sexual behaviours among college students. *Psychology and Health, 14*(4), 625.

Ratnam, S., Franco, E., & Ferenczy, A. (2000). Human papillomavirus testing for primary screening of cervical cancer precursors. *Cancer Epidemiology Biomarkets & Prevention, 9*, 945-951.

Resnick, B. (1998). Health promotion practices of the old-old. *Journal of the American Academy of Nurse Practitioners, 10*(4), 147-53.

Richardson, H., Franco, E., & Pintos, J. (2000). Determinants of low-risk and high-risk cervical human papillomavirus infections in Montreal university students. *Sexually Transmitted Diseases, 27*(2), 79-86.

Richardson, H., Kelsall, G., Tellier, P., Voyer, H., Abrahamowicz, M., & Ferenczy, A., et al. (2003). The natural history of type-specific human papillomavirus infections in female university students. *Cancer Epidemiological Biomarkers Preview, 12*(6), 485-90.

Rochon Ford, A. (2002). *Toronto cancer prevention coalition position paper on the primary prevention and early detection and screening of breast, ovarian and cervical cancer.* Prepared for the Early Detection/Screening Working Group.

Rolnick, S., La Ferla, J., & Wehrle, D. (1996). Pap smear screening in a health maintenance organization: 1986-1990. *Preventative Medicine, 25*, 156-61.

Rosenfeld, W., Vermund, S., & Wentz, S. (1989). High prevalence of human papillomavirus infection and association with abnormal papanicolaou smears in sexually active adolescents. *American Journal of Disease in Children, 143*, 14443-14447.

Roye, C., & Nelson, J. (2003). Evidence of the need for cervical cancer screening in adolescents. *Pediatric Nursing, 29*(3), 224-232.

Ruchlin, H.S. (1997). Prevalence and correlates of breast and cervical cancer screening among older women. *Obstetrics and Gynecology*, *90*(1), 16-21.

Rutter, D. (2000). Attendance and reattendance for breast cancer screening: A prospective 3-year test of the theory of planned behaviour. *British Journal of Health Psychology, 5*(1), 1-13.

Rutter, D. & Quine, L. (2002). *Changing health behaviour: intervention and research with social cognition models.* Buckingham/ Philadelphia: Open Buckingham Press.

Sedjo, R., Inserra, P., Abrahamsen, M., Harris, R., Roe, D., & Baldwin, S., et al. (2002). Human papillomavirus persistence and nutrients involved in the methylation pathway among a cohort of young women. *Cancer Epidemiology Biomarkers & Prevention, 11*, 353-359.

Sedjo, R., Roe, D., Abrahamsen, M., Harris, R., Craft, N., & Baldwin, S., et al. (2002). Vitamin A, Carotenoids, and risk of persistent oncogenic human papillomavirus infection. *Cancer Epidemiology Biomarkers & Prevention, 11,* 876-884.

Seller, J. (1999). Cervical cancer prevention for all Canadian: What do the new guidelines mean for family physicians? *Canadian Family Physician, 45*, 245-246.

Sellors, J., Mahoney, J., Kaczorowski, J., Lytwyn, A., Bangura, H., & Chong, S., et al. (2000). Prevalence and predictors of human papillomavirus infection in women in Ontario, Canada. *Canadian Medical Association Journal, 163*, 503-508.

Seow, A., Wong, M., Smith, W., & Lee, H. (1995). Beliefs and attitudes as determinants of cervical cancer screening: A community-based study in Singapore. *Preventative Medicine, 24*, 134-141.

Service Canada (2005). *Canadian youth: Who are they and what do they want?* Ottawa, Canada: Government of Canada. Retrieved October 17, 2005. http://www.youth.gc.ca/yoaux.jsp?&lang=en&flash=1&ta=1&auxpageid=853.html

Sheehan, K. (2001). Email survey response rates: A review. *Journal of Computer Mediated Communication*, *6*(2). Retrieved March 20, 2003. http://www.ascus.org/jcmc/vol6/issue2/sheehan.html.

Sheeran, P. & Abraham, C. (1996). The health belief model. In M. Conner & P. Norman (Eds.), Predicting health behaviour (pp. 23-61). Buckingham, UK: Open University Press.

Sheeran, P., Norman, P., & Conner, M. (2001). Can the theory of planned behaviour explain patterns of health behaviour change? *Health Psychology, 20*(1), 12-19.

Sheeran, P. & Orbell, S. (2000). Using implementation intentions to increase attendance for cervical cancer screening. *Health Psychology, 19*(3), 283-289.

Shew, M.L., Fortenberry, J.D., & Miles, P. (1994). Interval between menarche and first sexual intercourse, related to risk of human papillomavirus infection. *The Journal of Pediatrics, 125*, 661-666.

Sigelman, C., Maddock, A., & Epstein, J. (1993). Age differences in understanding disease causality: AIDS, colds, and cancer. *Child Development, 64*, 272.

Skegg, D. (2002). Oral contraceptives, parity, and cervical cancer, commentary. *Lancet*, 359(9312), 1080-1081.

Solomon, D. (2001). Conducting web-based surveys. *Practical Assessment, Research & Evaluation: A Peer-Reviewed Electronic Journal.* ISSN 1531-7714.

Solomon, T. & Gotlieb, N. (2001). Sociodemographic and health care system factors influencing cervical cancer screening among young women. *Wicazo Sa Review, 16*(1), 31-42.

Statistics Canada (2005). *Early sexual intercourse, condom use and sexually transmitted diseases*. The Daily. Ottawa, Canada: Government of Canada. Retrieved October 17, 2005. http://www.statcan.ca/Daily/English/050503/d050503a.htm

Steven, D., Fitch, M., Dhaliwal, H., Kirk-Gardner, R., Sevean, P., & Jamieson, J., et al. (2004). Knowledge, attitudes, beliefs and practices regarding breast and cervical cancer screening in selected ethnocultural groups in Northwestern Ontario. *Oncology Forum, 31*(2), 305-311.

Stuart, G., McGregor, E., & Duggan, M.A. (1997). Review of the screening history of Alberta women with invasive cervical cancer. *Canadian Medical Association Journal. 157*, 513-19.

Stuart, G., Taylor, G., Bancej, C., Beaulac, J., Colgan, T., and Franco, E., et al. (2004). Report of the 2003 Pan-Canadian forum on cervical cancer prevention and control. *Journal of Obstetrics and Gynecology Canada, 26*(11), 1004-14.

Svenson, L.W., Varnhagen, C.K., & Godin, A.M. (1992). Rural high school students' knowledge, attitudes and behaviours related to sexually transmitted diseases. *Canadian Journal of Public Health, 83*(4), 260-263.

Thomas, B.H., Dicenso, A., & Griffith, L. (1998a). Adolescent sexual behaviour: Results from an Ontario sample: Part I: adolescent sexual activity. *Canadian Journal of Public Health, 89*(2), 90-93.

Thomas, B.H., Dicenso, A., & Griffith, L. (1998b). Adolescent sexual behaviour: Results from an Ontario sample: Part II: adolescent use of protection. *Canadian Journal of Public Health, 89*(2), 94-97.

Tourangeau, R., & Smith, T. (1998). Asking sensitive questions: The impact of data collection mode, question format, and question context. *Public Opinion Quarterly, 60*, 275-304.

Turner, C. F., Ku, L., & Rogers, S. M. (1998). Adolescent sexual behaviour, drug use, and violence: Increased reporting with computer survey technology. *Science, 280*, 867-873.

Unruh, H., Bowen, D., Meischke, H., Bush, N., & Wooldridge, J. (2004). Women's approaches to the use of new technology for cancer risk information. *Women & Health, 40*(1): 59-79.

Vail-Smith, K., & White, D.M. (1992). Risk level, knowledge, and preventive behaviour for human papillomaviruses among sexually active college women. *Journal of American College Health, 40*, 227-230.

Vizcaino, A., Moreno, V., & Bosch, F. (1998). International trends in the incidence of cervical cancer: I. Adenocarcinoma and adenosquamous cell carcinomas. *International Journal of Cancer, 75*, 536-45.

Voss, J., & Kogan, L. (2001). Behavioural impact of a human sexuality course. *Journal of Sex Education and Therapy, 26*(2), 122-132.

Wadsworth, J., Johnson, A., & Wellings, K. (1996). What's in a mean? An examination of the inconsistency between men and women in reporting sexual partnerships. *Journal of the Royal Statistical Society, 159*, 11-123.

Walboomers, J., Jacobs, M., Manos, M., Bosch, F., Kummer, J., & Shah, K., et al. (1999). Human papillomavirus is a necessary cause of invasive cervical cancer worldwide. *Journal of Pathology, 189*(1),12-9.

Watkins, N., Gabali, C., Winkleby, M., Gaona, E., & Lebaron, S. (2002). Barriers to cervical cancer screening in rural Mexico. *International Journal of Gynecological Cancer, 12*(5), 475.

Weinrich, S., Coker, A., & Weinrich, M. (1995). Predictors of Pap smear screening in socioeconomically disadvantaged elderly women. *Journal of the American Geriatric Society, 43*(3), 267-70.

West, R., Bavington, B., & James, B. (1996). Healthy children, healthy society: The healthy status of the children of Newfoundland and Labrador 1996. St. John's: Health Research Unit, Memorial University of Newfoundland.

Wheeler, C.M., Parameter, C.A., & Hunt, W.E. (1993). Determinants of genital human papillomavirus infection among cytologically normal women attending the University of New Mexico student health center. *Sexually Transmitted Disease, 20*, 286-9.

Winer, R., Lee, S., & Hughes, J. (2003). Genital human papillomavirus infection: Incidence and risk factors in a cohort of female university students. *American Journal of Epidemiology, 157*, 218-226.

Woodman, C.B., Collins, S., Winter, H., Bailey, A., Ellis, J., & Prior, P., et al. (2001). Natural history of cervical human papillomavirus infection in young women: A longitudinal study. *Lancet, 357*, 1831-6.

Ziegler, R., Weinstein, S., & Fears, T. (2002). Nutritional and genetic inefficiencies in one-carbon metabolism and cervical cancer risk. *The American Society for Nutritional Sciences, 132*, 2345S-2349S.

Appendix C
Original "Pap Smear Questionnaire"

The following questions are asked for the purpose of designing future health education programs. Some of the questions are very personal. Your answers will be kept in the strictest confidence. Please answer each question honestly and to the best of your ability. Thank you for your help.

1. Age: _____ years old

2. Marital status
    a. Single- not in a relationship
    b. Single- in a relationship
    c. Partnered
    d. Married
    e. Divorced or separated
    f. Widowed

3. Sexual orientation
    a. Heterosexual
    b. Homosexual/lesbian
    c. Bisexual
    d. Other _____

4. Race
    a. Caucasian
    b. Native American
    c. Asian/Pacific Islander
    d. Hispanic
    e. African-America
    f. Other _____

5. Year in school
    a. Freshman
    b. Sophomore
    c. Junior
    d. Senior
    e. Other _____

6. How long have you been living away from home?
    a. Less than 6 months.
    b. 6 months to 1 year.
    c. Between 1 and 2 years.
    d. More than 2 years
    e. Living at home

7. Of what religious affiliation do you consider yourself to be?
    a. Protestant
    b. Catholic
    c. Jewish
    d. Native religion
    e. Buddhist
    f. Muslim
    g. Other

8. Do you currently, or have you ever, smoked cigarettes?
    a. Yes
    b. No

9. Do you believe you have a problem with alcohol or drugs or have been told you do?
    a. Yes
    b. No

10. How old were you when you had your first menstrual period?
    _____ (fill in the blank)

11. Have you ever had sexual intercourse?
    a. Yes
    b. No (If no, skip to question #22)

12. At what age did you first have sexual intercourse?
    _____ (fill in the blank)

13. With how many different partners have you had sexual intercourse in your lifetime, even if it was only one time?
    a. Never had sexual intercourse
    b. One only
    c. 2-4 partners
    d. 5-10 partners
    e. More than 10 partners

14. Estimate the number of other people each of your sexual partners have had intercourse with before you. Add them together for a total number. _____ (fill in the blank)

15. How many partners have you had sexual intercourse with only once?
    _____ (fill in the blank with your best estimate)

16. How many times have you had sexual intercourse with more than one partner within a week?

_____(fill in the blank with your best estimate)

17. To your knowledge, have you ever had sexual intercourse with an uncircumcised man?
    a. Yes
    b. No

18. How often do you use condoms when you have sexual intercourse?
    a. Never
    b. Rarely
    c. Sometimes
    d. Often
    e. Almost always

19. How often are you under the influence of drugs or alcohol when having sexual intercourse?
    a. Never
    b. Rarely
    c. Sometimes
    d. Often
    e. Almost always

20. How often do you engage in anal intercourse?
    a. Never
    b. Rarely
    c. Sometimes
    d. Often
    e. Almost always

21. Please indicate the types of birth control you currently use:
    a. Birth control pills
    b. Diaphragm
    c. Condom
    d. Norplant
    e. Intrauterine device (IUD)
    f. Contraceptive sponge
    g. Cervical cap
    h. Sterilization
    i. Withdrawal
    j. Rhythm method
    k. Other (please list) _____
    l. None, I do not currently use birth control when having sexual intercourse

22. Have you ever been tested for a sexually transmitted disease?
    a. Yes

b. No

23. Have you ever been diagnosed with a sexually transmitted disease? (If you are unsure, please refer to the list following the next question).
    a. Yes
    b. No

24. If yes, please indicate all that you have been diagnosed with:
    a. Chlamydia
    b. Genital herpes
    c. Genital warts/Human Papilloma Virus (HPV)
    d. Syphilis
    e. Gonorrhea
    f. Chancroid
    g. HIV/AIDS
    h. Pubic lice/crabs
    i. Trichomoniasis
    j. Other (please list) _____
    k. Never diagnosed with a sexually transmitted disease

25. To your knowledge, have you ever had sexual intercourse with a partner who had genital warts?
    a. Yes
    b. No

26. Have you ever been sexually abused?
    a. Yes
    b. No

27. Have you ever been sexually assaulted?
    a. Yes
    b. No

28. Have you ever had a hysterectomy?
    a. Yes
    b. No

29. Have you ever had a Pap smear?
    a. Yes
    b. No (If no, skip to question #38)

30. If yes, how many times have you had a Pap smear?
    a. Once
    b. Twice

c. Three times
d. Four times
e. Five or more times

31. How often for you have a Pap smear? If you had only one, how often do you plan to have a Pap smear?)
    a. Every two years
    b. Every year
    c. Every 6 months
    d. More than once, but not regularly

32. How old were you when you had your first Pap smear?
    _____ years old

33. Who accompanied you to your first Pap smear?
    a. Mother
    b. Sister
    c. Friend
    d. Father
    e. Other female relative
    f. Other male relative
    g. No one, I went alone
    h. Other _____

34. When was your last Pap smear?
    a. Less than 6 months
    b. 6months to 1 year ago
    c. Between 1 and 2 years ago
    d. More than 2 years ago

35. Where was your last Pap smear performed?
    a. Physician's office
    b. University Student Health Services
    c. Planned Parenthood
    d. Other (please list) _____

36. Was your Pap smear required to obtain birth control?
    a. Yes
    b. No

37. Were the results of your last Pap smear abnormal?
    a. Yes
    b. No

38. How old were you when you first learned about Pap smears?
    _____ years old

39. How did you learn about Pap smears?
    a. Never heard of them before today
    b. Parent
    c. Doctor/Nurse
    d. Friend
    e. T.V./radio/magazine/newspaper
    f. School Personnel
    g. School course
    h. Other _____

40. Does you mother get Pap smears regularly?
    a. Yes
    b. No
    c. Don't know

41. If you haven't had a Pap smear in the last 6 months, do you intend to have one before April 1999(_____ months)? (Women with a Pap smear in the last _____ months, skip to question #42). Please rate the strength of your intention.
    a. Extremely likely
    b. Somewhat likely
    c. Neutral
    d. Somewhat unlikely
    e. Extremely unlikely

42. Have any of the following ever influenced your decision to avoid or delay having a Pap smear? (Please indicate all that apply).
    a. I have never delayed or avoided having a Pap smear (If so, skip to question #44).
    b. Forgot to schedule one
    c. Too busy
    d. Too anxious
    e. Uncomfortable or embarrassed about having the test
    f. It hurts
    g. I worry that the results will show something bad
    h. Test is too expensive, I don't have any money or insurance
    i. Don't know a doctor and/or don't know where to go.
    j. I know there's nothing wrong with me so why bother.
    k. I don't feel comfortable with my doctor
    l. Female doctor wasn't available/my doctor is a male.
    m. Feel too vulnerable
    n. Don't think it is important
    o. My family doesn't want me to have the test
    p. My doctor said I don't need one
    q. Unpleasant past sexual experiences
    r. Don't want me parents to know I'm sexually active.

s. The results of my last Pap smear were bad
t. I had an unpleasant experience in the past during a test (please explain) _____
u. Other (please explain _____
v. Other (please explain)_____
w. Other (please explain) _____
x. Other (please explain) _____

43. Rank the top 5 reasons in order of importance by typing in the corresponding letter from the previous question

____ Most influential reason for avoiding/delaying a Pap smear
____
____
____
____ Least influential reason for avoiding/delaying Pap smear

44. Personally, I think having a pap smear is:
a. A good thing
b. Somewhat good
c. Neutral
d. Somewhat bad
e. A bad thing

45. Personally, I think having a pap smear is:
a. Not degrading at all
b. Mostly not degrading
c. Neutral
d. Somewhat degrading
e. Very degrading

46. Personally, I think having a pap smear is:
a. A smart thing to do
b. Mostly a smart thing to do
c. Neutral
d. Somewhat stupid
e. A stupid thing to do

47. Personally, I think having a pap smear is:
a. Not at all embarrassing
b. Mostly not embarrassing
c. Neutral
d. Somewhat embarrassing
e. Very embarrassing

48. Personally, I think having a pap smear is:

a. Helpful
b. Mostly helpful
c. Neutral
d. Somewhat harmful
e. Harmful

49. Personally, I think having a pap smear is:
a. Pleasant
b. Mostly pleasant
c. Neutral
d. Somewhat unpleasant
e. Unpleasant

50. I think Pap smears are:
a. Easy for me
b. Mostly easy for me
c. Neutral
d. Somewhat difficult for me
e. Difficult for me

51. I think Pap smears are:
a. Not painful at all
b. Mostly not painful for me
c. Neutral
d. Somewhat painful for me
e. Very painful for me

52. I think Pap smears are:
a. Not frightening at all
b. Mostly not frightening
c. Neutral
d. Somewhat frightening
e. Very frightening

53. I think Pap smears are:
a. Completely reliable
b. Mostly reliable
c. Neutral
d. Somewhat reliable
e. Completely unreliable

54. I think Pap smears are:
a. A very important preventative health measure
b. Mostly important preventative health measure
c. Neutral
d. Somewhat important preventative measure
e. Not an important preventative health measure at all

55. I think Pap smears are:
    a. Likely to provide helpful information
    b. Most likely to provide helpful information
    c. Neutral
    d. Somewhat unlikely to provide helpful information
    e. Unlikely to provide helpful information

56. I think Pap smears are:
    a. Going to tell me something I want to know
    b. Most likely to tell me something I want to know
    c. Neutral
    d. Somewhat likely to tell me something I don't want to know
    e. Going to tell me something I don't want to know

57. Rate the level or your agreement with the following statements by indicating the most appropriate answer.

    a. Pap smears test for the presence of cancer of the uterus

        1. Strongly Agree
        2. Agree
        3. Not Sure
        4. Disagree
        5. Strongly Disagree

    b. Pap smears test for the presence of cancer of the cervix.

        1. Strongly Agree
        2. Agree
        3. Not sure
        4. Disagree
        5. Strongly Disagree

    c. Pap smears test for the presence of any female cancer.

        1. Strongly Agree
        2. Agree
        3. Not sure
        4. Disagree
        5. Strongly Disagree

    d. Pap smears test for the presence of cancer of the bladder.

        1. Strongly Agree
        2. Agree

3. Not Sure
4. Disagree
5. Strongly Disagree

e. Pap smears are 100% reliable.

1. Strongly Agree
2. Agree
3. Not sure
4. Disagree
5. Strongly Disagree

f. Pap smears are only useful for non-virgins.

1. Strongly Agree
2. Agree
3. Not sure
4. Disagree
5. Strongly Disagree

g. Pap smears are only useful for women after menopause.

1. Strongly Agree
2. Agree
3. Not Sure
4. Disagree
5. Strongly Disagree

h. Pap smears are only useful for women who have had children.

1. Strongly Agree
2. Agree
3. Not Sure
4. Disagree
5. Strongly Disagree

i. Pap smears are only useful for women who are not married.

1. Strongly Agree
2. Agree
3. Not Sure
4. Disagree
5. Strongly Disagree

j. Pap smears require a local anesthetic.

1. Strongly Agree
2. Agree
3. Not Sure
4. Disagree
5. Strongly Disagree

k. Pap smears require an overnight stay in the hospital.

1. Strongly Agree
2. Agree
3. Not Sure
4. Disagree
5. Strongly Disagree

l. Pap smears also test for STDs.

1. Strongly Agree
2. Agree
3. Not Sure
4. Disagree
5. Strongly Disagree

m. Pap smears will tell me if I am pregnant.

1. Strongly Agree
2. Agree
3. Not Sure
4. Disagree
5. Strongly Disagree

n. Pap smears should normally be performed twice a year.

1. Strongly Agree
2. Agree
3. Not Sure
4. Disagree
5. Strongly Disagree

o. Pap smears should normally be performed once a year.

1. Strongly Agree
2. Agree
3. Not Sure
4. Disagree
5. Strongly Disagree

p. Pap smear should normally be performed every other year.

1. Strongly Agree
2. Agree
3. Not Sure
4. Disagree
5. Strongly Disagree

q. Pap smears should be performed when problems occur.

1. Strongly Agree
2. Agree
3. Not Sure
4. Disagree
5. Strongly Disagree

r. Pap smears can be obtained at Student Health Services.

1. Strongly Agree
2. Agree
3. Not Sure
4. Disagree
5. Strongly Disagree

s. Pap smears can be obtained at Student Health Services without insurance coverage at low cost.

1. Strongly Agree
2. Agree
3. Not Sure
4. Disagree
5. Strongly Disagree

58. Rate your level of agreement with the following statements about the Human Papilloma Virus (HPV) by indicating the most appropriate answer.

a. HPV is the virus responsible for AIDS.

1. Strongly Agree
2. Agree
3. Not Sure
4. Disagree
5. Strongly Disagree

b. HPV can be prevented by wearing condoms.

1. Strongly Agree
2. Agree
3. Not Sure
4. Disagree
5. Strongly Disagree

c. HPV is indicated by the presence of genital warts.

1. Strongly Agree
2. Agree
3. Not Sure
4. Disagree
5. Strongly Disagree

d. HPV may have no symptoms.

1. Strongly Agree
2. Agree
3. Not Sure
4. Disagree
5. Strongly Disagree

e. HPV is not curable.

1. Strongly Agree
2. Agree
3. Not Sure
4. Disagree
5. Strongly Disagree

f. HPV can cause infertility.

1. Strongly Agree
2. Agree
3. Not Sure
4. Disagree
5. Strongly Disagree

g. HPV is treated with penicillin.

1. Strongly Agree
2. Agree
3. Not Sure
4. Disagree
5. Strongly Disagree

h. HPV can cause cancer of the cervix.

1. Strongly Agree
2. Agree
3. Not Sure
4. Disagree
5. Strongly Disagree

i. HPV can cause cancer of the bladder.

1. Strongly Agree
2. Agree
3. Not Sure
4. Disagree
5. Strongly Disagree

j. HPV can be detected in a Pap smear.

1. Strongly Agree
2. Agree
3. Not Sure
4. Disagree
5. Strongly Disagree

k. HPV is increased in terms of risk by smoking.

1. Strongly Agree
2. Agree
3. Not Sure
4. Disagree
5. Strongly Disagree

l. HPV is increased in terms of risk by having multiple sex partners.

1. Strongly Agree
2. Agree
3. Not Sure
4. Disagree
5. Strongly Disagree

m. HPV is increased in terms of risk by having sexually transmitted disease.

1. Strongly Agree
2. Agree
3. Not Sure

4. Disagree
5. Strongly Disagree

n. HPV is increased in terms of risk by having intercourse at an early age.

1. Strongly Agree
2. Agree
3. Not Sure
4. Disagree
5. Strongly Disagree

59. Before today, had you ever heard of the Human Papilloma Virus (HPV)?
    a. Yes
    b. No

60. Most people who are important to me think I should have a regular Pap smear.
    a. Absolutely True
    b. Somewhat True
    c. Neutral
    d. Somewhat Untrue
    e. Absolutely Untrue

61. My mother/sister/grandmother/daughter thinks I should have a regular Pap smear.
    a. Absolutely True
    b. Somewhat True
    c. Neutral
    d. Somewhat Untrue
    e. Absolutely Untrue

62. My partner thinks I should have a regular Pap smear.
    a. Absolutely True
    b. Somewhat True
    c. Neutral
    d. Somewhat Untrue
    e. Absolutely Untrue

63. My close friends think that I should have a regular Pap smear.
    a. Absolutely True
    b. Somewhat true
    c. Neutral
    d. Somewhat Untrue
    e. Absolutely Untrue

64. My doctor thinks that I should have a regular Pap smear.
    a. Absolutely True
    b. Somewhat True

c. Neutral
d. Somewhat Untrue
e. Absolutely Untrue

65. Medical opinion in general is that I should have a regular Pap smear.
a. Absolutely True
b. Somewhat True
c. Neutral
d. Somewhat Untrue
e. Absolutely Untrue

66. Generally speaking, I want to do what my mother/sister/grandmother/daughter want me to do.
a. Absolutely True
b. Somewhat True
c. Neutral
d. Somewhat Untrue
e. Absolutely Untrue

67. Generally speaking, I want to do what my husband/partner/boyfriend wants me to do.
a. Absolutely True
b. Somewhat True
c. Neutral
d. Somewhat Untrue
e. Absolutely Untrue

68. Generally speaking, I want to do what my close friends want me to do.
a. Absolutely True
b. Somewhat True
c. Not Sure
d. Somewhat Untrue
e. Absolutely Untrue

69. Generally speaking, I want to do what my doctor wants me to do.
a. Absolutely True
b. Somewhat True
c. Not Sure
d. Somewhat Untrue
e. Absolutely Untrue

70. Generally speaking, I want to do what is recommended by medical professionals.
a. Absolutely True
b. Somewhat True
c. Not Sure

d. Somewhat Untrue
e. Absolutely Untrue

71. What do you think about Pap smears? (Please explain)

_____

_____

72. How could the experience of having a pap smear be improved? (Please explain)

_____

_____

_____

73. Which of the following best describes you current practice? After reading through all the choices, choose one (1) that describes you best.

a. I have not had a Pap smear in the last year and have no intention of getting a Pap smear in the next six months.
b. I have not had a Pap smear in the last year but I thinking about getting on in the next six months.
c. I have not had a Pap smear in the last year but I have an appointment scheduled to have one in the next month.
d. I have had a Pap smear in the past year, but my practice has not been consistent before that.
e. I have regular, yearly Pap smears.

Appendix D
Modified "Student Pap Test Survey" Questionnaire

The following questions are asked for the purpose of designing future health education programs. Some of the questions are very personal. Your answers will be anonymous since there is no way to link you with any of your answers. Please answer each question honestly and to the best of your ability.

Demographic:

1. What is your current age?
   a. 17
   b. 18
   c. 19
   d. 20
   e. 21
   f. 22
   g. 23
   h. 24
   i. 25
   j. Other

2. In which faculty are you currently studying?
   a. Nursing
   b. Education
   c. Business Administration
   d. Kinesiology
   e. Engineering
   f. Arts
   g. Science
   h. Computer Science
   i. Forestry
   j. Law
   k. Other

3. In what full-time year of study are you currently enrolled?
   a. First
   b. Second
   c. Third
   d. Fourth or greater
   e. Graduate student

4. What is your sexual orientation?
   a. Heterosexual
   b. Homosexual/lesbian
   c. Bisexual

d. Other

5. Have you ever smoked cigarettes?
   a. Yes
   b. No

6. Do you currently smoke cigarettes?
   a. Yes
   b. No (If no, skip to question #8)

7. How many cigarettes/day do you smoke?
   a. 10 or less
   b. 11-20
   c. 21-30
   d. 31 or more

8. How often are you exposed to second hand smoke?
   a. Daily
   b. Weekly
   c. Monthly
   d. Rarely

9. Have you ever had sexual intercourse?
   a. Yes
   b. No **(If no, skip to question #13)**

10. At what age did you first have sexual intercourse?
    a. <12
    b. 12
    c. 13
    d. 14
    e. 15
    f. 16
    g. 17
    h. 18
    i. 19
    j. >19

11. With how many different partners have you had sexual intercourse in your lifetime?
    a. One partner
    b. 2 to 4 partners
    c. 5 to 7 partners
    d. 8 to 10 partners
    e. More than 10 partners

12. How often do you use a condom when engaging in sexual intercourse?
    a. Never
    b. Rarely
    c. Sometimes
    d. Often
    e. Almost always

13. Do you currently use birth control pills?
    a. Yes
    b. No **(Skip to question #15)**

14. If you use birth control pills, how long have you been using them?
    a. 1 year or less
    b. 2 to 4 years
    c. 5 to 7 years
    d. 8 to 10 years
    e. 11 or more

15. Please indicate any other forms of birth control you currently use (check ALL that apply):

a. Diaphragm	YES/NO
b. Condom	YES/NO
c. Norplant	YES/NO
d. Intrauterine device (IUD)	YES/NO
e. Contraceptive sponge	YES/NO
f. Spermicidal foam or jelly	YES/NO
g. Depo Provera	YES/NO
h. Withdrawal	YES/NO
i. Rhythm method	YES/NO
j. Other (please list) _____	

16. In the past, have you ever been tested for a sexually transmitted infection?
    a. Yes
    b. No
    c. I don't know

17. In the past, have you ever been diagnosed with a sexually transmitted infection?
    a. Yes
    b. No **(Skip to question # 19)**

18. If yes, please indicate ALL of the sexually transmitted infections with which you have been diagnosed:
    a. Chlamydia
    b. Genital herpes
    c. Genital warts/Human Papilloma Virus (HPV)

d. Syphilis
e. Gonorrhea
f. Hepatitis B
g. HIV/AIDS
h. Pubic lice/crabs
i. Other (please list) _____

19. To your knowledge, have you ever had sexual intercourse with a partner who had genital warts?
    a. Yes
    b. No

20. Have you ever had a Pap test?
    a. Yes
    b. No **(Skip to question # 34)**

21. How old were you when you had your first Pap test?
    a. 16 or younger
    b. 17 years
    c. 18 years
    d. 19 years
    e. 20 years or older

22. How many times have you ever had a Pap test?
    a. Once
    b. Twice
    c. Three times
    d. Four times
    e. Five or more times

23. When was your last Pap test?
    a. Less than 6 months
    b. 6 months to 1 year ago
    c. Between 1 and 2 years ago
    d. More than 2 years ago

24. How often have you had a Pap test?
    a. Every two years
    b. Every year
    c. Every 6 months
    d. More than once, but not regularly

25. Is your Pap test required to obtain birth control?
    a. Yes
    b. No

26. Were you ever told that the results a Pap test were abnormal?
    a. Yes
    b. No

27. Have you ever been asked to have another Pap test within 6 months?
    a. Yes
    b. No

28. Have you ever had colposcopy (Examination of the vagina and cervix using a lighted magnifying instrument called a colposcope)?
    a. Yes
    b. No

29. How old were you when you first learned about Pap tests?
    c. 13 years and younger
    d. 14 years to 16 years
    e. 17 years to 19 years
    f. 20 years or older
    g. I never heard about Pap smears before today.

30. How did you learn about Pap tests?
    h. Teachers
    i. Parent
    j. Doctor/Nurse
    k. Friend
    l. Mass media
    m. Never heard of them before today
    n. Other _____

31. Do you intend to get regular Pap tests in the future?
    o. Yes
    p. No **(Skip to question # 33)**

32. If yes, how often do you intend to get regular Pap tests in the future?
    q. Every 6 months
    r. Every 12 months
    s. Every 18 months
    t. Every 24 months
    u. Less often than every 24 months

33. Have you ever delayed or avoided getting a Pap test in the past?
    v. Yes
    w. No

34. Rate your level of agreement with the following statements about Pap tests by indicating the most appropriate answer:

a. I don't have time to get a Pap test.
   i. Strongly Agree
   ii. Agree
   iii. Not sure
   iv. Disagree
   v. Strongly Disagree

b. I am nervous about getting Pap tests.
   i. Strongly Agree
   ii. Agree
   iii. Not sure
   iv. Disagree
   v. Strongly Disagree

c. It's reassuring to get regular Pap tests.
   i. Strongly Agree
   ii. Agree
   iii. Not sure
   iv. Disagree
   v. Strongly Disagree

d. I think having a Pap test is embarrassing.
   i. Strongly Agree
   ii. Agree
   iii. Not sure
   iv. Disagree
   v. Strongly Disagree

e. I think Pap tests hurt.
   i. Strongly Agree
   ii. Agree
   iii. Not sure
   iv. Disagree
   v. Strongly Disagree

f. I worry that the results will show something bad.
   i. Strongly Agree
   ii. Agree
   iii. Not sure
   iv. Disagree
   v. Strongly Disagree

g. Pap tests are a priority for me.
   i. Strongly Agree

ii. Agree
iii. Not sure
iv. Disagree
v. Strongly Disagree

h. I'm too young to worry about Pap tests.
i. Strongly Agree
ii. Agree
iii. Not sure
iv. Disagree
v. Strongly Disagree

i. Pap tests are no big deal.
i. Strongly Agree
ii. Agree
iii. Not sure
iv. Disagree
v. Strongly Disagree

j. I think Pap tests are unreliable.
i. Strongly Agree
ii. Agree
iii. Not sure
iv. Disagree
v. Strongly Disagree

k. I think Pap tests are an important preventative health measure.
i. Strongly Agree
ii. Agree
iii. Not sure
iv. Disagree
v. Strongly Disagree

35. Rate your level of agreement with the following statements by indicating the most appropriate answer.
This set of questions relate to cervical screening.
a. Pap tests can detect the presence of cancer of the uterus.
i. Strongly Agree
ii. Agree
iii. Not sure
iv. Disagree
v. Strongly Disagree

b. Pap tests can detect the presence of cancer of the cervix.
i. Strongly Agree

ii. Agree
iii. Not sure
iv. Disagree
v. Strongly Disagree

c. Pap tests can detect the presence of any female cancer.
i. Strongly Agree
ii. Agree
iii. Not sure
iv. Disagree
v. Strongly Disagree

d. Pap tests can detect the presence of cancer of the bladder.
i. Strongly Agree
ii. Agree
iii. Not sure
iv. Disagree
v. Strongly Disagree

e. Pap tests are 100% reliable.
i. Strongly Agree
ii. Agree
iii. Not sure
iv. Disagree
v. Strongly Disagree

f. Pap tests are only useful for non-virgins.
i. Strongly Agree
ii. Agree
iii. Not sure
iv. Disagree
v. Strongly Disagree

g. Pap tests are only useful for women who have had children.
i. Strongly Agree
ii. Agree
iii. Not sure
iv. Disagree
v. Strongly Disagree

h. Pap tests are only useful for women who are not married.
i. Strongly Agree
ii. Agree
iii. Not sure
iv. Disagree
v. Strongly Disagree

i. Pap tests require a local anesthetic.
    i. Strongly Agree
    ii. Agree
    iii. Not sure
    iv. Disagree
    v. Strongly Disagree

j. Pap tests also test for sexually transmitted infections.
    i. Strongly Agree
    ii. Agree
    iii. Not sure
    iv. Disagree
    v. Strongly Disagree

k. Pap tests will tell me if I am pregnant.
    i. Strongly Agree
    ii. Agree
    iii. Not sure
    iv. Disagree
    v. Strongly Disagree

l. Pap tests should normally be performed twice a year.
    i. Strongly Agree
    ii. Agree
    iii. Not sure
    iv. Disagree
    v. Strongly Disagree

m. Pap tests can be obtained at Student Health Services.
    i. Strongly Agree
    ii. Agree
    iii. Not sure
    iv. Disagree
    v. Strongly Disagree

n. It is important to abstain from sexual activity the night before receiving a Pap test.
    i. Strongly Agree
    ii. Agree
    iii. Not sure
    iv. Disagree
    v. Strongly Disagree

o. Douching interferes with the reliability of the Pap test.
    i. Strongly Agree

ii. Agree
iii. Not sure
iv. Disagree
v. Strongly Disagree

This next set of questions relate to the human papillomavirus (HPV).

a. Having HPV increases you chance of getting cervical cancer.
i. Strongly Agree
ii. Agree
iii. Not sure
iv. Disagree
v. Strongly Disagree

b. HPV transmission can be decreased by wearing condoms.
i. Strongly Agree
ii. Agree
iii. Not sure
iv. Disagree
v. Strongly Disagree

c. HPV may have no symptoms.
i. Strongly Agree
ii. Agree
iii. Not sure
iv. Disagree
v. Strongly Disagree

d. HPV can be detected by a Pap test.
i. Strongly Agree
ii. Agree
iii. Not sure
iv. Disagree
v. Strongly Disagree

e. The risk of acquiring HPV is increased with smoking.
i. Strongly Agree
ii. Agree
iii. Not sure
iv. Disagree
v. Strongly Disagree

f. The risk of acquiring HPV is increased by having multiple sex partners.
i. Strongly Agree
ii. Agree
iii. Not sure
iv. Disagree

v. Strongly Disagree

g. The risk of acquiring HPV is increased by having another sexually transmitted infection.
   i. Strongly Agree
   ii. Agree
   iii. Not sure
   iv. Disagree
   v. Strongly Disagree

h. The risk of acquiring HPV is increased by having sexual intercourse in early adolescence.
   i. Strongly Agree
   ii. Agree
   iii. Not sure
   iv. Disagree
   v. Strongly Disagree

36. Rate your level of agreement with the following statements about the Pap tests by indicating the most appropriate answer.
   a. Most people who are important to me think I should have a regular Pap test.
      i. Strongly Agree
      ii. Agree
      iii. Not sure
      iv. Disagree
      v. Strongly Disagree

   b. My mother gets regular Pap tests.
      i. Strongly Agree
      ii. Agree
      iii. Not sure
      iv. Disagree
      v. Strongly Disagree

   c. My partner always comes with me when I have a regular Pap test.
      i. Strongly Agree
      ii. Agree
      iii. Not sure
      iv. Disagree
      v. Strongly Disagree

   d. My close friends get regular Pap tests.
      i. Strongly Agree
      ii. Agree
      iii. Not sure

iv. Disagree
v. Strongly Disagree

e. My doctor thinks that I should have a regular Pap test.
i. Strongly Agree
ii. Agree
iii. Not sure
iv. Disagree
v. Strongly Disagree

f. Medical opinion in general is that I should have a regular Pap test.
i. Strongly Agree
ii. Agree
iii. Not sure
iv. Disagree
v. Strongly Disagree

g. My family does not want me to have the test.
i. Strongly Agree
ii. Agree
iii. Not sure
iv. Disagree
v. Strongly Disagree

37. Rate your level of agreement with the following statements about your ability to get a Pap test by indicating the most appropriate answer.
a. It would be difficult for me to get a Pap test within the next year.
i. Strongly Agree
ii. Agree
iii. Not sure
iv. Disagree
v. Strongly Disagree

b. I would be too busy to get a Pap test within the next year.
i. Strongly Agree
ii. Agree
iii. Not sure
iv. Disagree
v. Strongly Disagree

c. I am able to get a Pap test when I choose.
i. Strongly Agree
ii. Agree
iii. Not sure
iv. Disagree
v. Strongly Disagree

Appendix E
Comparison of Original "Pap Smear Questionnaire" to
New "Student Pap Test Survey"

☼ Beyond scope of study ♦ Discrete options added ◙ Changes to consistent Likert scale

Original	**Modified ("Student Pap Test Survey")**
#1	#1 ♦
#2	Deleted ☼ Added question #2: "In which faculty of study are you currently studying"
#3	#4
#4	Deleted ☼
#5	#3 Terms changed to reflect Canadian academic system Added category "graduate student"
#6	Deleted ☼
#7	Deleted ☼
#8	Separated into two questions: #5: "Have you ever smoked cigarettes before?" #6: "Do you currently smoke cigarettes?" Added two questions to section, including: #7: "How many cigarettes/day do you smoke?" #8: "How often are you exposed to second hand smoke?"
#9	Deleted ☼
#10	Deleted ☼
#11	#9
#12	#10 ♦
#13	#11 Deleted option "I have never had sexual intercourse" Added option "less than 15"
#14	Deleted ☼
#15	Deleted ☼
#16	Deleted ☼
#17	Deleted ☼
#18	#12
#19	Deleted ☼
#20	Deleted ☼
#21	Separated into two questions: #13: "Do you currently use birth control?" #14: "If you use birth control pills, how long have you been using them?" Added one question to the section: #15: "Please indicate any other forms of birth control you currently use?"). Deleted option "cervical cap" (unlikely option).Added "Spermicidal foam/jelly" & "Depo Provera" (likely options).

#22	#16 Added option "I don't know"
#23	#17 Added "Skip to question #17" to option "No"
#24	#18 Deleted options "chancroid", "trichomoniasis" (unlikely options) and "never diagnosed with a STI" (Diverted to #17 if answered "No" to #15) Added "Hepatitis B"
#25	#19
#26	Deleted ☼
#27	Deleted ☼
#28	Deleted ☼ Directions in the information letter for women not to participate in study if they have had a hysterectomy.
#29	#20
#30	#22
#31	#24
#32	#21 ♦
#33	Deleted ☼
#34	#23
#35	Deleted ☼
#36	#25
#37	#26 Added #27: "Have you ever been asked to have another Pap test within 6 months?" Added #28: "Have you ever had colposcopy?"
#38	#29 ♦
#39	#30 Deleted options "School personnel" and "school course" Added option "teachers"
#40	Moved to section on subjective norms (#34, b)
#41	Deleted Added #31: "Do you intend to get regular Pap tests in the future?" Added #32: "If yes, How often do you intend to get a Pap test in the future?"
#42	Deleted Added #33: "Have you ever delayed or avoided getting a Pap test in the past?"
#43	Deleted ☼
#44	#34 (a) Replaced with "I don't have time to get a Pap test" ◙
#45	#34 (b) Replaced with "I am nervous about getting a Pap test" ◙
#46	#34 (c) Replaced with "It's reassuring to get a Pap test" ◙
#47	#34 (d) ◙

#48	#34 (e) Replaced with "I think Pap tests hurt" ◙
#49	#34 (f) Replaced with "I worry that the results would show something bad" ◙
#50	#34 (g) Replaced with "Pap tests are a priority for me" ◙
#51	#34 (h) Replaced with "I'm too young to worry about Pap tests" ◙
#52	#34 (i) Replaced with "Pap tests are no big deal" ◙
#53	#34 (j) ◙
#54	#34 (k) ◙
#55	Deleted
#56	Deleted
#57 (a-s)	#35 (a-o) Deleted options (g), (k), (o), (p), & (q) Added option (n): "It is important to abstain from sexual activity the night before a Pap test" Added option (o): " Douching interferes with the reliability of the Pap test"
#58(a-n)	#35 (p-v) Deleted options (a), (c), (e), (f), (g), (h), (i) Changed wording in (b) from "HPV can prevented by wearing condoms to "HPV transmission can be decreased by wearing condoms"
#59	Deleted
#60	#36 (a) ◙
#61	#36 (b) Replaced with "My mother gets regular Pap tests" ◙
#62	#36 (c) Replaced with "My partner comes with me when I get a Pap test" ◙
#63	#36 (d) Replaced with "My close friends get regular Pap tests" ◙
#64	#36 (e) ◙
#65	#36 (f) ◙
#66	#36 (g) Replaced with "My family does not want me to get a Pap test" ◙
#67	Deleted
#68	Deleted
#69	Deleted
#70	Deleted
#71	Deleted
#72	Deleted
#73	Deleted Added #37 (a-c) related to Perceived Behavioural Control

Appendix F
Questionnaire Introduction- Ethical Considerations

Hi fellow students! My name is Linda Duffett-Leger and I am a Master of Nursing student here at UNB. I realize that this is a busy time of year but I would really appreciate approximately 10 minutes of your time to complete this survey I am doing for my Master's thesis.

If you are 25 years of age or younger, and have never had a hysterectomy, I am interested in your experiences with Pap tests. A Pap test, also known as a Pap smear, is the collection of cells from the cervix for examination under a microscope. The Pap test is used to detect changes in the cells of the cervix that may lead to cancer. You may have had a Pap test in the past, or are thinking about having one. Understanding the factors that lead women to get a Pap test, or prevent them from doing so, will be helpful in the development of programs to promote Pap testing behaviours.

Participation in this study is strictly voluntary. Whether or not you decide to participate will not influence your grades and status at UNB. The survey will be completed online (WebCT) on a secure site to ensure that your responses will be protected and completely anonymous. There is no way to trace you back to your responses. You can access the survey on WebCT through the direct link provided below. Information about completing the online survey will be provided once you login using your User ID and Password. The survey will take approximately 10 minutes of your time to complete. Some of the questions in this survey are very personal. Please feel free to skip any of the questions you feel uncomfortable answering.

The anonymous findings from this study may also be reported at health conferences and in journal publications, and you will receive an email invitation to read a summary of the findings on WebCT at the conclusion of this study. In the future, if any more analysis is planned, approval will first be obtained from the UNB Ethics Review

Appendix H
WebCT Quiz- "Student Pap Test Survey"

Question 1
How old are you?
a. 17
b. 18
c. 19
d. 20
e. 21
f. 22
g. 23
h. 24
i. 25
j. Other

Question 2
In which faculty are you currently studying?
a. Nursing
b. Education
c. Business Administration
d. Kinesiology
e. Engineering
f. Arts
g. Science
h. Computer Science
i. Forestry
j. Law
k. Other

Question 3
In what full-time year of study are you currently enrolled?
a. First
b. Second
c. Third
d. Fourth or greater
e. Graduate student

Question 4
What is your sexual orientation?
a. Heterosexual
b. Homosexual/lesbian
c. Bisexual
d. Other

Question 5

Have you ever smoked cigarettes?
a. Yes
b. No

Question 6
Do you currently smoke cigarettes?
a. Yes
b. No

Question 7
How many cigarettes/day do you smoke?
a. 10 or less
b. 11-20
c. 21-30
d. 31 or more
e. This does not apply to me, I do not smoke.

Question 8
How often are you exposed to second hand smoke?
a. Daily
b. Weekly
c. Monthly
d. Rarely

Question 9
Have you ever had sexual intercourse?
a. Yes
b. No

Question 10
At what age did you first have sexual intercourse?
a. < 12
b. 12
c. 13
d. 14
e. 15
f. 16
g. 17
h. 18
i. 19
j. > 19
k. This does not apply to me, I have not had sexual intercourse.

Question 11
With how many different partners have you had sexual intercourse in your lifetime?
a. One partner

b. 2 to 4 partners
c. 5 to 7 partners
d. 8 to 10 partners
e. More than 10 partners
f. This does not apply to me, I have not had sexual intercourse.

Question 12
How often do you use a condom when engaging in sexual intercourse?
a. Never
b. Rarely
c. Sometimes
d. Often
e. Almost always
f. This does not apply to me, I have not had sexual intercourse.

Question 13
Do you currently use birth control pills?
a. Yes
b. No

Question 14
If you use birth control pills, how long have you been using them?
a. 1 year or less
b. 2 to 4 years
c. 5 to 7 years
d. 8 to 10 years
e. 11 or more
f. This does not apply to me, I do not use birth control pills.

Question 15
Please indicate any other forms of birth control you currently use (select ALL that apply)
a. Diaphragm
b. Condom
c. Norplant
d. Intrauterine Device (IUD)
e. Contraceptive sponge
f. Spermicidal foam or jelly
g. Depo Provera
h. Withdrawal
i. Rhythm method
j. Other
k. This does not apply to me, I do not use birth control.

Question 16
In the past, have you ever been tested for a sexually transmitted infection?
a. Yes

b. No
c. I don't know

Question 17
In the past, have you ever been diagnosed with a sexually transmitted infection?
a. Yes
b. No

Question 18
If yes, please indicate ALL of the sexually transmitted infections with which you have been diagnosed:
a. Chlamydia
b. Genital herpes
c. Genital warts/Human Papilloma Virus (HPV)
d. Syphilis
e. Gonorrhea
f. Hepatitis B
g. HIV/AIDS
h. Pubic lice/crabs
i. Other
j. This does not apply to me, I have never been diagnosed with a sexually transmitted infection.

Question 19
To your knowledge, have you ever had sexual intercourse with a partner who had genital warts?
a. Yes
b. No
c. This does not apply to me, I have not had sexual intercourse.

Question 20
Have you ever had a Pap test?
a. Yes
b. No

Question 21
How old were you when you had your first Pap test?
a. 16 years or younger
b. 17 years
c. 18 years
d. 19 years
e. 20 years or older
f. This does not apply to me, I have never had a Pap test.

Question 22
How many times have you ever had a Pap test?

a. Once
b. Twice
c. Three times
d. Four times
e. Five or more times
f. This does not apply to me, I have never had a Pap test.

Question 23
When was your last Pap test?
a. Less than 6 months ago
b. 6 months to 1 year ago
c. Between 1 and 2 years ago
d. More than 2 years ago
e. This does not apply to me, I have never had a Pap test.

Question 24
How often have you had a Pap test?
a. Every 2 years
b. Every year
c. Every 6 months
d. More than once, but not regularly
e. This does not apply to me, I have never had a Pap test.

Question 25
Is your Pap test required to obtain birth control?
a. Yes
b. No
c. This does not apply to me, I have never had a Pap test.

Question 26
Were you ever told that the results of a Pap test were abnormal?
a. Yes
b. No
c. This does not apply to me, I have never had a Pap test.

Question 27
Have you ever been asked to have another Pap test within 6 months?
a. Yes
b. No
c. This does not apply to me, I have never had a Pap test.

Question 28
Have you ever had a colpsocopy (examination of the vagina and cervix using a lighted magnifying instrument called a colposcope)?
a. Yes
b. No

Question 29
How old were you when you first learned about Pap tests?
a. 13 years or younger
b. 14 years to 16 years
c. 17 years to 19 years
d. 20 years or older
e. I had never heard of Pap tests before today.

Question 30
How did you learn about Pap tests?
a. Teachers
b. Parent
c. Doctor/Nurse
d. Friend
e. Mass media
f. I had never heard of Pap tests before today.
g. Other

Question 31
Do you intend to get regular Pap tests in the future?
a. Yes
b. No

Question 32
If yes, how often do you intend to get regular Pap tests in the future?
a. Every 6 months
b. Every 12 months
c. Every 18 months
d. Every 24 months
e. Less often than every 24 months
f. This does not apply to me, I do not intend to get a Pap test in the future.

Question 33
Have you ever delayed or avoided getting a Pap test in the past?
a. Yes
b. No
c. I had never heard of Pap tests before today.

Rate your level of agreement with the following statement about Pap tests by indicating the most appropriate answer:

Question 34
I don't have time to get a Pap test.
a. Strongly Agree

b. Agree
c. Not Sure
d. Disagree
e. Strongly Disagree

Question 35
I am nervous about getting Pap tests.
a. Strongly Agree
b. Agree
c. Not Sure
d. Disagree
e. Strongly Disagree

Question 36
It's reassuring to get regular Pap tests.
a. Strongly Agree
b. Agree
c. Not Sure
d. Disagree
e. Strongly Disagree

Question 37
I think having a Pap test is embarrassing
a. Strongly Agree
b. Agree
c. Not Sure
d. Disagree
e. Strongly Disagree

Question 38
I think Pap tests hurt.
a. Strongly Agree
b. Agree
c. Not Sure
d. Disagree
e. Strongly Disagree

Question 39
I worry that the results will show something bad.
a. Strongly Agree
b. Agree
c. Not Sure
d. Disagree
e. Strongly Disagree

Question 40

Pap tests are a priority for me.
a. Strongly Agree.
b. Agree
c. Not Sure
d. Disagree
e. Strongly Disagree

Question 41
I'm too young to worry about Pap tests.
a. Strongly Agree
b. Agree
c. Not Sure
d. Disagree
e. Strongly Disagree

Question 42
Pap tests are no big deal.
a. Strongly Agree
b. Agree
c. Not Sure
d. Disagree
e. Strongly Disagree

Question 43
I think Pap tests are unreliable.
a. Strongly Agree
b. Agree
c. Not Sure
d. Disagree
e. Strongly Disagree

Question 44
I think Pap tests are an important preventative health measure.
a. Strongly Agree
b. Agree
c. Not Sure
d. Disagree
e. Strongly Disagree

Rate your level of agreement with the following statement about Pap tests by indicating the most appropriate answer:

Question 45
Pap tests can detect the presence of cancer of the uterus.
a. Strongly Agree
b. Agree

c. Not Sure
d. Disagree
e. Strongly Disagree

Question 46
Pap tests can detect the presence of cancer of the cervix.
a. Strongly Agree
b. Agree
c. Not Sure
d. Disagree
e. Strongly Disagree

Question 47
Pap tests can detect the presence of any female cancer.
a. Strongly Agree
b. Agree
c. Not Sure
d. Disagree
e. Strongly Disagree

Question 48
Pap tests can detect the presence of cancer of the bladder.
a. Strongly Agree
b. Agree
c. Not Sure
d. Disagree
e. Strongly Disagree

Question 49
Pap tests are 100% reliable.
a. Strongly Agree
b. Agree
c. Not Sure
d. Disagree
e. Strongly Disagree

Question 50
Pap tests are only useful for non-virgins.
a. Strongly Agree
b. Agree
c. Not Sure
d. Disagree
e. Strongly Disagree

Question 51
Pap tests are only useful for women who have had children.

a. Strongly Agree
b. Agree
c. Not Sure
d. Disagree
e. Strongly Disagree

Question 52
Pap tests are only useful for women who are not married.
a. Strongly Agree
b. Agree
c. Not Sure
d. Disagree
e. Strongly Disagree

Question 53
Pap tests require a local anesthetic.
a. Strongly Agree
b. Agree
c. Not Sure
d. Disagree
e. Strongly Disagree

Question 54
Pap tests also test for sexually transmitted infections.
a. Strongly Agree
b. Agree
c. Not Sure
d. Disagree
e. Strongly Disagree

Question 55
Pap tests will tell me if I am pregnant.
a. Strongly Agree
b. Agree
c. Not Sure
d. Disagree
e. Strongly Disagree

Question 56
Pap tests should normally be performed twice a year.
a. Strongly Agree
b. Agree
c. Not Sure
d. Disagree
e. Strongly Disagree

Question 57
Pap tests can be obtained at Student Health Services.
a. Strongly Agree
b. Agree
c. Not Sure
d. Disagree
e. Strongly Disagree

Question 58
It is important to abstain from sexual activity the night before receiving a Pap test.
a. Strongly Agree
b. Agree
c. Not Sure
d. Disagree
e. Strongly Disagree

Question 59
Douching interferes with the reliability of the Pap test.
a. Strongly Agree
b. Agree
c. Not Sure
d. Disagree
e. Strongly Disagree

The next set of questions relate to the human papillomavirus (HPV).
Rate your level of agreement with the following statement about HPV by indicating the most appropriate answer:

Question 60
Having HPV increases your chance of getting cervical cancer.
a. Strongly Agree
b. Agree
c. Not Sure
d. Disagree
e. Strongly Disagree

Question 61
HPV transmission can be decreased by wearing condoms.
a. Strongly Agree
b. Agree
c. Not Sure
d. Disagree
e. Strongly Disagree

Question 62
HPV may have no symptoms.

a. Strongly Agree
b. Agree
c. Not Sure
d. Disagree
e. Strongly Disagree

Question 63
HPV can be detected by a Pap test.
a. Strongly Agree
b. Agree
c. Not Sure
d. Disagree
e. Strongly Disagree

Question 64
The risk of acquiring HPV is increased with smoking.
a. Strongly Agree
b. Agree
c. Not Sure
d. Disagree
e. Strongly Disagree

Question 65
The risk of acquiring HPV is increased by having multiple sex partners.
a. Strongly Agree
b. Agree
c. Not Sure
d. Disagree
e. Strongly Disagree

Question 66
The risk of acquiring HPV is increased by having another sexually transmitted infection.
a. Strongly Agree
b. Agree
c. Not Sure
d. Disagree
e. Strongly Disagree

Question 67
The risk of acquiring HPV is increased by having sexual intercourse in early adolescence.
a. Strongly Agree
b. Agree
c. Not Sure
d. Disagree
e. Strongly Disagree

Rate your level of agreement with the following statement about Pap tests by indicating the most appropriate answer:

Question 68
Most people who are important to me think I should have a regular Pap test.
a. Strongly Agree
b. Agree
c. Not Sure
d. Disagree
e. Strongly Disagree

Question 69
My mother gets regular Pap tests.
a. Strongly Agree
b. Agree
c. Not Sure
d. Disagree
e. Strongly Disagree

Question 70
My partner comes with me when I have a regular Pap test.
a. Strongly Agree
b. Agree
c. Not Sure
d. Disagree
e. Strongly Disagree

Question 71
My close friends think that I should have a regular Pap test.
a. Strongly Agree
b. Agree
c. Not Sure
d. Disagree
e. Strongly Disagree

Question 72
My doctor thinks that I should have a regular Pap test.
a. Strongly Agree
b. Agree
c. Not Sure
d. Disagree
e. Strongly Agree

Question 73

Medical opinion in general is that I should have a regular Pap test.
a. Strongly Agree
b. Agree
c. Not Sure
d. Disagree
e. Strongly Disagree

Question 74
My family does not want me to have the test.
a. Strongly Agree
b. Agree
c. Not Sure
d. Disagree
e. Strongly Disagree

Rate your level of agreement with the following statement about your ability to get a Pap test by indicating the most appropriate answer:

Question 75
It would be difficult for me to get a Pap test within the next year.
a. Strongly Agree
b. Agree
c. Not Sure
d. Disagree
e. Strongly Disagree

Question 76
I would be too busy to get a Pap test within the next year.
a. Strongly Agree
b. Agree
c. Not Sure
d. Disagree
e. Strongly Disagree

Question 77
I am able to get a Pap test when I choose.
a. Strongly Agree
b. Agree
c. Not Sure
d. Disagree
e. Strongly Disagree