UNDERSTANDING AND MANAGING CANCER PREVENTION: EXPLORING INFLUENCES ON MODIFIABLE RISK FACTORS IN A NOVA SCOTIA UNIVERSITY SAMPLE

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Abstract

An effective population health approach to cancer prevention for young adults requires an informed understanding of cancer-relevant factors for this distinct population. Such factors include the social context, modifiable health behaviours and intrapersonal factors which influence those behaviours. It is also necessary to understand how this population seeks out and uses health information. This descriptive study was carried out through an online questionnaire delivered to a sample of 484 university students in Nova Scotia aged 17 to 29. The study revealed that most students reported good health behaviours, students new to Nova Scotia reported better health behaviours, and while health was a priority, cancer was not. Students also described how intrapersonal factors and their broader social context influenced health behaviours. The results will advance a contemporary depiction of young adult health essential for developing tailored cancer prevention and health promotion strategies.

Keywords: cancer, health behaviours, population health, young adults

List of Abbreviations Used

BMI	Body Mass Index
CAMH	Centre for Addiction and Mental Health
CDHA	Capital District Health Authority
CTUMS	Canadian Tobacco Use Monitoring Survey
DHA	District Health Authority
DRIs	Dietary Reference Intakes
HBM	Health Belief Model
HINTS	Health Information National Trends Survey
HIV	Human Immunodeficiency Virus
HPV	Human Papillomavirus
IARC	International Agency for Research on Cancer
NCI	National Cancer Institute (American)
NSDHW	Nova Scotia Department of Health and Wellness
NSHPP	Nova Scotia Department of Health Promotion and Protection
NSCDPS	Nova Scotia Chronic Disease Prevention Strategy
NSNS	Nova Scotia Nutrition Survey
PHAC	Public Health Agency of Canada
PRI	Policy Research Initiative (Canada)
SPF	Sun Protective Factor
STI	Sexually Transmitted Infection
TPB	Theory of Planned Behaviour

TRA	Theory of Reasoned Action
UV	Ultraviolet
TSD	Theory of Self-Determination
WHO	World Health Organization
YSS	Youth Smoking Survey

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Chapter One: Introduction

In the field of health promotion, we are trained to appreciate the process of achieving and maintaining health as evolving and dynamic. We are prepared to understand the preconditions of health across a fluid continuum that enables the intersection of age and life stage. For example, while young adults are typically described as 'healthy', young adulthood is actually a sensitive period of significant personal transition when lifelong health behaviours and attitudes are established (Marshall, 2011). These often indelible attributes can contribute to immediate and long-term health outcomes and may serve as predictors of risk for chronic diseases such as cancer.

Many cancers are linked to modifiable risk factors (Garcia et al., 2007; World Health Organization, 2009), therefore establishing and supporting positive health behaviours in young people may have significant long-term benefits in improved health outcomes and reduced treatment costs. The young adult population is an important target for cancer prevention research because 1) they have a comparatively lower risk of receiving a cancer diagnosis yet many new cases are diagnosed in this age group annually (Barr, 2011; Bleyer & Barr, 2009); 2) behaviour choices at this developmental stage and preventive practices throughout the lifespan can impact the risk of eventually developing cancer (Woodgate & Leach, 2010), and 3) health practices learned in adolescence and young adulthood can be transferred to family members (i.e., partners and children) which can significantly impact the health of future generations (Mulye et al., 2009; Public Health Agency of Canada[PHAC], 2011).

Achieving a comprehensive representation of the context of young adult health has been challenging for many reasons. First, in a world of continuous change the various transition phases Canadian young adults make on the way to adulthood are more complicated and less certain when compared to previous generations (Franke, 2010). With limited data available to analyze the impact of these new realities on health and health behaviours, interpretation of existing information must be done with caution.

A second obstacle associated with studying young adult health is the ambiguity and inconsistency of common age-banding categories used to describe 'young adults'. Depending on the purpose and context, 'young adulthood' is portrayed in many ways by different researchers, departments and organizations. For example, Health Canada categorizes 'youth' as between ages 15 and 19, and 'young adults' as between ages 20 and 24 (Health Canada, 2006a) while the National Census segments 'adolescents' (ages 15-24) from 'adults' (ages 24-65) (Statistics Canada, 2008a).

Until fairly recently researchers have neglected to recognize or articulate the life stage and life experiences that occur between the teen years and the mid to late twenties. These age groups have rarely been considered as specific cohorts for examination (Arnett, 2010; Gaudet, 2007; Schwartz, Cote, & Arnett, 2005). As a result, much of the research cited represents more traditional age categories that nonetheless may be useful in the absence of more appropriate and relevant literature.

This study aimed to highlight various cancer prevention management strategies adopted by young adults (defined here as those aged 17-29) in Nova Scotia. While some factors that affect cancer prevention are exclusively relevant to the individual (such as a

person's perceived risk of contracting an illness and perceived control over adopting a health protective behaviour) (Ajzen, 1991; Elder et al., 2007; Tyc, Nuttbrock-Allen, Klosky, & Ey, 2004), health protective strategies are also affected by socio-ecological factors such as policy, socioeconomic status, racial and cultural diversity, physical and social environments, and the organization of the larger community (Daniels, Kennedy, & Kawachi, 1999; Frohlich, Corin, & Potvin, 2001). Describing how these determinants interconnect may explain important differences across situations and populations (Gotay, 2005; Guile & Nicholson, 2004; Janz, Champion, & Strecher, 2002; Nutbeam & Harris, 2004). Furthermore, the interconnections may foster a comprehensive and contemporary depiction of young adult health to inform effective, relevant and sustainable health promotion policies and programs (Gaudet, 2007).

In Canada, the most commonly accepted socio-ecological model is the Population Health Model which includes intrapersonal, socio-cultural, policy, physical, and environmental factors that incorporate a wide range of significant predictor variables and the relationships that link them together (Elder et al., 2007; Sallis & Owen, 2002). It is difficult to capture all of the contexts in a single study, therefore it becomes important to select key elements for a given cohort. The Population Health determinants chosen for this study were the social context (age and gender were defined as social constructs), modifiable health behaviours, and the intrapersonal factors that influence health behaviours (perceived susceptibility, perceived control, personal motivation). An understanding of health information and information-seeking practices is also useful for developing health promotion interventions and were included for consideration.

Modifiable Risk Behaviours Related to Cancer Prevention

Although cancer occurs relatively infrequently in young adults and their survival rates are generally higher (in Canada young adult survival rates are 23% higher than the general population) (PHAC, 2011), their cancer risk should not be overlooked. More than 30% of new cancer cases and 17% of cancer deaths will occur in young and middle-aged adults between 20-50, and cancer incidence is rising in young women aged 20-39 (Canadian Cancer Society [CCS], PHAC, & Statistics Canada, 2009). In 2007, the most diagnosed cancers for young adult females were thyroid, skin melanomas, Hodgkin lymphoma, breast and cervical cancer (CCS et al., 2009). The most commonly diagnosed cancers in young adult males were: testicular, Hodgkin and non-Hodgkin lymphomas, thyroid and brain (CCS et al., 2009).

The term 'cancer' describes the uncontrolled growth and expansion of atypical cells which have the capacity to invade healthy tissue and organs and which may result in chronic illness and premature mortality (Garcia et al., 2007; Stratton, Campbell, & Futreal, 2009). There are over 100 different types of cancer, each type with different causes, signs and treatments; and each type involves a form of genetic malfunction in a cell's DNA that controls cellular-level growth, division, and death (Garcia et al., 2007; Stein & Colditz, 2004; Stratton et al., 2009).

It is estimated that 5%-10% of all cancers are strongly hereditary and individuals who inherit a specific genetic alteration have a very high risk of developing a particular cancer (Garcia et al., 2007). The transformation of a normal cell into a cancer cell depends on many factors and can be the result of specific interactions between genetics and external carcinogenic triggers such as physical carcinogens (including ultraviolet

[UV] light exposure and radiation); chemical carcinogens (including tobacco smoke and alcohol), and biological carcinogens (including infections from viruses, bacteria or parasites) (Bleyer, Viny, & Barr, 2006; Cancer Care Ontario, 2006; Garcia et al., 2007; WHO, 2009).

Another unavoidable risk factor for cancer is simply growing older (WHO, 2009). In fact, approximately 78% of cancer in industrialized countries occurs in adults aged 55 and over (Campisi, 2003; Garcia et al., 2007). In Canada, approximately 43% of new cancer cases and 60% of cancer-related deaths are among those who are 70 years old or older (CCS et al., 2009). As individuals age they experience increased cancer risk due to an accumulation of exposure to risk factors and because cellular repair mechanisms become less resilient along the ageing process (WHO, 2009).

While genetics and ageing cannot be avoided, cancer experts believe that between 30% and 50% of all newly diagnosed cancers are potentially preventable by establishing proactive health behaviours such as: adopting positive personal health practices, vaccinating against carcinogenic viruses, detecting the disease in its early stages, and avoiding carcinogenic risk factors (Danaei, Vander Hoorn, Lopez, Murray, & Ezzati, 2005; Ezzati & Lopez, 2003; Garcia et al., 2007; Lopez, Mathers, Ezzati, Jamison, & Murray, 2006; Parkin, Bray, Ferlay, & Pisani, 2005; WHO, 2009). The most prominent modifiable cancer risk factors in the developed world have been identified as: tobacco use, alcohol use, overweightedness and obesity, poor nutrition, physical inactivity, sexually transmitted infections (STIs), and excessive exposure to ultra-violet radiation (Danaei et al., 2005; Ezzati & Lopez, 2003; Garcia et al., 2007; Lopez et al., 2006; Parkin

et al., 2005; WHO, 2009). When it comes to young people, evidence shows that risk taking behaviours often cluster together (for example, tobacco users are generally more likely to use alcohol) (Canadian Institute for Health Information, 2005; Jackson, Haw, & Frank, 2010). Therefore, developing an enhanced understanding of young adult cancer-relevant health behaviours is a fundamental component of building effective health promotion interventions. Some of these behaviours are discussed below.

Independent health-seeking behaviour and self-assessment exams. One way to facilitate young adult capacity for independent cancer prevention practices is to increase access to health care professionals. Independent health-seeking behaviours (such as independent visits to a physician) are important for two reasons: early detection of cancer leads to early treatment and primary health care providers are important sources of health information, interventions and support (including providing information on self-assessment exams such as testicular or breast exams) (Marshall, 2011; Mulye et al., 2009). However, young adults are often in a vulnerable position because they tend to use less primary care when compared to other age groups (Irwin, 2010; Marshall, 2007). The lower rate of usage is often attributed to the perception that young people are enjoying good health when it may be because they have unmet health care needs (meaning that there may be a difference in the health care service needed and the actual services received) (Marshall, 2011). Another explanation for reduced use of primary care may be lifestyle change (Callahan & Cooper, 2010; Marshall, 2011). Young adulthood is frequently a time of significant transition that frequently involves a change in family status and/or physical relocation away from the family home (such as moving to a new

province to attend university) (Callahan & Cooper, 2010). These changes may result in reduced family encouragement to visit a health care provider or unfamiliarity with options for care in the new place of residence (PHAC, 2011).

In order to enhance access to the availability of health care services, there is a need to develop an improved understanding of why, where and from whom care is being sought. Young adult health care usage can be influenced by many factors including intrapersonal factors such as perceived risk and self-efficacy, the availability of health care providers and young adults' ability to navigate the health care system (Callahan & Cooper, 2010).

Tobacco use. Tobacco use and exposure to environmental tobacco smoke (second-hand smoke) are major causes of preventable chronic illness and death around the world (Steptoe et al., 2002). Conclusive evidence that smoking prematurely kills approximately half of all long-term tobacco users has been available since the 1964 Surgeon General's report in the United States (Garcia et al., 2007). This message was reiterated in a report prepared by the 1986 International Agency for Research on Cancer (IARC) Working Group who demonstrated that smoking causes not only cancer of the lung, but also of the lower urinary tract, upper aero-digestive tract including the oral cavity, pharynx, larynx, and oesophagus, breast, prostate and pancreas (IARC, 2003; Vineis et al., 2004). Despite the evidence, tobacco use persists as a dangerous addiction that has killed approximately 100 million people in the 20th century and is projected to kill more than one billion people in the 21st century (Garcia et al., 2007).

Nova Scotia has some of the best anti-tobacco legislation in the world including the *2001 Tobacco Control Strategy* (Nova Scotia Department of Health Promotion and Protection [NSHPP], 2005b; Pyra Management Consulting Services, Inc., 2006) which led the way for the *Smoke-Free Places Act* (Nova Scotia House of Assembly, 2002) and its subsequent amendments that require all indoor workplaces and public places, all outdoor licensed areas and patios of all restaurants, lounges, beverage rooms and cabarets to be smoke-free. While tobacco-free policies, smoke-free public places, increased taxation and publicized research on tobacco-related cancers have helped reduce national and provincial tobacco-use rates, young adults are still a major category of tobacco consumers (Zhang, Cohen, Ferrence, & Rehm, 2006).

In Nova Scotia, young people typically smoke their first whole cigarette by age 13 (Colman, 2006) and in 2007, more than 22% of Nova Scotians reported being regular smokers (Nova Scotia Department of Health, 2007). The *Canadian Tobacco Monitoring Survey (CTUMS)* data indicate that a greater proportion of young adults may be initiating daily smoking after the age of 20 (Hammond, 2005). According to the 2009 statistics from CTUMS, 14% of Nova Scotians aged 15-19 reported regular tobacco use (Health Canada, 2011). About 30% of Nova Scotia young adults aged 20-24 reported regular tobacco use, ranking higher than the national rate (23%), and 19% of young adults aged 25 -29 reported regular tobacco use (compared to the national rate of 17%) (Health Canada, 2011).

Exposure to second-hand tobacco smoke is also an issue in Nova Scotia where between 12% and 24% of respondents to the *2007 Canadian Community Health Survey*

(Nova Scotia Department of Health, 2007) indicated someone smoked inside their home every day or almost every day and 7.3% of non-smokers reported being exposed to second hand smoke in their homes in 2009 (Physicians for a Smoke-Free Canada, 2010a). Exposure to second hand smoke in public places is also a significant concern. The average rate for exposure to second-hand smoke in public places in Nova Scotia for all ages is 7.8%, however estimates from 2009 reveal that youth and young adults are more likely to report higher rates than the general public (12-19 year olds reported their rate of exposure to second hand smoke to be 18.1% and 20-34 year olds report a 13.5% rate of exposure) (Physicians for a Smoke-Free Canada, 2010b).

Unrestricted alcohol consumption. Alcohol is a known carcinogen that is responsible for approximately 5% of cancers worldwide and has been ranked as one of the top ten risks for chronic disease (Baan et al., 2007; Danaei et al., 2005). The IARC Working Group confirmed that any amount of alcohol is "carcinogenic to humans (2003, p. 293)" and concluded that the occurrence of malignant tumours of the oral cavity, larynx, oesophagus, liver, colorectum, and female breast tissue is related to alcohol consumption (Baan et al., 2007; Chen, Rosner, Hankinson, Colditz, & Willett, 2011). The mechanisms for alcohol's cancer-causing properties have yet to be clarified. However, it is believed that alcohol may act as a solvent that allows carcinogens to penetrate mucosal walls; as an irritant that stimulates rapid cell growth, or possibly as a transporter that carries carcinogens to the basal layer of the mucosa (Stein & Colditz, 2004).

Although cancer-protective drinking guidelines have not been established, the Centre for Addiction and Mental Health (CAMH) offers a set of low-risk drinking

guidelines to minimize the potential harms from excessive alcohol use (CAMH, 2008) . Under these guidelines, 'one drink' (one can of regular strength beer, one glass of wine, one shot glass of liquor) is the equivalent of 13.6 grams of alcohol (CAMH, 2008). The lowest risk level is zero drinks and minimized risk involves no more than 2 standard drinks in any one day, no more than 9 standard drinks in one week for women, and no more than 14 standard drinks in one week for men (CAMH, 2008).

While binge drinking[1] has been associated with breast cancer risk (Berkey et al., 2010; Byrne et al., 2002; Chen et al., 2011), even a moderate intake of alcohol is related to an increased risk of breast and colorectal cancer (Chen et al., 2011; Garcia et al., 2007; Gotay, 2005; Stein & Colditz, 2004). Daily consumption of around 50g (the equivalent of four drinks) of alcohol increases the risk of these cancers by 2 and 3 times compared to risks of non-drinkers (Alcohol Policy Network, Ontario Public Health Association, 2007).

The *2004 Canadian Addiction Survey* (Health Canada, 2004) demonstrated that Canadian young adults (aged 19-24) had the highest rates of non-compliance with the low-risk drinking guidelines (49.1%).It is estimated that about 40% of all alcohol sold in Nova Scotia is consumed by people aged 30 and under (NSHPP, 2007b). According to the *2005 Alcohol Indicators Report*, Nova Scotia adults aged 25-29 had the highest current drinking rates (90.9% - 91.1%) followed by young adults aged 19-24 (89.2%-

[1] "Binge drinking" is defined as having many drinks on one occasion: five or more drinks for a male, or four or more drinks for a female (Centre for Addiction and Mental Health, 2008)

92.3%) (NSHPP, 2007b). Binge drinking and heavy drinking patterns in Nova Scotia typically peak among young adult males and females aged 20-24 with males reporting heavy drinking at more than double the rate of women (NSHPP, 2007b). Finally, the *2004 Canadian Campus Survey* indicated that drinking patterns varied considerably across the country with university students in the Atlantic region ranking higher than the national average and male students more likely than female students to be frequent drinkers (Adlaf, Demers, Gliksman, & CAMH, 2005).

Diet and nutrition. The relationship between dietary intake and cancer is complex and has stimulated rising interest due to international variations in cancer rates and diets. For example, studies have shown that people migrating to new regions were more likely to experience cancer rates like those in their host country rather than their country of origin (Gotay, 2005). Unfortunately, much of the current evidence and information about the impact of diet is unclear. This is in part because most research centres on the value of specific dietary components without considering that diets are made up of multiple forms of food and nutrients (Fitzgerald, Dewar, & Veugelers, 2002). Also, most studies do not reflect young adult dietary behaviours, nor do they specify the life stage when diet is most important for cancer prevention (Gotay, 2005; Stein & Colditz, 2004). However, it has been estimated that low fruit and vegetable intake is responsible for about 5% of the world's cancers (Danaei et al., 2005).

Overall, the evidence that specific foods and nutrients are related to the incidence of particular kinds of cancer is not convincing and more research is needed (Stein & Colditz, 2004). However, in some cases the evidence does substantiate the large

protective effect of fruit and vegetable consumption for mouth, pharynx, larynx, oesophageal, stomach, pancreas, bladder, colon and lung cancer (Gotay, 2005; Stein & Colditz, 2004); and red meat consumption has been shown to have a large effect for the development of cancers of the colon and rectum (Gotay, 2005).

According to *Canada's Food Guide* (Health Canada, 2007), individuals should consume between 5 and 10 servings of fruits and vegetables each day (depending on gender and age) to maintain good health. Further, Canada and the United States have a shared set of nutrient guidelines (called dietary reference intakes or DRIs) that underscore the prevention of chronic diseases (Fitzgerald et al., 2002). In terms of cancer prevention, a 'healthy' diet is a diet rich in fruits and vegetables, is limited in red meat and animal fat, and includes a daily multivitamin with folate (a B vitamin that helps repair DNA) (Fitzgerald et al., 2002; Stein & Colditz, 2004).

Statistics Canada (2011) reports that Canadian young adults have increased their consumption of fruits and vegetables. Between 2000 and 2009 the number of young adults who reported consuming fewer than 5 fruits and vegetables each day decreased from 65% to 56% (Statistics Canada, 2011b). However, fewer young adult men (38%) reported eating only home-prepared meals than young adult women (43%) and young men were more likely to frequent fast food restaurants (PHAC, 2011; Statistics Canada, 2011b).

Unfortunately, in Nova Scotia only 34.9% of the population meets or exceeds these recommended dietary guidelines (compared to the 43.8% national rate) (Cancer Care Nova Scotia [CCNS], 2007). Fitzgerald et al. (2002) investigated the diet quality

and cancer risk among participants using the Nova Scotia Nutrition Survey (NSNS). They investigated the relationship between diet quality and cancer using a score based on the DRIs revealing that provincial cancer rates could be potentially reduced by 35% through dietary intervention (Fitzgerald et al., 2002). When the combination of an insufficient diet and the issue of nutrient-related indicators (high BMI) are considered, it is feasible to conclude that provincial health promotion strategies are needed to improve health outcomes in the province.

Physical inactivity. Physical inactivity and sedentary lifestyles cause approximately two million deaths per year worldwide and are linked to most major chronic diseases including osteoporosis, stroke, heart disease and cancer (Danaei et al., 2005; Stein & Colditz, 2004). Several mechanisms have been proposed to explain the dose-response relationship observed between activity and cancer risk (McTiernan, 2003; Stein & Colditz, 2004). First, physical activity may reduce circulating levels of insulin, hormones and other growth factors. Second, lower BMI is associated with lower prostaglandin levels (high prostaglandin levels are found in tumour cells) and improved immune function. Third, in the case of colon cancer, activity may modify bile acid metabolism thereby lowering risk (McTiernan, 2003; Stein & Colditz, 2004).

As in other developed countries, the physical activity levels of Canadians have been declining rapidly while the incidence of being overweight and obese has been increasing (Tremblay et al., 2011). Only about half (52.3%) of adult Canadians and less than half (49.2%) of adult Nova Scotians reported being physically active (CCNS, 2007), with over half (55.1 %) of Nova Scotians reporting that they get less than 15 minutes of

moderate exercise per day (NSHPP, 2005a). Inactivity among children and youth is becoming a nation-wide concern as research indicates that physical activity decreases considerably during adolescence for both boys and girls. By grade 11, only 8.7% of males and 5.1% of females are achieving the provincial recommendation of 60 minutes of moderate or vigorous physical activity each day (Nova Scotia Department of Health, 2007). According to the *2007 Canadian Community Health Survey* (Nova Scotia Department of Health, 2007), young people between 12 and 19 were more physically active than those aged 20 and older, and young boys between 12 and 19 were more likely to engage in regular physical activities. Thus, exploring interventions and supports to encourage more physical activity in young adulthood is important to improve personal health strategies throughout the lifecycle.

The new *Canadian Physical Activity Guidelines* (released in January 2011) replace the previous recommendations for children (aged 5-11), youth (aged 12-17), adults (aged 18-64), and older adults (aged 65 and older) (Tremblay et al., 2011). The revised guidelines recommend that adults need to engage in a minimum of 150 minutes of moderate-to-vigorous intensity aerobic activity (in sessions lasting 10 minutes or more) each week plus add activities designed to strengthen bone and muscle at least twice a week to maintain improved health (Tremblay et al., 2011).

As a result of pervasive changes in physical activity and dietary patterns, obesity is increasing at epidemic rates around the world and is estimated to account for over 2.5 million deaths each year (Gotay, 2005; Stein & Colditz, 2004). Excess body weight influences the production levels of hormones and growth factors and causes severe health

consequences including colorectal, postmenopausal breast, endometrial, renal, and oesophageal cancers (Stein & Colditz, 2004). Additionally, research is emerging that shows how obesity may influence non-Hodgkin's lymphoma, multiple myeloma, in addition to cancers of the prostate, liver, gallbladder, pancreas, stomach, ovary, and cervix (Stein & Colditz, 2004).

One of the most common measures of adiposity is the body mass index (BMI) which provides a value of body weight adjusted by height (kg/m2) (Gallagher et al., 2000). An adult (aged 18 and older) is considered 'underweight' when his/her BMI is below 18.5, 'normal' when his/her BMI is between 18.5 and 24.9, 'overweight' when the BMI is over 25.0, and 'obese' when the BMI exceeds 30 (Gallagher et al., 2000; Gotay, 2005; NSHPP, 2007a). Although the BMI measure has its limitations (for example: some people have high BMIs due to high percentage of muscle and others may have a normal BMI but still maintain a high percentage of body fat), it is still used as a standard comparison tool for classifying health status (Gallagher et al., 2000).

Canadian youth and young adults are experiencing higher rates of obesity than in the past. Between 1978 and 2009, rates of measured obesity rose from 3% to 11% among youth and from 6% to 15% among young adults (PHAC, 2011). Using the BMI as a guide, over half (58%) of Nova Scotians aged 18 and older have a BMI above a healthy range, a much higher score than the national rate of 50% (NSHPP, 2007a). Obesity in children is also growing at a higher rate than in adults. Almost one in every five children in grade 3 is overweight, with just as many at risk of obesity. A recent study of Nova Scotia children in grades 3, 7 and 11 found that up to 37% of boys and up to 45% of girls

were either overweight or at risk of becoming so (NSHPP, 2005a). Because overweight adolescents have a 70% chance of becoming overweight or obese adults (Gotay, 2005) these percentages are particularly distressing.

Safe sexual practices. The criteria for safe sexual practices are defined as: having as few sexual partners as possible, using prophylactic condoms, and maintaining a monogamous relationship with someone who has not had a lot of sexual partners (CCS, 2008a). Unsafe sex facilitates the transmission of several oncogenic viruses (Lopez et al., 2006). These viruses include: the human papillomavirus (HPV) which causes cervical, vulvar, penile and anal cancer; hepatitis B and C viruses which cause hepatocellular carcinoma, and human lymphotropic virus type 1 which is associated with adult T-cell leukemia (Garcia et al., 2007; Gotay, 2005; Stein & Colditz, 2004).

Nearly 100% of women with cervical cancer have evidence of cervical infection with HPV, the main cause of cervical cancer (Garcia et al., 2007). Cervical cancer is the second most commonly diagnosed cancer in women and one of the third leading causes of cancer death worldwide (Garcia et al., 2007). It is estimated that about 75% of sexually active men and women in Canada will experience at least one HPV infection in their lifetime, with young women (aged 20-24) experiencing the highest rates of cancer-causing HPV infection (24%) (CCS, 2008a). In response to these figures, Health Canada approved the use of the Gardasil vaccine to protect young Canadian women against four different types of HPV that increase risk for about 70% of cervical cancer (Health Canada, 2006b). Nova Scotian women have the highest incidence of invasive cervical cancer in Canada and in 2007 a Federal pledge of 2.8 million dollars made the Gardasil

vaccine available to all grade 7 girls in the province as part of the school-based immunization program (NSHPP, 2007c).

Exposure to ultraviolet radiation (sun exposure and tanning beds). Sunlight exposure in Canada is strong enough to emit damaging ultraviolet (UV) A and B rays that cause premature aging of the skin and harmful sunburns (CCS, 2008c; Lamanna, 2004). Sun exposure increases the risk of basal cell carcinoma, squamous cell carcinoma and malignant melanoma (Stein & Colditz, 2004). Non melanoma skin cancers are associated with cumulative exposure to UV radiation, while melanoma is associated with intense episodes of UV resulting in sunburns (Guile & Nicholson, 2004; Lamanna, 2004). In addition to sun exposure, UVB exposure through the use of tanning beds (which have the capacity to emit levels of UV many times stronger than the midday sun) has also been associated with numerous adverse health effects, ranging from minor to potentially fatal disorders (Lamanna, 2004; WHO, 2005).

There are an estimated 132,000 cases of malignant melanoma (the most dangerous form of skin cancer) annually, and an estimated 66,000 deaths from malignant melanoma and other skin cancers worldwide (WHO, 2005). The incidence of melanoma is rising more rapidly than the incidence of any other cancer in North America (Stein & Colditz, 2004). The incidence of skin cancer has been increasing steadily in Canada over the past 30 years: in 2007 an estimated 69,000 new cases of non-melanoma skin cancers were diagnosed in Canada in addition to 4,600 new cases of melanoma skin cancer (CCNS, 2008). Over 230 of these melanomas were expected to occur in Nova Scotians (CCNS, 2008).

Although skin cancer is the most common cancer in the world, it is also the most preventable through simple sun protection behaviour (Lamanna, 2004; Stein & Colditz, 2004). It is recommended that all individuals (regardless of risk) practice primary prevention to reduce their risks for UV exposure. These practices include: applying sun protective factor (SPF) 15+ sunscreen 30 minutes before sun exposure (and reapplying sunscreen every 1.5 to 2 hours and after swimming or sweating); dressing in protective clothing (such as long sleeve shirts and wide-brimmed hats); using available shaded areas as protection from sunlight; limiting sun exposure during peak hours (between 11am and 4pm), and avoiding artificial sources of UV such as tanning beds (CCS, 2008c; WHO, 2005). Examining skin and seeking treatment for suspicious lesions are also important behaviours, with early identification offering at least a 95% chance of preventing malignant melanoma (Guile & Nicholson, 2004).

It is known that young people who experience severe and/or frequent burns from exposure to UV will have a greater risk for developing melanoma later in life (WHO, 2005), therefore it imperative that sun safety behaviours are learned at a young age. Young people aged 16-24 are at greater risk for skin cancers because they are most likely to spend time in the sun due to occupational and recreational exposure and for the purpose of sun tanning (Lamanna, 2004). The *2008 National (Canada) Sun Survey Report* shows that 49% of young adult women and 28% of young adult men actively seek out sun tanning activities (CCS, 2008b; 2008c). Young people (particularly young women) are also most likely to use tanning beds and are least likely to practice sun protective behaviours (CCS, 2008c). While 58% of young women and 42% of young

men say they practice safe sun strategies, 20% of young women and 5% of young men rely exclusively on sunscreen SPF 15+ for UV protection (CCS, 2008b; 2008c).

In summary, substantial evidence exists regarding young people and 'risky' behaviours that negatively impact their immediate health while also putting them at future risk for cancer. However, in order to gain more insight on the realities facing young adults in Nova Scotia, it is also important to understand the intrapersonal and social constructs that influence health-related decision making.

Influences on Personal Health Behaviours Related to Cancer Prevention

One way to explore the complicated connections contributing to a modern interpretation of the 'young adult health context' is to take advantage of the strengths of existing frameworks. In the field of health promotion, practitioners typically rely on the Population Health Approach to examine and assess health determinants. Understanding cancer in the context of the Population Health approach demands an enhanced appreciation of what it means to be "healthy". No longer defined in terms of body parts and pathologies, the concept of 'health' has evolved into a more holistic construct that encompasses physical, mental and social wellbeing. Once depicted solely as a genetic or biological commodity of an individual (you either have good health or you don't), Population Health redefines *health* as a capacity or resource of a population (PHAC, 2001). In other words, health is not endowed but, rather, achieved and maintained.

In Canada, it has been estimated that only 15% of the population's health is attributable to biology and genetic factors (Keon & Pepin, 2008). Medical advances, health care systems, and health services are often mistakenly credited with low levels of

illness (Raphael, 2004) but can only rightfully be credited with approximately 25% of the nation's health standings (Keon & Pepin, 2008). In fact, Canada's health status is mainly shaped by the organization and distribution of social and economic resources (Keon & Pepin, 2008; Raphael, 2003; 2004) and, in effect, achieving good health becomes a perpetual and complicated process influenced by the relationship between health inequities experienced by population groups and a broad range of health determinants (NSCDPS, 2003; PHAC, 2001). These factors include: gender, culture, income, employment, social support networks, education, working and living conditions, physical environments, social environments, the capacity to make healthy choices and develop effective coping skills, healthy childhood development, and access to health services (NSCDPS, 2003; PHAC, 2001).

The Population Health model and the *Ottawa Charter for Health Promotion* (WHO, 1986) are commonly accepted as guidelines for Nova Scotia health strategies and are consistently referenced in the works of the Nova Scotia Department of Health and Wellness[2] and the regional District Health Authorities (DHAs). These approaches are designed to encourage health and wellbeing using a wide range of interrelated programs, actions and activities and may involve the combined efforts of governments, professional organizations, public health professionals, health practitioners, individuals, and communities.

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[2] Formerly known as the Nova Scotia Department of Health Promotion and Protection

Preventing and reducing cancer rates in Nova Scotia can be approached on two different levels: 1) broad-level population health based policy/legislation and 2) health promotion strategies targeted and tailored for specific demographics. The Population Health Model highlights the importance of developing policy and legislation to support equitable socio-economic contexts that enable healthy living and reduce health disparities which may contribute to cancer (Daniels et al., 1999; PHAC, 2001). In Nova Scotia, examples of population-centred health promotion strategies include the provincial *Tobacco Control Strategy* (Pyra Management Consulting Services, Inc., 2007), the *Chronic Disease Prevention Strategy* (NSCDPS, 2003) and the new legislation to restrict tanning bed use by Nova Scotians under 19 years of age (NSHPP, 2010). These health promotion strategies are viable capacity-building mechanisms for influencing long-term health and economic outcomes by reinforcing positive cancer-relevant health behaviours (Saint-Jacques, Dewar, Gao, MacIntyre, & Walsh, 2006).

In addition to institutional and community factors, the Population Health Model also recognizes the importance of the intrapersonal determinants of young adult health. Models of health behaviour such as the Theory of Reasoned Action (TRA) (Ajzen, 1991), Theory of Planned Behaviour (TPB) (Ajzen, 1991; Montano & Kasprzyk, 2002), Self-Determination Theory (SDT) (Deci & Ryan, 2008), and the Health Belief Model (HBM) (Janz et al., 2002) suggest that aggregates of cognitive-motivational variables play a role in the initiation of health behaviours and practices. For example, young adults' attitudes about health behaviour are shaped by perceived susceptibility to ill-health, their perceived control of committing to the health-protective behaviour, their motivation and intentions,

(Ajzen, 1991; Montano & Kasprzyk, 2002) and the information seeking behaviour that informs their perspectives and actions (Kelly et al., 2010).

These theoretical constructs are reliable predictors of a variety of health protective behaviours and they are important components of health promotion strategies and interventions (Ajzen, 1991; Montano & Kasprzyk, 2002; Tyc et al., 2004). While the intention of this study was not to test the validity of these health behaviour theories, the literature suggests that surveys featuring young adult cancer prevention should include questions guided by these theories. Accordingly, many of the intrapersonal components of the Population Health model that were selected for this project are based on these constructs and are outlined below.

Personal health assessment. Personal health assessments offer a wide range of personal health information that could not otherwise be easily achieved. Self-rated health status invites individuals to describe their quality of life, all aspects of physical and mental health, and their perceptions of vulnerabilities and resiliencies to ill-health (Idler, Leventhal, McLaughlin, & Leventhal, 2004; Starfield, 2001). In Canada, when asked to rate their health on a scale from "poor" to "excellent" (Statistics Canada, 2010), 70% of young adults[3] perceived their health to be "very good" or "excellent" (PHAC, 2011).

Personal history with cancer. One of the most commonly used predictors of perceived cancer risk is an individuals' personal cancer diagnosis, a family history of cancer, and/or having had a close friend receive a cancer diagnosis (DiLorenzo et al.,

[3] The definition of 'young adult' was not specified.

2006; Lykins et al., 2008). Reporting a personal history with cancer has been shown to be positively related to self-efficacy behaviours around cancer screening (DiLorenzo et al., 2006) and actively seeking cancer-related information (Shim, Kelly, & Hornik, 2006). Also, knowing someone who has been diagnosed with cancer has been linked to increased knowledge about cancer risk (Bendelow, Williams, & Oakley, 1996).

Perceived susceptibility (risk perception). Attitudes about health behaviour and control beliefs are also influenced by an individual's perception of risk of contracting a health condition (Janz et al., 2002; Kaptein et al., 2007; Tyc et al., 2004). Perceived vulnerability is directly related to the uptake of protective health behaviours (Kaptein et al., 2007). For example, risk perceptions have been found to be positively associated with protective behaviour such as breast self exams (Kaptein et al., 2007; Moser, Mccaul, Peters, Nelson, & Marcus, 2007) and inversely related to engagement in health-risk behaviours such as alcohol consumption (Tyc et al., 2004).

Perceived control (control beliefs). According to the Theory of Reasoned Action and the Theory of Planned Behaviour, the concept of perceived behavioural control is related to self-efficacy and describes an individual's beliefs about the presence of factors that may facilitate or impede performance of the behaviour (Ajzen, 1991; Montano & Kasprzyk, 2002). A positive attitude about a health behaviour leads to increased levels of perceived control and a stronger intention to execute the behaviour and vice versa. The Health Belief Model also suggests that perceived barriers to improving or initiating health behaviours contribute to control beliefs (Janz et al., 2002). Individuals may (subconsciously or consciously) identify possible harmful or negative aspects to adopting

health behaviours and assess the perceived benefits against the perceived harms (Janz et al., 2002). For example, personal investments in health practices such as engaging in more frequent physical exercise may be impeded by the perception that going to the gym may be time-consuming, expensive, difficult or stressful.

Personal motivation and self-determination. Understanding what motivates young adults to practice healthy behaviours and knowing more about their personal priority and value systems is key to establishing tailored health promotion strategies. The difference between self-determined motivation and controlled types of motivation is an important component of Self-Determination Theory. Those with self-determined motivation believe their health behaviours are guided by personal choice and autonomy while people whose motivation is not self-determined feel their behaviours are the result of external controlling pressures or factors (Deci & Ryan, 2008; Hagger & Chatzisarantis, 2009). Self-Determination Theory research has shown that self-determined motives positively affect behavioural engagement and can be either supported or hindered by environmental influences such as social support or social isolation (Deci & Ryan, 2008; Hagger & Chatzisarantis, 2009).

The Theory of Planned Behaviour and Self-Determination Theory connect intention and motivation to health behaviour by providing a foundation for categorizing influences for decision making into personal, social and system-based contexts. The literature demonstrates a need for more focused attention on contextual factors and building an understanding of how young adults' personalized meanings and perceptions and of how their life situations facilitate or hinder their ability to understand and manage

cancer risk. Thus, qualitative research has been recommended to build inductively-derived knowledge grounded in the experiences of young adults.

The Social Context of Cancer Prevention

Studies on 'risky behaviour' and the influences on that behaviour are valuable but can be limited in scope as they may only explore behaviours and lifestyle choices within a biomedical framework or disease discourse (Frohlich et al., 2001; Oakley, Bendelow, Barnes, Buchanan, & Husain, 1995; Woodgate & Leach, 2010). In order to influence cancer prevention in young adults, socio-ecological models suggest/imply it is necessary to understand the individual within larger social and societal contexts. Elder et al.(2007) suggest that young adults require customized and context-specific interventions because predictors and lived experience will vary between groups and life-stages (Elder et al., 2007). Achieving a heightened understanding of the complex and various influences that direct cancer protective and health-related decision making may serve to inform health promotion and risk communication strategies that are more tailored to the target population. The factors described in the section below have been selected to help position health behaviour within social and system-based contexts to better understand the qualifiers that may influence improved health outcomes for young adults.

Socio-demographic factors as determinants of health. Demographic categories such as age, race/ethnicity, gender and socio-economic status are major determinants of health that must be understood in order to inform and develop health promotion strategies. Often these characteristics are viewed as individual determinants of health and health behaviour. For instance, studies have shown that young adult males are more

prone to taking risks related to sexual behaviour, driving, and drug use when compared to their female counterparts (Hess & Hagen, 2006; PHAC, 2011); but is being a male of a certain age a true predictor of health outcomes? In the context of health promotion, basic demographic information tells only part of the story. In order to approach health more holistically, these determinants should not be limited to *factors of individual risk* as much as they should be assessed as examples of *socially constructed conditions.*

Jeffrey Arnett, a leading researcher on young adult health, advocates for an improved appreciation of how gender-specific roles and behaviour are the product of cultural expectations (Arnett, 2004). Males and females may be treated differently, maintain gender-specific expectations for themselves or adopt behaviours that they believe to be appropriate based on the legacy of societal guidelines (Arnett, 2004). Similarly, expectations for behaviours according to age and life-stage are also socially constructed. For example, definitions of 'adulthood' are influenced heavily by social class: people with lower levels of education and lower levels of income typically expect earlier deadlines for leaving the family home, acquiring full-time employment, getting married and/or becoming a parent (Franke, 2010). This more comprehensive consideration of socio-demographic factors allows for an enhanced understanding of young adults and their living environments, mechanisms for social support, access to health services, and capacities to address and respond to their personal health needs (Warnecke et al., 2008).

In order to begin to shape some of these intrapersonal and socio-cultural contexts, health promoters need to understand how young adults search for and interpret health information.

Information and information seeking behaviour. Young adults make a lot of important decisions related to cancer prevention such as what foods to eat, how often to exercise, and whether to wear sunscreen. Health information is ubiquitous and the communication landscape is complex therefore understanding how young adults engage in information-seeking strategies is an important step in ensuring that the information needs of the target audience are appropriately addressed (Janz et al., 2002; Oakley et al., 1995; Rutten, Squiers, & Hesse, 2006; Viswanath et al., 2006). However, most research in this area has focused on *cancer patients* actively looking for specific cancer-related information such as treatment options (Kelly et al., 2010; Shim et al., 2006; Tian & Robinson, 2008). While people with personal experience with cancer are more likely to seek cancer information (Shim et al., 2006), less is known about the cancer- related information seeking habits of the general public who are less strategic about their information searching (Kelly et al., 2010).

Acquiring health information can be incidental and non-strategic: young adults may see advertisements for a cancer charity event on television, read a news article highlighting recent cancer research, hear about a friend with cancer on a social media site, or simply know of someone with a cancer experience (Kelly et al., 2010; Viswanath, 2005; Viswanath et al., 2006). Young adults can also employ more vigilant approaches such as referring to peers or family members for advice, consulting health professionals,

or actively searching for information on the Internet or at the library (Heaney & Israel, 2002; Kelly et al., 2010). Interpersonal communication is an important component in health-related decision making and the role and contributions of family members, friends, classmates, teachers, and medical professionals play a key part in informing decision making. Although physicians may be a *preferred* source of information, most people rely on the Internet as their primary access point and use the Web to supplement information acquired from their health care providers (Kelly et al., 2010; Ybarra & Suman, 2008).

Research suggests that how people search for health information varies a great deal and depends on the topic (i.e.,, searching for 'colonoscopy' instead of 'PSA'), and on their information-seeking style (i.e.,, searching the web and/or journals) (Kelly et al., 2010). Recent advances in technology also point to the importance of understanding how people use different devices to search for health information. *Healthline*, an American health search and information services provider, reported in 2011 that the most frequently searched health terms on their website by people using their desktop and laptop computers were related to serious chronic conditions such as cancer (Healthline, 2011). The company also found that consumers turn to mobile devices (such as Smartphones and cell phones) to search for information related to private issues, such as those related to sexually transmitted diseases (Healthline, 2011).

Gender and age differences in information seeking have also been reported in the literature (Kelly et al., 2010; Shim et al., 2006; Ybarra & Suman, 2008). Women are more likely to actively seek out general health information from a variety of sources, but men are more likely than women to search for information about sensitive health issues

by using the Internet exclusively (Ybarra & Suman, 2008). While women typically look for general health information on the Web, they are also more prone to report feelings of frustration and negative attitudes towards computers and the Internet and report dissatisfaction with the effort it takes to find information (Ybarra & Suman, 2008). Adolescents search online for information about personal problems where young adults and older people (who may experience more health problems and are more likely to be a parent or caregiver) tend to search for health information to support a loved one (Ybarra & Suman, 2008). Further, younger people are more comfortable using the Internet and can find the information they are looking for quickly and easily (Djamasbi, Siegel, & Tullis, 2010; Ybarra & Suman, 2008) but have reported leaving health-related websites because of what they considered to be unprofessional design (Djamasbi et al., 2010; Fox & Rainie, 2002).

Mass media campaigns and clever social marketing techniques to promote health behaviours have become key communication devices for public health and health promotion practitioners (Eke, 2011; Higgins, 2011; Rothschild, 2010). As a result, health information is growing in complexity and magnitude and can be disseminated quickly and easily through the Internet, radio, television and print media (Han, Moser, & Klein, 2007; Randolph & Viswanath, 2004; Rimer, Briss, Zeller, Chan, & Woolf, 2004). Notably, this revolution in communications has changed the landscape of health care. Individuals are now empowered with more information-based opportunities to maintain more control over their own health and the use of this information is changing the

behaviour of the health consumer (Fischer & Reuber, 2010; Rimer et al., 2004; Suarez-Almazor, 2011).

Theoretically, increased exposure to health information should build the capacity of Canadians to make informed and competent choices with regard to screening, treatment and preventive behaviour. However, the knowledge-behaviour link can be tenuous. Perceived ambiguity represents an uncertainty about the reliability, credibility, or adequacy of one's information (Han, Moser, & Klein, 2006) and research has demonstrated that when people have access to complicated health-based information they may become confused instead of empowered (Han et al., 2007).

Ambiguity is intensified when an individual believes that the suggestion of risk is unreliable, inconsistent or when expert opinions and advice are contested (Han et al., 2006). This sense of uncertainty influences people's judgments of potential risks and risk behaviour. For example, in the 1990s a drug known as tamoxifen was introduced as a chemo-preventive drug therapy to prevent breast cancer but was later linked to endometrial cancer (Crabbe, 1996; Toma, Ugolini, & Palumbo, 1999). Although the benefit of reducing breast cancer has outweighed the risk of endometrial cancer, doubt was cast via negative media coverage leaving a cloud of public uncertainty. Similarly, media outlets placed doubt in the public mind with respect to the value of mammography screening when a 1997 Canadian study suggested that mammography offered little benefit for reducing breast cancer mortality (Begg, 2002).[4] While such media hype may

[4] In 2011, the Canadian Task Force on Preventive Health Care (Gøtzsche, 2011)

have various consequences, many experts contend that it sometimes plays a role in increased public confusion, ambiguity and scepticism about health recommendations (Han et al., 2006).

Information-seeking strategies provide a personal basis of knowledge, awareness, attitudes and motivation which inform health-related decision making and behaviour (Shim et al., 2006). Shim et al. (2006) reported that people who sought out health information were more likely to eat fruits and vegetables, exercise more often and were less likely to report tobacco use. Information seeking has also been positively associated with mammography screening, colonoscopies and PSA testing (Shim et al., 2006). Nevertheless, although studies have shown that information seeking is *associated with* cancer-relevant behaviours, it is difficult to claim that it *results in* the adoption of healthier practices (Kelly et al., 2010).

From a Population Health perspective, it is perhaps more appropriate to consider information seeking and the link to health behaviour as part of a broader system of processes and relationships. For example, cancer screening participation can be assessed using a framework that links health information to psychosocial determinants and socioeconomic inequalities (von Wagner, Good, Whitaker, & Wardle, 2011). The mere availability of information is not enough to drive behaviour change; it is also important to consider how factors such as age, gender, education, illness experience, confidence in

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outlined new recommendations on screening for breast cancer in women at average risk aged 40-74, years of age. Based on current evidence, screening with mammography has not been shown to reduce the occurrence of advanced cancers therefore the guidelines advise against routine screening of women aged 40-49, but recommends screening women aged 50-74 every 2-3 years.

navigating the health care system, perceived risk, and perceived control impact how an individual processes and uses health information (von Wagner et al., 2011). Population-wide programming relies on information about individual beliefs, perceptions, awareness and motivation to create relevant, responsive and sustainable health interventions.

The Population Health elements selected for this study can be reviewed in Figure 1. The diagram demonstrates the bidirectional relationship between elements and across three domains (society/culture, the social context and the level of the individual). While all three contexts are important, the primary focus of this research was on intrapersonal determinants of young adult cancer prevention.

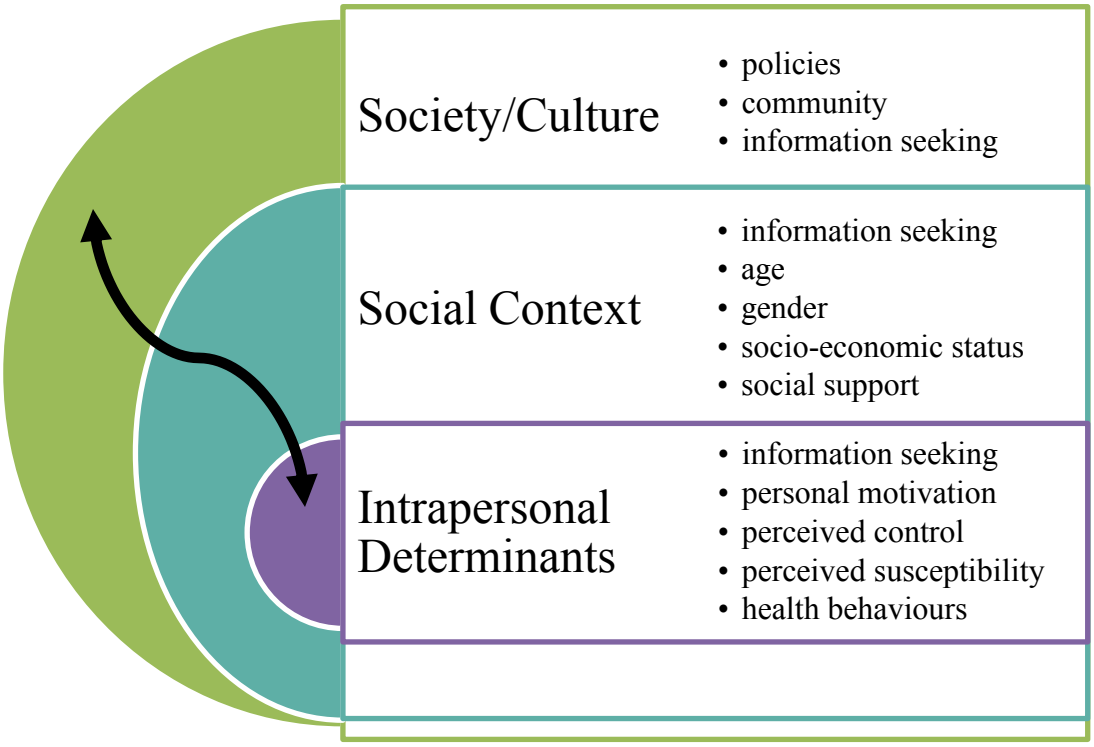

Figure 1. Population Health elements of young adult (age 17-29) cancer prevention.

Cancer Prevention and Health Promotion for Young Adults in Nova Scotia

In Nova Scotia, chronic diseases such as cancer account for almost three quarters of all deaths in the province, and are the largest causes of premature death and hospitalization (NSCDPS, 2003). Some of the notable geographic differences in cancer occurrence that distinguish NS from the rest of Canada are likely due to a combination of influences including variation in early disease detection and variations in the prevalence of cancer risk factors (CCS/National Cancer Institute of Canada [NCIC], 2008). Since these variations are affected by personal health beliefs, awareness, risk perceptions, and modifiable lifestyle and behavioural factors, the implementation of positive, population-wide change could significantly reduce incidence and mortality rates (Stein & Colditz, 2004). Likewise, a substantial portion of direct and indirect health-care expenditures could also be avoided through the execution of effective preventive measures.

Unfortunately, despite the best efforts of provincial and regional strategies to improve health and engage citizens in improving their lifestyles, Nova Scotia continues to rank poorly in national comparisons. According to the data from the *2007 Canadian Community Health Survey (Cycle 3.1)*, over 22% of Nova Scotians report using tobacco products regularly, slightly less than half of Nova Scotians reported being physically active, 58% were categorized as overweight and over 10% identified as heavy frequent drinkers (Nova Scotia Department of Health, 2007). The 2008 Canadian Tobacco Use Monitoring Survey (CTUMS) (Health Canada, 2008) results demonstrated notable decreases in tobacco use for the 15-19 age category but young adults aged 20-24 represent 30% of tobacco users (the third highest in the country). Additionally, 23.4% of current drinkers in Nova Scotia exceeded recommended drinking guidelines (2 standard

drinks per day with weekly limits of 14 standard drinks for men and nine for women) (CAMH, 2008), with young adults maintaining the highest rate of non-compliance at 49.1% (NSHPP, 2007b). Given these discrepancies between health messages and outcomes, it is important and timely to examine this Nova Scotia sub-population more closely to identify gaps in awareness, health-related behaviours and perceptions of risk.

The success of Population Health and health promotion strategies relies heavily on achieving an enhanced understanding of the socio-ecological constructions in which people live, work and play (Figure 1). In Canada, the 'young adult health experience' can be considered using many metrics and characterizations. In 2006, youth and young adults (aged 12-29) made up 24% (7.5 million) of the country's population and approximately 54% were young adults (aged 20-29) (PHAC, 2011; Statistics Canada, 2007; 2008). Although the census data show that 42% lived in their family homes, this life stage represents a period of transition and mobility for many young adults: 22% were living alone or with other non-relations and more than 15% were married, living with a common law partner (18%), or were themselves parents (3%) (PHAC, 2011). Further, approximately78% of all young adults live in urban areas (many move to urban areas to pursue post-secondary education and employment). An increasing number of young adults are enrolling in post-secondary education than in the past: in 2009/10, 40% of young adults (aged 18-24) were attending college (15%) or university (25%) (Canadian Council on Learning, 2010). In 2009, 74% of young adult Canadian females had at least some post-secondary education compared to 65% of young adult males (Organisation for Economic Cooperation and Development, 2010).

This study provided a depiction of young adulthood for Dalhousie University students in Halifax, NS. Thus, it is fitting to enhance the reader's appreciation of the local context and begin to populate the layers of the model featured in Figure 1 using a Nova Scotia perspective. Halifax is a port city on the eastern coast of Canada and the Dalhousie campus is located within walking distance to the downtown core (shops, grocery stores, restaurants and bars), hospitals, fitness facilities, parks and hiking trails. Dalhousie offers a range of undergraduate and advanced degrees including engineering, nursing, medicine, law, theatre studies, etc., and standard fees for tuition and books cost upwards of $8000.00 (CDN)[5]. Campus services include a student health clinic, student residences, cafeterias, café and a pub. Students also receive a membership to Dalplex (the campus fitness facility) as part of their tuition package.

This preliminary model will be augmented by identifying the multiple factors that contribute to the understanding and management of young adult cancer prevention. It is important to understand how intrapersonal determinants (behaviour, perceived susceptibility, perceived control, motivation), the social context (age, gender, socio-economic status, social support), and society/culture (policies, community) interrelate and impact health outcomes including young adult cancer risk. While the population health model implies that determinants mutually influence each other, 'information' is a somewhat unique factor in that it can be conceived from an intrapersonal standpoint (i.e., the behaviour of seeking information), from a social context (i.e., equity issues in the

[5] Based on entry-level tuition for an arts and social science program in 2011 (http://www.dal.ca/admissions/money_matters/tuition_fees_costs/fee_calculator.html)

accessibility of information) and within the societal/cultural context (i.e., the information that is provided within a given context).

Purpose and Research Questions

Understanding and identifying factors influencing healthy behaviours are critical for the development of health promotion interventions for young adults. A health promotion approach to cancer prevention demands a comprehensive appraisal of the health behaviours, intrapersonal determinants and societal and cultural influences that impact the adoption of healthy practices, and perceived obstacles for maintaining and improving health. This study represents a contribution to a relatively untapped niche of research by providing a relevant and contemporary depiction of cancer-related health management strategies of university-aged adults (aged 17-29). In an effort to incorporate an ecological perspective, the experimental design was guided by the following research questions:

- What cancer-related risk and protective behaviours do the young adults in this sample practice?
- What are the cancer-related intrapersonal determinants reported by young adults?
- Are the intrapersonal determinants reported by young adults (personal health assessment, personal experience with cancer, perceived susceptibility, perceived control, motivation/self determination and information seeking behaviours) related to their health behaviours?

- What do young adults report as barriers and facilitators to adopting, achieving, and maintaining good health practices?

Based on the evidence presented in the literature review, some hypotheses were formed to test the influence of age, gender, and intrapersonal determinants on health behaviour. For example, with the exception of sun-seeking (where it was expected that females would more actively engage in a negative health practice than their male counterparts) (CCNS, 2008), it was anticipated that females would report healthier behavioural practices than males. It was also expected that female students would report different strategies for health-related information seeking and that males would report higher levels of alcohol consumption. Age differences in health behaviours have also been widely reported and it was anticipated that younger students would report higher levels of physical activity than older students.

Chapter Summary

This chapter discussed the significance of advancing an enhanced understanding of young adult health with respect to cancer prevention. The basic components of key population health and health promotion concepts (including cancer-relevant influences) that guided the development of the study's research instrument were provided. A literature review informed the research questions related to the intrapersonal, social and cultural influences on cancer-relevant health behaviours, and a research model was outlined. Chapter Two will describe in greater detail the methods used.

Chapter Two: Methods

In an effort to inform the context of young adult health and cancer prevention, it was important to develop a descriptive study and survey instrument that demonstrated the value of self-reporting. Capturing the unique perceptions and perspectives of young adults was a way of working *with* the target population and including them in the research process as content experts (Topolski, Edwards, & Patrick, 2004). The survey was designed to include quantitative data to provide a snapshot of young adult health and for ease of comparison. The qualitative component provided an opportunity for young adults to use their own words to describe their personal viewpoints and experiences that can only be known to them (Sandelowski, 2000; Topolski et al., 2004).

An online survey (titled: *University Student Cancer Awareness and Prevention Survey*) was developed based on information gleaned from the literature review and using related content from similar cancer prevention awareness surveys (see Appendix A). The survey was delivered using Opinio, an online survey management tool supported by Dalhousie University, and included a mix of Likert scale, nominal scale, and short answer questions plus a small variety of open-ended queries.

The adoption of an online survey tool was completed after considering the advantages and limitations of online data collection. When compared to paper-and-pencil options, Web-based surveys offer an efficient, inexpensive, and convenient alternative for gathering information (Lefever, Dal, & Matthíasdóttir, 2007). Further, secure online data collection tools provide researchers with safe mechanisms that not only protect against the loss of data but also simplify the transfer of data to a database for analysis (Carbonaro

& Bainbridge, 2000). Some disadvantages to web-based surveys (such as an increased chance of fraudulent responses, the risk of respondents postponing prompt responses, or submitting incomplete responses, the need for respondents to have access to a computer) have been noted in the research (Carbonaro & Bainbridge, 2000; Lefever, etal., 2007). Being aware that most university students enjoy consistent access to web-connected computers, the researcher committed to implementing strategies that limited falsified submissions and encouraged prompt participation. Thus, the web-based component was adopted because it offered young adults increased survey accessibility, an easy-to-use and familiar format, and a convenient, inexpensive, environmentally friendly mechanism for reliable data collection.

Participants

University students are an easily accessible, relatively healthy component of the population with similar education backgrounds. University student populations also offer a unique potential for the delivery of health promotion programming. The age range (17-29) was selected based on categories outlined in current literature on young adulthood but was expanded slightly (from 18 through 29 to 17-29) to represent the possible early graduation from high school and younger age of entry into university in Nova Scotia.

The final participant tally indicated that 527 students opened the survey between June 1 and July 17, 2010, however 43 individuals opened the survey but did not complete the five preliminary questions related to socio-demographics and were, therefore, prohibited by the Opinio survey program to advance to subsequent questions. Data for these 43 cases were determined to be 'missing at random' and these cases were excluded

from the study. Additionally, some cases were eliminated from the analysis of specific grouped variables because they did not offer enough responses to permit inclusion. A record of eliminated cases and their related demographic information is provided in Appendix B.

The final 484 participants were between the ages of 17 and 29 (mean age=21.5 years, SD=2.5), 361 (74.6%) of the respondents were females and 123 (25.4%) were males, as well 53.5% of participants indicated they had spent most of their life residing outside Nova Scotia. When asked which ethnic group they best identified with, 69.2% of students described themselves as Caucasian. One hundred and thirty-three (27.5%) identified as having an annual family income of more than $100,000; 79 (16.3%) indicated $81000 - $100,000); 82 (16.9%) indicated $61,000 -80,000); 108 (22.3%) indicated annual family incomes of below $61,000, 35 (7.2%) indicated they had been living independently of their parents/family for more than five years, and 47 (9%) preferred not to disclose their income. According to Dalhousie University, of the approximate 17000 students enrolled each year, 45% are male, 55% are female, 44.4% are from provinces other than Nova Scotia and 10.5% are from countries outside of Canada (Dalhousie University, 2011). Thus, this sample did not closely approximate Dalhousie's distribution as females were over-represented.

Of the 484 survey participants, 394 (81%) people completed the sentence stem: "It would be easier to improve my health behaviour(s) if..." and 348 (72%) completed the sentence stem: "I think health promotion/public health messages about improving my own health would be more relevant to my age group if..." All quotes were reviewed and

subjected to the content analysis but 67 students indicated they did not want their quotes used in the final report. Their corresponding responses were assigned unique formatting in both the PASW 17.0 and NVIVO 8 programs to ensure confidentiality.

Some additional characteristics about this sample are worth noting. Over 500 students followed a hyperlink in an email message from the researcher and forwarded by their program administrator in June 2010 (several months after classes and exams had ended). The majority of student respondents completed all 42 questions and many reached the 255 character limit set for the final two long-answer response queries. Even though the long-answer queries were optional, several students offered brief and friendly apologies for not being able to offer definitive answers to the questions.

Recruitment. On June 1, 2010 the weblink to the Opinio survey was embedded in a personalized email and sent to the administrative and program support staff of all undergraduate and graduate Dalhousie university faculties to capture greater diversity in age ranges and life experiences (see Appendix C for a copy of the email request). Administrative support staff was requested to forward the embedded email with the survey weblink to their student distribution lists.

The survey was closed on July 17, 2010 after the Opinio summary report indicated that 527 participants had opened the survey (the expected *N* value was 250). Submissions were reviewed to ensure that the information collected was sufficient to allow for data analysis prior to disabling the survey.

Measures

The online survey represented a multiple methods approach to exploring young adult cancer prevention. Combining quantitative and qualitative methods provided an opportunity to increase the "robustness of our understanding" (Mingers, 2001). The quantitative queries were designed to collect data that could be analyzed and organized into descriptive statistics while the qualitative questions were created to gain more knowledge and allow for the development of more complete explanations (Gil-Garcia & Pardo, 2006).

The questionnaire content was developed using author-compiled items from peer-reviewed literature, information from local and national community based organizations, and existing surveys such as CTUMS, the Youth Smoking Survey (YSS) and the Health Information National Trends Survey (HINTS). Health Canada's Youth Smoking Survey (YSS) is also a biennial survey procuring national and provincial data on youth smoking rates as well as attitudes and behaviours of Canadian children and adolescents with respect to tobacco (University of Waterloo, 2007). HINTS is a biennial telephone survey conducted by the American National Cancer Institute (NCI) to support scientific research and to advance the discipline of cancer communication (Han et al., 2006; Rutten et al., 2006). HINTS surveys a nationally representative sample of US adults aged 18 and over and assesses several cancer-related cognitions known to be determinants of cancer-protective behaviour; perceived preventability of cancer, perceived cancer risk, cancer related worry and perceived ambiguity about cancer prevention recommendations (Han et al., 2007; Rutten et al., 2006).

This survey was composed of 42 questions including Likert-scale, categorical scale, dichotomous variables, and long-answer questions (see Appendix A). Dichotomous variable questions were satisfied using 'yes' and 'no' checkboxes while Likert scale questions were designed to measure cancer-related attitudes and perceptions of young adults and included appraisals of ranges of individual agreement with various statements; the likelihood of engaging in a particular behaviour; the frequency of specified behaviours and activities; the level of importance of specified issues, and the quality of specified constructs and experiences.

Content validity. A draft survey was designed using information gleaned from peer-reviewed literature and sample questions from existing surveys. To confirm appropriateness of content, local health experts from Halifax, NS were asked to review the prepared survey and provide feedback, identify unsuitable and/or redundant items, and suggest alternative and additional questions. This strategy ensured that the most important/relevant questions and topics were represented. The panel of experts included a nutritionist, a chronic disease specialist and a tobacco reduction coordinator from Public Health Services (CDHA), a Board member from SunSafe Nova Scotia and a young adult cancer survivor.

The panel of experts received a brief outline of study objectives and a full copy of the draft questionnaire with references. After reviewing the list of proposed questions, individuals were asked to make written comments and offer relevant background information regarding any additions, omissions or links to be made. In consultation with my thesis supervisor, all written suggestions were then compared to the information

offered in the literature review and were included, blended in or rejected based on relevance and balance with other questionnaire segments.

Survey readability. Survey readability was evaluated using the Flesch Kincaid readability formula which offers scores out of 100 points based on the number of words and the number of syllables in a sentence (the higher the score, the easier it is to understand the document). While scores of 0.0 to 30.0 are suitable for university students (Kincaid, 1975; Paasche-Orlow, Taylor, & Brancati, 2003), this survey was designed to achieve a score of approximately 60 to reach a grade 10 reading level to accommodate ease of readability for the entire target group (aged 17-29) by helping increase the understanding of concepts and instructions, improve the quality of responses and reduce the amount of participation time. According to the Readability Statistics Tool offered in Microsoft Word 2007, the survey scored 61.4.

Microsoft Word's Readability Statistics Tool calculates the Flesch Kincaid score by estimating the number of syllables per passage (Friedman & Hoffman-Goetz, 2006). While the correlation between computer software and manually calculated comparisons is excellent, because computer software programs recognize each period as the end of a sentence, abbreviations, numbers with decimal points and bullets may offer a readability score that underestimates the level of difficulty in the sample text (Friedman & Hoffman-Goetz, 2006). Thus, follow-up editing was incorporated using feedback offered by the content reviewers and the pilot test volunteers (described below).

Pilot testing. A pilot test of the questionnaire (Appendix D: University Student Cancer Awareness and Prevention Survey) was performed prior to online distribution to

provide information on questionnaire length, readability, and areas where modifications to questions were needed. Pilot-testing was completed by four volunteer university-aged individuals (aged 17, 23, 25 and 29) including one cancer survivor. The purpose of the pilot test was explained and participants were asked to provide feedback with respect to their understanding and perceptions of the survey questions. Participants were also assured that their individual responses would not be recorded or reported as part of the formal study. While the final survey was expected to take 25 minutes, the pilot test was extended to a period of one hour to provide enough time for written feedback. Feedback from the pilot test participants was reviewed and changes were made where appropriate.

Upon completion of the pilot test, participants rated each question based on the following categories:

a) Were the questions understandable, clear and straightforward?
b) Were the scales offered adequate and appropriate?
c) Were any queries written in a manner that could be answered in more than one way?
d) Were any queries written in such a way that the answers were obvious/loaded?
e) Were any of the queries offensive or insulting?

Participants indicated agreement by circling "yes" or "no" by each item and a summary of concerns guided revisions for the final survey. Some minor grammar and formatting suggestions were incorporated to make the survey more reader friendly and less repetitive. As a result the final survey was reduced from 44 questions to 42 questions and was transferred to an online format which provided the opportunity to blend several

questions into matrix format and to employ conditions that prevented survey participants from having to review questions that were not applicable. The original survey pilot test participants were invited to trial the online survey version and the reported irregularities (spelling and grammatical errors, duplicate questions and formatting issues) were resolved by the researcher.

Details of online participation. The research questionnaire was distributed using Opinio which is accessible to any Dalhousie student with on-campus or remote access to the Internet. Participants were asked to use their Dalhousie student email account to log onto a confidential and secure survey website to gain access to the study questionnaire. The survey design required students to answer each question before advancing. Students were not provided the option to revisit or review answers and all responses to the questionnaire items were recorded.

Screening questions. The email recruitment campaign highlighted the age specification for inclusion and a qualifying question was built into the survey (Appendix A). Question 1 provided an opportunity to screen participants based on their enrolment at Dalhousie University and age. Visitors to the survey site who indicated that they were not Dalhousie students or did not fall within the selected age range were thanked for their interest via a pop-up window that automatically closed the survey and prevented further participation. Question 2 asked students if they agreed or disagreed with having their personal quotations used in the final report.

Demographics. Certain socio-demographic categories (such as age, gender, geographic location, ethnicity and socio-economic status) have been reported as strong

determinants of health perceptions, health behaviours, and health outcomes (Fromme, Corbin, & Kruse, 2008; Tyc et al., 2004; Woodgate & Leach, 2010). Questions 3 -7 elicited each student's demographic profile. Students were asked to identify their gender, age, ethnic/cultural background and socio-economic status. These categories and ranges were based on standard examples offered by Statistics Canada (Statistics Canada, 2006). Further, because this study was designed to offer support for future health promotion strategies in Nova Scotia and because Dalhousie welcomes students from all over Canada and other countries, students were also asked to indicate if they had spent more than half their lives in Nova Scotia so to offer a mechanism for comparison.

Health behaviours. Questions 27 to 39 were related to health behaviours:

Propensity for behaviour change. Question 27 asked students to reply "yes" or "no" to the question: "Have you ever changed any of your health behaviours?" This question was developed to provide a description of young adult propensity for changing health behaviour and may be helpful information for designing risk communications and social marketing campaigns.

Independent health-seeking behaviour and self-assessment exams. Early detection and treatment of cancer is facilitated by visits to health care providers and by performing self-assessment exams (Mulye et al., 2009). Based on modified questions from the HINTS survey, in questions 28 and 29 students were asked to indicate how often they arranged a visit with their doctor without the assistance of a parent/guardian and also indicate how often they have performed self-assessment exams (such as a breast exam or testicular exam) in the past year ("zero", "one", "two", and "three or more times").

Tobacco-related behaviours. In questions 36-39, students were asked about their tobacco-related behaviours. Students were asked to rate how often they are knowingly exposed second-hand tobacco smoke using questions modified from the HINTS survey: "How often do you willingly/knowingly expose yourself to second hand smoke (also known as environmental tobacco smoke)? For example, how often might you attend gatherings where other people are smoking?" with the response options of: "never", "rarely", "often" and "regularly" (National Cancer Institute, 2007).

Based on standardised questions from CTUMS, personal tobacco use was recorded using the response choices: "never", "current non-smoker", and "daily/occasional smoker (having ever smoked 100 cigarettes and at least 1 cigarette in the past 30 days)" (Health Canada, 2006a). Students were then asked ("yes" or "no") if their tobacco use is exclusively related to their alcohol consumption: "Do you only smoke when you drink alcohol?" and individuals who identified as tobacco users were asked "Have you ever stopped smoking for one day or longer because you were trying to quit smoking?" based on the same question used to gauge propensity for behaviour change from the HINTS survey (National Cancer Institute, 2007).

Alcohol consumption. Question 35 was developed using the CAMH low risk drinking guidelines that indicate a standard drink as 13.6 g of alcohol. Students were asked to indicate how often they consume alcohol per week: "Zero", "No more than 9 drinks per week", "No more than 14 drinks per week" or "More than 14 drinks per week (CAMH, 2008)." These responses were matched with gender to determine level of risk.

Diet. According to *Canada's Food Guide*, individuals should consume between 5 and 10 servings of fruits and vegetables each day (depending on gender and age) to maintain good health (CCNS, 2007). Based on the modified version of questions used in HINTS, question 31 asked students to indicate how often they eat a well-balanced diet using the question: 'How much do you agree/disagree with the following statement: 'I generally eat a well-balanced diet that includes fruits, vegetables, whole grains, and protein sources' and the options of: "strongly agree", "somewhat agree", "somewhat disagree", "disagree strongly" (National Cancer Institute, 2007).

Physical activity. Question 30 was developed based on information gleaned from HINTS where exercise frequency was assessed by asking students to describe their moderate to intense physical activity in a typical week (i.e., comparable to walking as if in a hurry). Response choices were scored from "zero" to "three or more times" (National Cancer Institute, 2007).

Obesity/Body Mass Index. Body mass indices such as the BMI can be used as a valuable predictor of health risk (Gallagher et al., 2000; National Cancer Institute, 2007). In questions 8-9*, s*tudents were asked to indicate their current body weight (lbs.) and height (feet and inches) and this information was used to calculate individual BMIs using the formula: weight (lb) / [height (in)]^2 x 703(Gallagher et al., 2000; National Cancer Institute, 2007).

Sun safety. Questions 32-34 were developed using the results from *Canada's 2006 National Sun Survey Highlights Report* (which surveyed over 7000 Canadians aged 16 and older) students were asked about their sun protection behaviour (i.e.,: frequency of

use of sunscreen and/or protective clothing) using the options of "never"; "rarely"; "often" and "always"(CCS, 2008b). Finally, students were asked "During June to August of last summer (2009): when you were in the sun for 30 minutes or more, how frequently did you seek shade or avoid the sun between 11am and 4pm?" and offered the options of "never"; "rarely"; "often" and "always" and "I don't know"(CCS, 2008b). Yearly use of artificial tanning devices was gauged using the options: "never"; "1-2 times"; "3-4 times", 5 or more times". Four-point scale scores on each item of behaviour was summed to result in a score with a range of 1-12 (representing the options for the range of a minimum to a maximum qualifier).

Personal health assessment. Self-rated health assessments have been examined as a predictor of health behaviour and are also connected to the concepts of perceived control and perceived vulnerability (Gill & Feinstein, 1994; Starfield, 2001; Tyc et al., 2004; Undén & Elofsson, 2006). Typically, if respondents rate their overall health in a positive way they may perceive themselves to be at lower risk for contracting a health condition and/or may practice more healthy behaviours (Jylhä, 2009). Self-reported health assessments, (represented here by a Likert scale question: Please rate your overall health: poor, fair, average, excellent). Question 10 allowed for students to provide a holistic answer of how they perceive their physical, emotional, social and mental wellbeing (Fayers & Sprangers, 2002; Gill & Feinstein, 1994).

Personal experience with cancer/cancer history. Personal history with cancer is a commonly used predictor of perceived risk, health screening behaviours and information seeking (DiLorenzo et al., 2006; Lykins et al., 2008; Oncken, McKee,

Krishnan-Sarin, O'Malley, & Mazure, 2005; Shim et al., 2006). Students were asked to indicate their personal experience with cancer to assess if their experience influenced their personal health behaviours and to understand how cancer history influenced their perceived susceptibility of developing the disease. In questions 11 and 12 students were asked to indicate if they had ever been diagnosed with cancer and if any of their brothers, sisters, parents or other close family members had ever had cancer.

Perceived susceptibility. Attitudes about health behaviour are also influenced by an individual's perception of risk of contracting a health condition (Janz et al., 2002; Kaptein et al., 2007; Tyc et al., 2004). In question 17, students were asked to describe their perceived cancer susceptibility using a matrix-style question format that incorporated a list of nine potential cancer-causing variables identified in the literature review. These variables included UV exposure, second hand tobacco smoke, tobacco use, sexual behaviour, obesity, dietary intake, alcohol consumption, physical activity, family history of illness/cancer. A range of four risk categories ("no influence", "low", "medium", "high risk" and "don't know") were offered for each variable. Four-point scale scores on each item were summed to result in a score with a range of 0-3 (representing the options for the range of a minimum to a maximum qualifier).

Question 18 was modified from existing surveys and asked: "When you compare yourself to other students your age at Dalhousie University, what do you think are your chances of being diagnosed with cancer in the future?"(National Cancer Institute, 2007). Response options were offered on a four point scale including: "no chance"; "below average"; "average," and "higher than average." The HINTS (2007) survey also

provided the foundations for questions 19 through 22 which assessed the construct of perceived risk using student responses to four statements: “By the time I am old enough to get cancer, there will be a cure and/or more effective treatment”; “It seems like everything causes cancer”; “There’s not much people can do to lower their chances of getting cancer” and “There are so many different recommendations about cancer; it’s hard to know which ones to follow.” Likert scale responses offered were: “No opinion”; “Disagree strongly”; “Disagree”; “Disagree somewhat”; “Agree somewhat”; “Agree,” and “Strongly agree”.

Perceived control (control beliefs). Perceived behavioural control is related to self-efficacy and describes an individual's beliefs about the presence of factors that may facilitate or impede performance of the behaviour (Ajzen, 1991; Montano & Kasprzyk, 2002). Cognitive motivational variables such as control beliefs provide information regarding individual motivation for adopting health behaviours (Tyc et al., 2004). A positive attitude about a health behaviour leads to increased levels of perceived control and a stronger intention to execute the behaviour and vice versa (Ajzen, 1991; Montano & Kasprzyk, 2002). Questions 15 and 16 were designed to describe the level of control students believe they have on their current and long-term health. Responses to “I can control my own actions that directly influence my health” and “My behaviour at this stage in my life will influence my long-term health” were scored using a 6-point Likert scale including the response options: “Disagree strongly”; “Disagree”; “ Disagree somewhat”; “Agree somewhat”; “ Agree”; “Strongly agree”.

Personal motivation and self determination. The Theory of Planned Behaviour and Self-Determination Theory connect intention and motivation to health behaviour. Questions from Bendelow et al.'s (1996) and Oakley's (1995) studies on young people and cancer awareness were modified to help understand more about these factors within young adult culture (Oakley et al., 1995). Several studies have offered mechanisms to measure how "health" is ranked amongst competing personal priorities. For example, in their research on young people and cancer knowledge, Bendelow et al. (1996) and Oakley et al. (1995) asked youth participants to rank 'health' among a pre-defined list of concerns in their current lives and how they thought health might rank as a concern in the future. In Bendelow et al's study, youth aged 15-16 selected 'happiness' over 'health' as a current priority and 'job security' over 'health' as a potential future priority (1996).

Students in this study were asked to rank their top three most important *current* concerns (question 13) and also, what they believe their top three concerns will be in the *future* (question 14). The selection list included: job security, death of self/friend/relative, environmental issues, happiness, cancer, health, violence, financial independence, peace of mind, money, friends, love, family, illness/injury, school. An additional space was provided for students to indicate an unlisted item. Question 40 was created independently to allow for personalized answers with respect to establishing a description of intrinsic and extrinsic motivations for young adults aged 17-29. Using previous studies as a guideline to develop the survey questions, students were prompted to identify the top three personal influences that guide their health-related decision making behaviour from the list of: spirituality, sense of adventure, desire to be fit/healthy, peer pressure,

responsibility to my family, physical appearance, fear of death/illness, career, studies, or "other" (Bendelow et al., 1996; Oakley et al., 1995). These questions helped provide a foundation for categorizing determinants for influencing decision making into personal, social and system-based contexts.

Two long-answer and open-ended questions (questions 41and 42) were created by the researcher to garner information on personal attributions (such as personal motivation, perceived control, and access to resources), regarding the uptake of health promoting behaviours and their perceptions of current health promotion/public health strategies and messaging. Students were asked to provide brief statements (to a maximum of 255 characters) in response to the following sentence stems: "It would be easier to improve my health behaviour(s) if..." and "I think health promotion/public health messages about improving my own health would be more relevant to my age group if..."

Information-seeking behaviour and perceived ambiguity. Knowing who young adults rely on for information helps provide a description of who they view as relevant and trustworthy sources. Further, understanding where young adults get their health and cancer-related information are important components of designing health strategies and information-dissemination mechanisms for the target population. In questions 23-26, students were asked to identify if and how they retrieve information about their health and cancer. Students were asked to identify the people/person they rely on for health information from a list of options including: teachers/professors, health care providers, friend(s), parent(s)/family, I don't seek info, and other. Students were then asked to categorize the top three types of information sources they use the most when

seeking health information (such as random or specific Internet searches, academic journals, television, health/fitness magazines, newspapers or 'other' sources not listed).

Finally, to explore the concept of perceived ambiguity (uncertainty about the reliability, credibility, or adequacy of information) (Han et al., 2006) students were asked to describe their experience when searching for health information, given the options of: "I have never searched for health information"; "I found the information I needed easily and trusted the source"; "it took a lot of effort to get the information I needed"; "I felt frustrated during my search for information"; "the information I found was hard to read/difficult to understand"; and "I was concerned with the quality of information."

Data and analysis. A data reduction process (Collins & O'Cathain, 2009) was used to analyze quantitative data and categorize qualitative data into descriptive themes.

The numerical data were exported from Opinio to a Microsoft Excel 2007 file for preliminary data clean-up, exclusion of non-response rates and relabeling. Data (n=484) were subsequently uploaded into PASW 17.0 for the purpose of descriptive statistical analyses (synthesize, summarize and highlight important characteristics of the data sets) (Sparks-Jackson & Silverman, 2010), tests for differences, and analysis of variance.

Data were examined using histograms and frequency tables to determine the centre and spread (symmetry and skewness) of distributions and boxplots and scattergrams were used to detect outliers. Three outliers (listed in Appendix B) were excluded from responses related to the category of BMI because the numerical value for self-reported height and/or weight exceeded the expected values (values for height that exceeded 7ft/2.13m and values for weight that exceeded 500lbs/227kg) were excluded.

Descriptive statistics. Descriptive statistics were expressed using the mean (standard deviation) for continuous variables with symmetric distributions; number (%) for categorical variables, and the median (minimum, maximum) for variables with skewed distributions (Thabane & Akhtar-Danesh, 2008).

Composite scores for the categories of Health Behaviours, Perceived Susceptibility, and Perceived Control were created using the methods described below:

- The eight health behaviour variables listed in Table 4 (independent health seeking, self assessments, physical activity, diet, UV protection, tanning bed use, alcohol consumption, and second-hand smoke exposure) were used to create the Health Behaviour Composite Score with a mean ranging from 0 to 32. Higher scores suggested the practice of healthier behaviours. The independence among health behaviours resulted in a low Cronbach's alpha estimate (alpha=.3), an estimate similar to those found in the literature for health behaviour indices (Tyc et al., 2004).
- The three variables listed in Table 6 were used to create the Perceived Susceptibility Composite Score with a mean ranging from 0 to 36. Higher scores indicated an elevated sense of vulnerability for cancer. Cronbach's alpha estimate for this series of questions was .58.
- The responses to the two perceived control questions (Q15 and Q16) in Table 8 were summed to create the Perceived Control Composite Score with a mean ranging from 0 to 12. Higher scores were indicative of higher perceptions of

individual control over health and health outcomes. Cronbach's alpha estimate for this composite measure was .49.

The variable used to indicate Household Income (Table 2) was manipulated to exclude those living independently and those who preferred not to respond. The BMI variable (Table 5) was also divided into categories (underweight, normal weight, overweight, obese) according to the common standards defined in Chapter One (Gallagher et al., 2000).

Table 1

Frequencies of Reported Annual Household Income

Reported annual household income *n*=484	# (%)
Less than 61,000	108 (22.3)
61-80000	82 (16.9)
81-100000	79 (16.3)
More than 100000	133 (27.5)
Living Independently	35 (7.2)
Prefer Not to Answer	47 (9)

Tests of Difference. Differences of means were examined using independent *t*-tests for parametric variables. Cohen's categories for effect size (*d*) for the independent t-test are: $.2 \leq d < .5$ (small); $.5 \leq d < .8$ (medium) and $d \geq .8$ (large). The measure of strength and direction of relationships between ordinal variables were measured using Pearson's *R* parametric test for correlation. The size of effect for the correlation co-efficient is described in Table 2.

Table 2

Correlation Co-Efficient

Absolute Value of r	r Squared	Size of Effect (Association)
$.1 \leq \|r\| < .30$	$.01 \leq r^2 < .09$	Small
$.30 \leq \|r\| < .50$	$.09 \leq r^2 < .25$	Medium
$\|r\| \geq .50$	$r^2 \geq .25$	Large

Tests of association for nonparametric nominal data were examined using the chi-square inferential test for significance with an expected frequency count for each cell being at least 5. Analyses of variance were performed to investigate the effect and interaction of multiple independent variables using ANOVA between-subjects tests. The rejection level for all analyses was set at p=.05.

Qualitative analysis. A conventional content analysis served to enhance the development of a more comprehensive description of the student sample (it helped to describe "why" and "how" versus "who", "when" and "how often"). The long-answer survey responses (questions 41 and 42) were uploaded into NVIVO 8 (software for qualitative analyses) and unique text and consistent themes were interpreted, coded, categorized. The qualitative software allowed for major emerging themes to be coded, categorized and (where appropriate) linked to each other in clusters (Hsieh & Shannon, 2005). Definitions for each category, subcategories were developed by the researcher and examples for each code and category were highlighted. In an effort to avoid researcher bias, the content and categorizations were validated by an external reviewer.[6]

[6] The external reviewer was Amy MacDonald (Nutritionist and Evaluation Consultant, Public Health Capacity and Knowledge Management Division, Public Health Agency of Canada).

The quotations used in this report have been garnered from the students who approved having their quotes used and their answers have been intentionally unedited (no spelling or grammatical errors have been corrected).

Ethical Considerations

Ethical considerations from Dalhousie University. Ethics approval for this project was received from Dalhousie University's Research Ethics Board.

Confidentiality and anonymity. Participation in this study was anonymous as no personal identifiers were requested during the survey or consent process. The data were not of a sensitive nature but some personal information was collected such as: age, cultural background, history with chronic illness, and personal opinions. Students were provided with a voluntary opportunity to provide their names and email address on an electronic entry ballot for a prize draw but this information was collected on an independent webpage and could not be linked to the survey results. All quotes were reviewed and subjected to content analysis but responses from students who indicated they did not want their quotes used in the final report were assigned unique formatting in NVIVO 8 to ensure confidentiality and were not included in this paper.

Data security. The personal information collected in this survey was stored in an anonymous fashion and there is no way data can be linked to an identifiable individual. The raw data were not transferred nor shared with researchers and colleagues outside Canada, nor was it taken outside Canada for the personal use of the principal investigator. Further, the Opinio survey software is hosted on Dalhousie's secure Opinio Web server

and it was not necessary for a survey company to assist in data collection, management or analysis.

The data were collected using Opinio and then downloaded onto a password-protected memory stick. Data analyses were performed on the appropriate software housed on a password-protected computer located in a secure home office. The data will be retained by the principal researcher until the research project is successfully defended. At that time all related files will be destroyed by the researcher who will also securely transfer all electronic files to a single electronic data storage device which will become the responsibility of Dr. Lynne Robinson. These files will be stored in a locked cabinet in Dr. Robinson's office for five years post-publication, after which they will be destroyed appropriately.

Informed consent process. Consent was achieved via an online consent form that was provided to student participants prior to the launch of survey questions on the Opinio secure server (Appendix E). Students indicated consent by 'clicking' to indicate that they agreed. This is a commonly-used consent process for online surveys with low-risk populations using relatively non-sensitive or intrusive questions (Andrews, Nonnecke, & Preece, 2007). It was possible for students to print a copy of the consent form and contact the lead investigator with questions before proceeding to complete the survey. Students were prompted to click on "I agree" or "I disagree" when asked for permission to use their anonymous, personal quotations in the final report. The research design did not support the need or mechanism for quotes to be attributed.

Compensation. Student participation was voluntary and an online ballot to win a $200 gift card from The Future Shop was provided to all students who chose to enter the prize draw at the end of the survey or when they elected to withdraw (the provision of a raffle-style prize is an ethical and standard procedure when asking volunteers to dedicate time to data collection) (Cobanoglu & Cobanoglu, 2003). Opinio software was programmed to provide an information box to record student email addresses for entry in the prize draw. This information box was not linked to the main survey and the provision of email addresses and entry in the prize draw was clearly defined as voluntary.

Risk and benefits. In accordance with *Dalhousie University's Social Sciences and Humanities Research Ethics Board Guidelines* (Office of Research Ethics Administration, Dalhousie University, 2007), no deception was used, there were no safety issues to be considered as students were not asked to undergo physical or emotional testing, and the estimated probability of participants experiencing adverse emotional reactions was considered to be low. Time constraints on students were minimal (estimated 25 minutes) and it was not necessary for students to be re-contacted by the researcher.

Chapter Summary

This chapter outlined the value of self reporting mechanisms and the significance of advancing a depiction of young adult health using both quantitative and qualitative approaches. A description of the study participants was provided as was an overview of the recruitment strategy, how the online survey instrument was developed, how the

results were analyzed and the ethical considerations that were implemented. The quantitative and qualitative research results will be discussed in Chapter Three.

Chapter Three: Results

An exploration of young adult health behaviours and the relationship between health behaviours and intrapersonal determinants was conducted using a three-part process that involved descriptive statistics, tests for differences, and qualitative analyses.

The first set of analyses used descriptive statistics to describe the health behaviours, personal health assessment, personal experience with cancer, perceived susceptibility, perceived control, personal motivation and self determination, and the information-seeking behaviour of young adults in this sample.

Description of the Young Adults in This Sample

Health behaviours. Inspection of the distribution of responses for reported frequencies of health/cancer protective behaviours indicated that 83% have at one point changed their health behaviours, almost 34% visit a healthcare provider three or more times a year, and 40% had performed at least one self-assessment exam in the past year. Almost 56% reported exercising three or more times a week and (summarizing the responses of those who generally 'agreed' to the statements provided), 83% indicated that they generally eat a balanced diet. In terms of UV protection, although almost 42% reported that they never or rarely sought shade during peak hours in the summer sun, 42% of young adults did report that they often use hats, clothing and sunscreen to shield themselves from the sun's rays, and 81% reported never using tanning beds. Most (85%) reported consuming less than nine alcoholic beverages per week, and 56% indicated that they rarely participate in activities where second-hand tobacco smoke is present. A summary of the eight young adult female and male health behaviours included in the

Health Behaviour Composite Score are listed in Table 3. The mean of the composite health behaviour score was 23.54 (SD=2.91) and indicated that this sample adopts moderately healthy practices.

With respect to tobacco use (which was not included in the composite score due to the unique formatting of tobacco-related queries and responses) 78% of young adults in this sample (n=484) identified as having never smoked, 14% reported being current non-smokers and 8% identified as current smokers. Of the 36 students (26 female, 10 male) who identified as current smokers, 10 (7 females, 3 males) indicated that they only smoke when they drink alcohol and 28 (21 females, 7 males) reported quit attempts.

Table 3

Frequencies of Reported Health Behaviours of Young Adults by Gender

Health behaviour query		Females *n*=341 # (%)	Males *n*=116 # (%)	Total *n*=457 # (%)
Independent visits to a healthcare professional (in the past 365 days)	0 visits	29 (8.5)	33 (28.4)	62 (13.6)
	1 visit	69 (20.2)	35 (30.2)	104 (22.8)
	2 visits	110 32.3)	27 (23.3)	137 (30)
	3+ visits	133 (39)	21 (18.1)	154 (33.7)
Self-assessment exams (in the past 365 days)	0 exams	185(54.3)	88 (75.9)	273 (59.7)
	1 exam	68(19.9)	14 (21.1)	82 (17.9)
	2 exams	34 (10)	4 (3.4)	38 (8.3)
	3+ exams	54 (15.8)	10 (8.6)	64 (14)
Physical activity (days per week)	0 days	23 (6.7)	10 (8.6)	33 (7.2)
	1 day	40 (11.7)	14 (12.1)	54 (11.8)
	2 days	86 (25.2)	25 (21.6)	111 (24.3)
	3+ days	192(56.3)	67 (57.8)	259 (56.7)

Health behaviour query		Females *n*=341 # (%)	Males *n*=116 # (%)	Total *n*=457 # (%)
Eat a well-balanced diet (weekly)	Disagree strongly	13 (3.8)	3 (2.6)	16 (3.5)
	Disagree somewhat	45 (13.2)	19 (16.4)	64 (14)
	Agree Somewhat	162(47.5)	54 (46.6)	216 (47.3)
	Strongly agree	121(35.5)	40 (34.5)	161 (35.2)
Adopt sun safety behaviour	Never	20 (5.9)	17 (14.7)	37 (8.1)
	Rarely	101(29.6)	60 (51.7)	161 (35.2)
	Often	163(47.8)	30 (25.9)	193 (42.2)
	Always	57 (16.7)	9 (7.8)	66 (14.4)
Annual use of artificial tanning equipment (in the past 365 days)	5+ times	27 (7.9)	2 (1.7)	29 (6.3)
	3-4 times	16 (4.7)	0 (0)	16 (3.5)
	1-2 times	37 (10.9)	5 (4.3)	42 (9.2)
	never	261 76.5)	109 (94)	370 (81)
Weekly alcohol consumption	More than 14 drinks	6 (1.8)	11 (9.5)	17 (3.7)
	No more than 14 drinks	28 (8.2)	24 (20.7)	52 (11.4)
	No more than 9 drinks	189(55.4)	50 (43.1)	239 (52.3)
	0 drinks	118(34.6)	31 (26.7)	149 (32.6)
Exposure to second-hand tobacco smoke	regularly	17 (5)	4 (3.4)	21 (4.6)
	often	31 (9.1)	20 (17.2)	51 (11.2)
	rarely	192(56.3)	65 (56)	257 (56.2)
	never	101(29.6)	27 (23.3)	128 (28)

Intrapersonal influences on health behaviours.

Personal health assessment. Almost 55% of young adults rated their personal health as "average" and BMI calculations based on self-reported weight and height indicated that 67% were "normal weight" (see Table 4).

Table 4

Frequencies of BMI According to Gender

	Females *n*=360 # (%)	Males *n*=122 # (%)	Total *n*=482 # (%)
Underweight	19 (5.3)	7 (5.7)	26 (5.4)
Normal weight	256 (71.1)	67 (54.9)	323 (67)
Overweight	62 (17.2)	37 (30.3)	99 (20.5)
Obese	23 (6.4)	11 (9)	34 (7.1)

Personal experience with cancer. Six (2 females and 4 males) of the young adults who participated in the survey reported experiencing a personal diagnosis of cancer while 67.6% reported knowing a friend or family member with cancer.

Perceived susceptibility. A summary of the variables related to perceived susceptibility/vulnerability can be found in Table 5. When comparing themselves to other Dalhousie University students, 58% reported that their chances of receiving a cancer diagnosis in the future was 'average' and 82% generally disagreed that a cure or effective treatment could be available by the time they were old enough to get cancer. Around 89% of students in this sample disagreed with the statement that "there is not much people can do to lower their cancer risk." Most students generally agreed (79%) that it seems like everything causes cancer and most (71%) also agreed that there are so many cancer recommendations it is difficult to know which ones to follow. The mean of the Perceived Susceptibility Composite Score was 10.58 (SD=2.5) indicating that the young adults in this sample have a moderate level of perceived susceptibility for cancer risk.

Table 5

Frequencies of Perceived Susceptibility Rankings According to Gender

Perceived Susceptibility	Ranking	Females *n*=331 # (%)	Males *n*=112 # (%)	Total *n*=443
Risk comparison with other students	No chance	2 (0.6)	4 (3.6)	6 (1.4)
	Below average	85 (25.7)	39 (34.8)	124 (28)
	Average	204 (61.6)	52 (46.4)	256 (57.8)
	Higher than average	40 (12.1)	17 (15.2)	57 (12.9)
Expect a cancer cure/treatment	Strongly agree	0 (0)	1 (0.9)	1 (0.2)
	Agree	3 (0.9)	6 (5.4)	9 (2)
	Agree somewhat	47 (14.2)	21 (18.8)	68 (15.3)
	Disagree Somewhat	91 (27.5)	31 (27.7)	122 (27.5)
	Disagree	110 (33.2)	29 (25.9)	139 (31.4)
	Disagree strongly	80 (24.2)	24 (21.4)	104 (23.5)
It seems like everything causes cancer	Disagree strongly	7 (2.1)	5 (4.5)	12 (2.7)
	Disagree	25 (7.6)	14 (12.5)	39 (8.8)
	Disagree somewhat	30 (9.1)	12 (10.7)	42 (9.5)
	Agree Somewhat	121 (36.6)	40 (35.7)	161 (36.3)
	Agree	107 (32.3)	26 (23.2)	133 (30)
	Strongly agree	41 (12.4)	15 (13.4)	56 (12.6)
There's not much people can do to lower their chances of getting cancer.	Disagree strongly	55 (16.6)	19 (17)	74 (16.7)
	Disagree	143 (43.2)	51 (45.5)	194 (43.8)
	Disagree somewhat	96 (29)	30 (26.8)	126 (28.4)
	Agree Somewhat	28 (8.5)	11 (9.8)	39 (8.8)
	Agree	9 (2.7)	1 (0.9)	10 (2.3)
	Strongly agree	0 (0)	0 (0)	0 (0)
There are so many recommendations about preventing cancer it is hard to know which ones to follow	Disagree strongly	8 (2.4)	2 (1.8)	10 (2.3)
	Disagree	32 (9.7)	21 (18.8)	53 (12)
	Disagree somewhat	47 (14.2)	17 (15.2)	64 (14.4)
	Agree Somewhat	122 (36.9)	28 (25)	150 (33.9)
	Agree	94 (28.4)	31 (27.7)	125 (28.2)
	Strongly agree	28 (8.5)	13 (11.6)	41 (9.3)

Students were asked to consider a list of nine environmental, genetic and behavioural factors and score each one based on its potential for cancer risk. Tobacco use

(71.9%), UV exposure (51.9%), family history of cancer (56.7%), second-hand tobacco smoke (42.7%) and obesity (32.6%) ranked as high-level risks for cancer. Dietary intake (41.4%), alcohol consumption (39.1%) and physical inactivity (38.4%) were ranked as medium-level risk factors for cancer. The only variable that ranked as a low-level risk factor was sexual behaviour (34.3%). The category of 'no influence' received more than 10% of student scores in 4 cases: sexual behaviour (19.5%), tobacco use (18.9%), obesity (15.5%), and alcohol consumption (10.1%). The frequencies of reported perceived cancer risk of nine potential cancer risk factors by females and males are listed in Table 6.

Table 6

Frequencies of Perceived Risk of Cancer-related Factors by Gender

Risk Factor	Perceived Risk	Females *n*=350 # (%)	Males *n*=116 #(%)	Total *n*=466 # (%)
UV exposure	No influence	5 (1.4)	3 (2.6)	8 (1.7)
	Low	31 (8.9)	20 (17.2)	51 (10.9)
	Medium	110 (31.4)	48 (41.4)	158 (33.9)
	High	201 (57.4)	41 (35.3)	242 (51.9)
	Don't know	3 (0.9)	4 (3.4)	7 (1.5)
Second hand tobacco smoke	No influence	30 (8.6)	6 (5.2)	36 (7.7)
	Low	46 (13.1)	32 (27.6)	78 (16.7)
	Medium	117 (33.4)	34 (29.3)	151 (32.4)
	High	155 (44.3)	44 (37.9)	199 (42.7)
	Don't know	2 (0.6)	0 (0)	2 (0.4)
Tobacco use	No influence	66 (18.9)	22 (19)	88 (18.9)
	Low	9 (2.6)	4 (3.4)	13 (2.8)
	Medium	18 (5.1)	9 (7.8)	27 (5.8)
	High	254 (72.6)	81 (69.8)	335 (71.9)
	Don't know	3 (0.9)	0 (0)	3 (0.6)

Risk Factor	Perceived Risk	Females *n*=350 # (%)	Males *n*=116 #(%)	Total *n*=466 # (%)
Sexual behaviour	No influence	49 (14)	42 (36.2)	91 (19.5)
	Low	108 (30.9)	52 (44.8)	160 (34.3)
	Medium	112 (32)	12 (10.3)	124 (26.6)
	High	66 (18.9)	5 (4.3)	71 (15.2)
	Don't know	15 (4.3)	5 (4.3)	20 (4.3)
Obesity	No influence	52 (14.9)	20 (17.2)	72 (15.5)
	Low	65 (18.6)	31 (26.7)	96 (20.6)
	Medium	98 (28)	38 (32.8)	136 (29.2)
	High	126 (36)	26 (22.4)	152 (32.6)
	Don't know	9 (2.6)	1 (0.9)	10 (2.1)
Dietary intake	No influence	15 (4.3)	8 (6.9)	23 (4.9)
	Low	75 (21.4)	22 (19)	97 (20.8)
	Medium	141 (40.3)	52 (44.8)	193 (41.4)
	High	112 (32)	33 (28.4)	145 (31.1)
	Don't know	7 (2)	1 (0.9)	8 (1.7)
Alcohol consumption	No influence	36 (10.3)	11 (9.5)	47 (10.1)
	Low	114 (32.6)	45 (38.8)	159 (34.1)
	Medium	134 (38.3)	48 (41.4)	182 (39.1)
	High	51 (14.6)	11 (9.5)	62 (13.3)
	Don't know	15 (4.3)	1 (0.9)	16 (3.4)
Physical activity	No influence	18 (5.1)	14 (12.1)	32 (6.9)
	Low	63 (18)	30 (25.9)	93 (20)
	Medium	137 (39.1)	42 (36.2)	179 (38.4)
	High	126 (36)	27 (23.3)	153 (32.8)
	Don't know	6 (1.7)	3 (2.6)	9 (1.9)
Family history of cancer	No influence	9 (2.6)	6 (5.2)	15 (3.2)
	Low	35 (10)	11 (9.5)	46 (9.9)
	Medium	96 (27.4)	38 (32.8)	134 (28.8)
	High	206 (58.9)	58 (50)	264 (56.7)
	Don't know	4 (1.1)	3 (2.6)	7 (1.5)

Perceived Control. A summary of the variables related to perceived control can be found in Table 7 Almost all students (96%) generally agreed that they can control their own actions that directly influence their health. Additionally, 99% of the students in this sample generally agreed that the behaviours they adopt at this stage of their life will impact their long-term health. The median of the composite score for perceived control was 11 (min=3, max=12) and indicated that this sample of young adults has a high level of perceived control over their health.

Table 7

Frequencies of Perceived Control Rankings by Gender

Perceived Control Query	Ranking	Females *n*=352 # (%)	Males *n*=117 # (%)	Total *n*=469 # (%)
"I can control my own actions that directly influence my health."	Disagree strongly	3 (0.9)	1(0.9)	4 (0.9)
	Disagree	3 (0.9)	2 (1.7)	5 (1.1)
	Disagree somewhat	10 (2.8)	2 (1.7)	12 (2.6)
	Agree Somewhat	69 (19.6)	16 (13.7)	85 (18.1)
	Agree	128 36.4)	55 (47)	183 (39)
	Strongly agree	139 (39.5)	41 (35)	180 (38.4)
"My behaviour at this stage of my life will influence my long-term health."	Disagree strongly	2 (0.6)	0 (0)	2 (0.4)
	Disagree	0 (0)	0 (0)	0 (0)
	Disagree somewhat	2 (0.6)	1 (0.9)	3 (0.6)
	Agree Somewhat	26 (7.4)	23 (19.7)	49 (10.4)
	Agree	127 (36.1)	44 (37.6)	171 (36.5)
	Strongly agree	195 (55.4)	49 (41.9)	244 (52)

Information seeking and perceived ambiguity. When asked which people or person young adults turn to for health information, the two most frequent responses from

the list provided were ‘health care providers’ (57.6%) and ‘parent(s)/family member(s)’ (21.3%). A variation of these two answers was offered in the short-answer response ‘other’ category where several students indicated they rely on friends and/or family members who are health care professionals.

A summary of the resources related to information seeking and perceived ambiguity can be found in Tables 8-10. When asked about the most recent time they looked for health information, most students rely on the Internet: random Web searches (59.5%), visits to specific Internet sites (18%) and consulting academic journals (11.6%) were the three most frequently reported information-seeking strategies. Similarly, random Web searches (86.8%), visits to specific Internet sites (60.1%) and consulting academic journals (50%) were ranked as the top three methods for general health information seeking from sources other than people. Again, the short-answer responses offered for both of these questions indicated that many students rely on friends or family members who are health care providers for health information.

A division in reported opinion occurred when students were asked to describe their information seeking experience: 42.1% reported that they were concerned with the quality of the information they found and 39% reported that they easily found information that they trusted.

Table 8

Frequencies of Reported Health-Seeking Information Sources and Strategies by Gender

Query	Options	Females *n*=331 # (%)	Males *n*=108 # (%)	Total *n*=439 # (%)
Thinking about the most recent time you looked for health information, where did you look first?	Random Internet search	194 (58.6)	67 (62)	261 (59.5)
	Specific Internet site	60 (18.1)	19 (17.6)	79 (18)
	Academic journal(s)	44 (13.3)	7 (6.5)	51 (11.6)
	Television	3 (0.9)	1 (0.9)	4 (0.9)
	Health/fitness magazine(s)	11 (3.3)	4 (3.7)	15 (3.4)
	Newspapers	3 (0.9)	0 (0)	3 (0.7)
	Never looked for information	5 (1.5)	2 (1.9)	7 (1.6)
	Other	11 (3.3)	8 (7.4)	19 (4.3)

Table 9

Frequencies of Most-used Health Information Sources by Gender

Query	Options	Females *n*=331 # (%)	Males *n*=108 # (%)	Total *n*=439 # (%)
Top 3 sources used to retrieve health information	Random Internet search	286 (86.4)	95 (88)	381 (86.8)
	Specific Internet site	196 (59.2)	68 (63)	264 (60.1)
	Academic journal(s)	161 (48.6)	57 (52.8)	218 (49.7)
	Television	79 (23.9)	29 (26.9)	108 (24.6)
	Health/fitness magazine(s)	133 (40.2)	28 (25.9)	161 (36.7)
	Newspapers	62 (18.7)	16 (14.8)	78 (17.8)
	Never looked for information	7 (2.1)	5 (4.6)	12 (2.7)
	Other	72 (21.8)	26 (24.1)	98 (22.3)

Table 10

Frequencies of Perceived Value of Information Sources by Gender

Query	Options	Females *n*=324	Males *n*=107	Total *n*=431
Perceived value of information source and strategy	Concerns with quality	141 (43.5)	44 (41.1)	185 (42.9)
	Trusted information found easily	129 (39.8)	42 (39.3)	171 (39.7)
	Effort was required	32 (9.9)	7 (6.5)	39 (9)
	Search was frustrating	16 (4.9)	11 (10.3)	27 (6.3)
	Never searched for information	6 (1.9)	3 (2.8)	9 (2.1)

Personal Motivation and Self-determination. The top three current and future concerns as ranked by young adults are listed in Table 11. The top three current health concerns selected from the list of 15 options provided were 'school' (51.8%), 'family' (45.2%), and 'happiness' (39.1%). 'Health' ranked fourth (37%) and 'cancer' ranked 14th (2.2%) of 15 possible options. The top three future concerns were 'family' (50.3%), 'health' (46.92%) and 'job security' (38.2%). The topic of 'cancer' as a potential concern for the future was ranked as 13th (4.1).

Table 11

Current and Future Concerns Ranked by Young Adults (Males and Females Combined)

Current Concerns	*n*=465 # (%)	Future Concerns	*n*=465 #(%)
Violence	6 (1.3)	Violence	5 (1.1)
Cancer	10 (2.2)	Illness/injury	11 (2.4)
Illness/injury	14 (3)	Cancer	19 (4.1)
Death of self/loved one	29 (6.2)	Peace of mind	35 (7.5)
Peace of mind	34 (7.3)	School	41 (8.8)
Environmental issues	47 (10.1)	Death of self/loved one	44 (9.5)
Job security	68 (14.6)	Friends	44 (9.5)
Financial independence	86 (18.5)	Environmental issues	67 (14.4)
Friends	89 (19.1)	Financial independence	102 (21.9)
Love	97 (20.9)	Love	118 (25.4)
Money	101 (21.7)	Money	122 (26.2)
Health	172 (37)	Happiness	156 (33.5)
Happiness	182 (39.1)	Job security	177 (38.1)
Family	210 (45.2)	Health	218 (46.9)
School	241 (51.8)	Family	234 (50.3)

A summary of the influences that guide health-related decision making according to gender can be found in Table 12. Students' 'personal desire to be fit and healthy'

ranked as the top influence (90.6%) that guides health-related decision making followed by 'physical appearance' (76.3%) and 'fear of death/illness' (37.1%).

Table 12

Influences that Guide Health-Related Decision Making Behaviour According to Gender

Factor	Female *n*=341 # (%)	Male *n*=115 # (%)	Total *n*=456 # (%)
My spirituality	22 (6.5)	9 (7.8)	31 (6.8)
Peer pressure	25 (7.3)	10 (8.7)	35 (7.7)
My career	41(12)	19 (16.5)	60 (13.2)
My sense of adventure	45 (13.2)	27 (23.5)	72 (15.8)
My pursuit of academic studies	74 (21.7)	31 (29.5)	105 (23)
My responsibility to my family	84 (24.6)	27 (23.5)	111 (24.3)
Fear of death/illness	135 (39.6)	34 (29.6)	169 (37.1)
Physical appearance	270 (79.2)	78 (67.8)	348 (76.3)
My desire to be fit/healthy	311 (91.2)	102 (88.7)	413 (90.6)

Relationships Between Variables

The next step in data analysis included testing the relationships between young adult health behaviour, gender and age, and various intrapersonal factors. The results from the hypothesis testing are highlighted below along with the results from post-hoc analysis. The composite scores (composite measure of eight health behaviours described in the section on descriptive statistics) used for these analyses are listed in Table 13.

Table 13

Descriptive Statistics and Distributions for Composite Scores

	N	Sum	Mean (SD)	Range (min, max)	Distribution
Health Behaviour Composite Score	457	10759	23.54 (2.91)	(15, 31)	Normal
Perceived Susceptibility Composite Score	443	4686	10.58 (2.5)	(4, 16)	Normal
Perceived Control Composite Score	469	4911	10.47 (1.39)	(3, 12)	Normal

Hypothesis: Young adult Females will report healthier practices than young adult Males. A one-way ANOVA between the Health Behaviour Composite Score and Gender showed that there was a statistically significant effect of gender on health behaviour ($F(1, 455) = 35.156$, $p<.0001$). Gender (Female, Male) and Age were the between-subjects factors with Health Behaviour Composite Score as the dependent variable. No significant effects for Age ($F(12, 432) = .78$, $p=.67$, partial $\eta^2 = .0004$) or interactions between Gender and Age for Health Behaviour Composite Score ($F(11, 432)=7.958$, $p=.91$, partial $\eta^2 =.0001$) were found. There was, however, a significant main effect of Gender on Health Behaviour Composite Score ($F(1, 432) = 13.438$, $p<.001$, partial $\eta^2 = .0009$). The independent t-test showed that the Health Behaviour Composite Score for Females ($M = 23.997$; $SD = 2.77$) was significantly higher than that of Males ($M = 22.21$; $SD=2.92$). The mean difference between Females and Males was 1.79 and the 95% confidence interval for the estimated population was between 1.19 and 2.38. The difference between Females and Males was significant ($t= 5.929$, $df = 455$, $p<.001$, one tailed). Cohen's $d = 2.81$, a 'large' effect (meaning being female has a very large effect on health behaviours). This result supports the hypothesis that Females report adopting healthier practices than Males.

Tobacco Use was not included in the calculation of the Health Behaviour Composite Score (because the question and response format on the questionnaire was not congruent with the format of the other health behaviour questions) and was therefore analyzed separately using a Chi-square test. The relationship between Tobacco Use and Gender was not significant $X^2(2, N=457) =2.441$, $p=.295$.

Hypothesis: Young adult Females will report higher levels of sun-seeking behaviour.

It was expected that Females would report higher levels of sun-seeking behaviours than Males. Chi square tests were used to explore the relationship between Gender and the sun-seeking and sun safety behaviours described below.

UV-protective behaviour (such as wearing a hat or sunscreen). Chi Square testing suggested that the relationship between Gender and UV-protective behaviour was significant with Females reporting more protective behaviours than Males X^2 (3, N=457 = 34.94, p<.0001).The association was of weak strength: ϕ = .276 and thus gender could account for only 8% of the variance. However, by using the Chi-Square test for linearity, the Linear-by-Linear Association Value of 29.884 (p<.00001) demonstrates a linear trend underlying these data.

Avoiding the sun between 11am and 4pm. Similar testing showed that Gender also played a role in avoiding UV exposure during outdoor activities. The data suggest that Females reported avoiding the sun or seeking shade more often than males X^2 (3, N=457) = 16.256, p<.005. The association was of weak strength: ϕ=.2, indicating that gender could account for only 4% of the variance and Linear-by-Linear Association Value of .712 was not significant (p=.221) and therefore a curvilinear relationship could not be refuted.

Tanning Bed Use. The data for Tanning Bed use were dichotomized into 2 categories of young adults who use tanning beds and those who do not use tanning beds. Chi-Square testing suggested that the relationship between Gender and Tanning Bed Use

was significant X^2 (1, N=457) = 17.053, p<.0001. The Linear-by-Linear Association Value of 17.02 (p<.00001) demonstrates a linear trend underlying these data and suggests (as seen in Table 4) that Females are more likely to use tanning beds than Males.

Hypothesis: Males will report higher levels of alcohol consumption.

It was expected that Males would report higher levels of alcohol consumption than Females. Chi-Square testing suggested that drinking patterns were significantly different with Males reporting higher levels of unsafe drinking behaviours than Females X^2 (3, N=457) = 29.885, p<.0001. The association was of weak strength: ϕ = .256 and thus Gender could account for only 7% of the variance but the Linear-by-Linear Value of 19.438 (p<.00001) suggests a significant linear trend. As highlighted in Table 4 and Figure 2 below, more Males report consuming alcohol at levels that exceed the CAMH guidelines (more than 14 drinks per week).

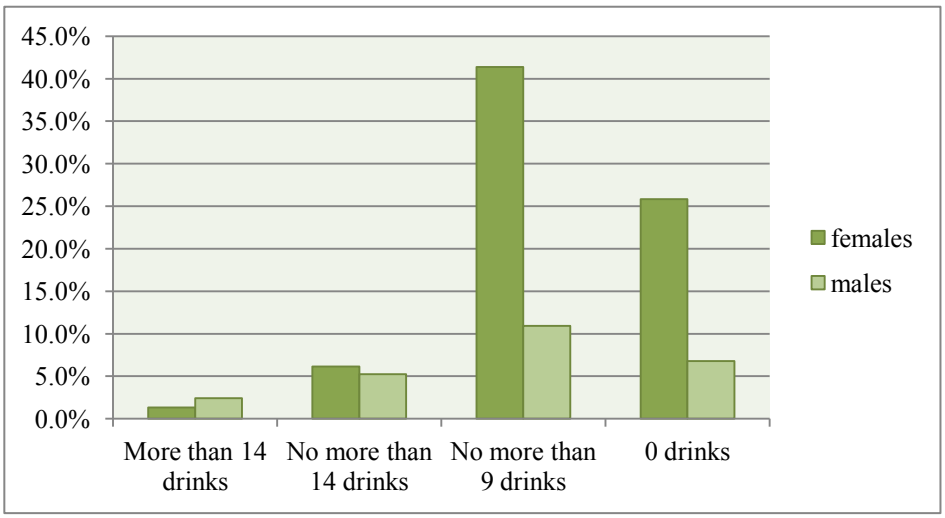

Figure 2. Reported weekly consumption of alcoholic beverages (Females and Males) (n=457).

Hypothesis: Younger students will report higher levels of physical activity than older students. It was expected that younger students from this sample would report higher levels of physical activity than older students. However, one-way ANOVA testing showed no significant effects for Age ($F(3,453) = .751$, $p=.522$).

Hypothesis: Females will adopt different strategies for seeking health-related information. Chi-Square testing was used to examine gender differences with respect to information-seeking strategies using the options listed in Table 9 (random or specific Internet searches, academic journal(s), television, health/fitness magazine(s), and newspaper(s)). Only the relationship between Gender and health/fitness magazines was significant: $X^2(1, N=439) = 7.125$, $p=.008$. The association was of weak strength: $\phi = .127$, indicating Gender could account for only 1.6% of the variance. However, the Chi-Square test for linearity's Linear-by-Linear Association Value of 7.109 ($p=.005$), demonstrated a linear trend suggesting more Females than Males use health/fitness magazines to retrieve health information.

Post Hoc Analysis: Nova Scotia as a predictor of health. An independent t-test was performed to examine the relationship between Health Behaviour and students who spent at least half of their lives in Nova Scotia. The Mean for those from outside of Nova Scotia was 23.9431 and the Mean for those from Nova Scotia was 23.0758. The mean difference was 0.86726 and the 95% confidence interval for the estimated population mean difference was between -1.4 and -.34. An independent t-test showed that the difference between the two groups was significant ($t= -3.206$, $df =455$, $p= <.005$, two-

tailed) and suggested that young adults who grew up outside of NS reported practicing healthier behaviours.

Qualitative Analyses

Two open-ended questions were included in this study to encourage first-voice contributions from young adults to learn more about the barriers and facilitators they experience to 'be healthy' and how health promotion messages can be customized to suit their unique needs. In order to honour the integrity and authenticity of the quotations presented in the section below, no grammar or spelling edits were incorporated.

Barriers and facilitators to adopting, achieving, and maintaining good health practices. The responses related to identifying barriers and facilitators to healthy practices were categorized into six major themes: 1) barriers and facilitators to adopting healthy behaviours are both internal and external; 2) achieving and maintaining health is impeded by lack of time and money; 3) campus life is unhealthy; 4) food is a major concern; 5) young adults see 'government' as a significant influence on health and 6) information about health can be unclear and confusing.

It is important to note that an additional level of analysis could have been added to divide responses between the context of 'student experience' and 'general experience'. Although the open-ended question was free of any language relating to 'university life', many respondents offered replies from a 'student' point of view versus a broad-spectrum statement making the context more specific. For the purpose of this project, 'student' and 'general' responses have been coded under the themes defined above and examples from both perspectives were highlighted.

Adopting healthy behaviours is influenced by internal and external factors.

Motivation and deterrents for adopting health practices came in many forms. 'Internal' influences were categorized as those which were described on an individual or interpersonal level. Lack of personal motivation and self-determination were reported as key challenges by many students who responded that improvements in health behaviour could be made if "i was better at motivating myself" (Male, 27) and if "I had a better self control" (Female, 18). Responses describing lack of motivation, effort, convenience, and the words "ease", "easy" and "easier" were consistently coded within responses linked to activities participants viewed as lesser options.

> *I try make being healthy a priority but it is difficult to do so when I am busy and have deadlines to meet. For example, it's easy to grab Tim Horton's for supper while studying, even though I know there is a lot of sodium/fat/etc in it. (Female, 22)*
>
> [It would be easier to improve my health behaviour(s) if] *it wasn't so convenient not to. Its too easy to sit on your but, and eat cheap crap, but takes a lot of effort to get up, go work out and prepare good food. (Male, 27)*
>
> [It would be easier to improve my health behaviour(s) if] *I had more motivation. I would need to enlist myself in a program where I was highly monitored because I want to be fit I just lack the personal motivation to actually get up and do something. I'm semi slim now and at a reasonable weight, maybe if I passed this it would freak me out and motivate me to be more active but at the moment I'm*

alright with my body even though I would and could use to be slimmer and more active. (Female, 19)

Intrapersonal motivation was sometimes reported to be influenced by mental health and self-esteem. Individual responses to reflect this theme included statements like: "[It would be easier to improve my health behaviour(s) if] my mental health improved" (Female, 20) and "I feel self-conscious at gyms and would rather excersice at home. School and other stressors make me over-eat" (Female, 20).

The perceived immediacy of health concerns was a commonly reported intrapersonal barrier for adopting healthy practices. Young adults often reported that changing their behaviours would be easier if they "cared about future health status" (Female, 23) or if they "had a serious concern that needed to be attended to" (Male, 23). Further, young adults often recognized that they currently knowingly maintain unhealthy behaviours but have not yet been adequately motivated by short-term or long-term health implications to change their practices:

[It would be easier to improve my health behaviour(s) if] *I were motivated, and knew that what I was doing, although it might not be benefiting me right now, really has a high chance of paying off later. Eating good food pays off now, in terms of energy and short term health, but excluding unhealthy food is losing out on some delicious things, and in the short term, indiscretions can be made up through exercise. The long term affect on probability of developing cancer though might not be so easy to remedy. I do not really know the likelihood of*

unhealthy food affecting me, and so eat it alongside whole grains and fruits and vegetables. (Male, 21)

[It would be easier to improve my health behaviour(s) if] *the ozone layer was still intact (i love being in the sun and getting a tan, but i find sunscreen unpleasant and inconvenient. i know it's irresponsible, but i do it anyway!) (Male, 24).*

In addition to acknowledging occasional struggles to comply with dietary and sun safety recommendations, many students also referenced alcohol and recreational drugs as contributing factors to decreasing motivation. One respondent wrote: "[It would be easier to improve my health behaviour(s) if] I saw a serious need to change my lifestyle that involves drinking several days a week and smoking marijuana fairly often" (Male, 23).

Young adults also reported an array of *external* factors that influence their health-related behaviours. These influences were categorized as those having to do with family and friends, culture, and climate conditions. When it comes to social support, positive encouragement from family, friends and romantic partners is viewed as a powerful potential motivator for embracing positive health behaviours:

[It would be easier to improve my health behaviour(s) if] *I felt more support from my partner and if my partner actively engaged in healthy behaviours with me. Moreover, if my friends and family also engaged in proper eating and drinking habits, and were more apt to engage in active living with me.(Female, 25)*

[It would be easier to improve my health behaviour(s) if] *I stay with my family. This is because my family will take a good care of my health and will insist me to go and seek for hospitals if I'm sick. When I stay away from my family, I often forget about my health because I'm too busy with my education and work. I would say that it would be easier to improve my health behaviours if I have my beloved and cared ones beside me who will take good care of me and my health. :) (Female, 19)*

However, many young adults view their existing social interactions as barriers to achieving personal health goals:

[M]y health behaviours become negatively affected when I live at home. Having to fit into the lives of my family tends to lower my ability to focus on health. Being able to plan my own activities and shopping for myself greatly improve my healthy behaviours. (Female, 19)

[It would be easier to improve my health behaviour(s) if] *I weren't grocery shopping with my boyfriend. He makes a lot of impulse buys of unhealthy food that I also end up eating. (Female, 21)*

Peer pressure and perceived social obligations were also related to unhealthy behaviours such as alcohol consumption: "[It would be easier to improve my health behaviour(s) if] I didn't feel obligated to go drinking with my friends" (Female, 19).

The socio-cultural environment was often highlighted as a hurdle to the successful adoption of positive health practices. With respect to alcohol consumption, many young adults disclosed that their health behaviours could be improved more

easily if “alcohol was not such a crutch for social events” (Male, 21) or if “drinking heavily wasn't such a 'normal' part of our culture” (Female, 22). Another example of being knowingly subjected to risk factors due to perceived cultural norms was the perceived pressure to maintain a sun-kissed complexion. One female student believed it would be easier for her to be healthier if “there were no such things as tanning beds or the desire to be tanned. If the media did not portray tanned as being 'hot'” (Female, 22)

Additionally, many young adults reported that their livelihoods place them in working conditions that have the potential to make them unhealthy. Some students reported that they would be healthier if they “didn't have to work in the sun for 10 hours a day for 3 months exposing myself to way too many u v rays” (Male, 27) or if “ my boss didn't chain smoke in the kitchen where i work” (Female, 19). These statements were coded together because they indicated that their behaviours and/or exposure to potential risk factors were not characterized by personal choice or intrapersonal motivation but were instead guided by a broader socio-cultural context.

Not all external influences were identified as social or cultural. The climate was also viewed as a deterrent to achieving healthy behaviours. While some students expressed their dislike of Nova Scotia’s maritime conditions in simple terms: “[It would be easier to improve my health behaviour(s) if] THE WEATHER WAS BETTER IN NOVA SCOTIA” (Female, 19), others depicted the weather as a deterrent to exercise “If there were more sunny days I would be able to spend more time outside exercising, rather than staying inside exercising” (Male, 19) and weight gain “[It would

be easier to improve my health behaviour(s) if...] There was nicer weather for 4 months of the year, the winter weight is a big problem!" (Male, 22).

Achieving and maintaining health is impeded by lack of time and money. Many young adults recognized certain behaviours contributed to improved health but expressed that engaging in those activities was difficult due to limited time and money. Typical responses indicated that their lifestyles were often very busy:

> [It would be easier to improve my health behaviour(s) if] *I added more structure to my life and managed my time better, because when I am able to plan ahead of time I plan healthier meals and consistent exercise times and always follow through but when life gets busy I don't plan out my time in advance and I do not eat as healthy or exercise as much. (Female, 22)*

Students often used words like "busy" or "rushed" to describe their hectic routines. One respondent described how being healthy would be take less effort if she "...wasn't always in a rush to do more. I know for a fact that I burn - but when I'm in a rush out that door and think oh my sunscreen, I still dont go back to put it on" (Female, 20).

Many young adults also revealed that life is not only busy, but it is also expensive. The concept of 'expensive' was coded in two different ways: things that are generally costly and things that are costly due to the limitations of student budgets. Below is an example of commentary unbound by the 'student' context:

> [It would be easier to improve my health behaviour(s) if] *I had more time in the day to dedicate to physical activity and to planning healthy meals. I also find healthy eating to be expensive and there is a need to grocery shop more*

frequently to maintain a fresh diet. If there were more time, I would be much more complient with these things. (Female, 28)

However, when young adults chose to offer observations specifically based on their student experience, the costs of higher education such as tuition and housing were highlighted as a significant burden leading to less money and less time to be healthy:

Right now paying for school and the basic living expenses is my main concern and all I can really afford. I find fresh vegetables and healthy meat and other healthy choices are more expensive. They also require more time to prepare. With the stress of school, it is hard to take that time to do that. (Female, 24)

[It would be easier to improve my health behaviour(s) if] *Local foods and unprocessed foods (organic) were less expensive and more accessible in grocery stores especially on a student's budget. Also, if gym memberships were less expensive (i.e., Dalplex cardio room passes were offered to Dal students as part of tuition) it would encourage me to vary my form of exercise and go to the gym more often. It mostly comes down to cost that prevents me from making the healthiest choices on a regular basis. (Female, 24)*

[It would be easier to improve my health behaviour(s) if] *I was not a University student. I find it hard to find the time to run, a hobby which I miss. For example, this summer I have a 40+ hour work week and then 9 hours of class at night to study for the MCAT. On top of this class time, I must study. Adding in a one hour commute to work, plus family responsibilities, this does not leave a lot of time in the week to work out. I miss working out everyday and playing*

organised sports. The University life style does not lend itself to healthy active living. I look forward to the day when work day ends by supper! (Female, 20)

As described by the young adults in this sample, student life personifies a complicated balancing act of friends, family, academia, finances, and the fulfilment of current and future personal goals. In this milieu of competing concerns, the management of healthy behaviours is often depicted as a low priority.

Campus life is unhealthy. While student lifestyles were described as unhealthy, so was the campus environment. Again, although the sentence stem was not designed to intentionally elicit student-related responses, a large number of participants chose to underscore their dissatisfaction with campus resources and support with respect to student health.

Limited availability of healthy and affordable food options on and near campus was a key theme: "It would be easier also if there were more healthy options available near/on campus (besides coffee stores)" (Male, 21). Similarly, limited access to suitable physical fitness activities was highlighted as a common complaint with both male and female students: "[It would be easier to improve my health behaviour(s) if] I had more access to alternative forms of excerise that I find more enjoyable, for example, circus classes" (Female, 20). Others offered specific suggestions with respect to Dalplex (Dalhousie University's on-campus fitness and training facility): "Dalplex membership should NOT expire over summer break if you are attending school again in the fall" (Male, 21).

An additional thread of observations about the quality of campus life focused on student smoking behaviours and exposure to second-hand tobacco smoke (despite the university-wide smoking ban): "[It would be easier to improve my health behaviour(s) if] if smokers actually followed the smoking guidelines and regulations around campus" (Female, 21).

> *Dalhousie University should also take their Tobacco Free Campus Policy more seriously and actually enforce it so that people will feel unable and uncomfortable to smoke on campus. Currently there are far too many people who smoke in front of the Killam Library with no repercussions by the Dal Security (some of whom also smoke in this area) (Male,23).*

The Dalhousie University smoke-free campus ban has been in effect since 2003 and prohibits smoking anywhere on Dalhousie property and in all Dalhousie buildings (including residences) (Dalhousie University Office of Environmental Health and Safety, 2010).

Food is a major concern. As previously discussed, many students expressed that access to healthy and affordable food on/near campus is poor: "[It would be easier to improve my health behaviour(s) if] residence food wasn't so greasy" (Female, 20). Concerns over food quality were common to both males and females: "With food (particularly food bought at the grocery store) there's always that unknown as to what is in it" (Male, 22). Although food quality was specifically highlighted by young adults, no references with respect to the accessibility or availability of healthy beverages or drinking water were recorded.

Many young adults alluded to their lack of time and/or lack of skill to prepare food as an obstacle to healthy eating:

> [It would be easier to improve my health behaviour(s) if] *I learned how to cook well. I think a lot of my health issues come from an unbalanced diet. I try to eat as best as I can but sometimes with school work and all the other activities that I am involved with I tend to put less emphasis on the food that I prepare my meals with. It's also more difficult to monitor my diet as oppose to monitoring my physical activity level. (Male, 22)*

Much like the examples discussed previously, the reasons for suboptimal food consumption were described using a student lens and from a more universal perspective.

Another sub-theme that was identified was the notion that many young adults equate "healthy" food with the common descriptors of "non-processed", "fresh", "local" and/or "organic". For example, many students reported that it would be easier to improve their health behaviour(s) if "fresh meat and produce was not so expensive!" (Female, 22), "it were easier and less expensive to buy fresh produce and free-range meat" (Female, 26), or if "healthy, organic food wasn't so much more expensive than unhealthier, processed food" (Female, 22).

> [It would be easier to improve my health behaviour(s) if] *healthy food at the grocery store was cheaper. It's so expensive to buy fresh produce over pre-packaged, even though fresh is much better for the body. (Female, 22)*

Although many students mentioned grocery stores or shopping for food, no specific outlets or markets were highlighted.

Young adults see 'government' as a significant influence on health. The role of the government in shaping the health of individuals and communities was a major theme. References to 'government' were both specific (used the word or an abbreviated reference for the term 'government') and implied (referred to a/the 'system') in the coded text. The role of the government was divided into two categories: blame and expectations. For instance, one student said, "I would love to see smoking become illegal ... unfortunately the government likes the money they make off tabacco too much" (Female, 22).

The government shouldered significant blame for contributing to poor health by creating unhealthy environments, policies and processes that lead to pollution, unhealthy food production, food security, and lack of access to health-related services.

> [It would be easier to improve my health behaviour(s) if] - *If OUR GOVERNMENT wasn't letting companies sell, shit that destroys the planet, fills our landfills, and poisons our bodies, because the products our everywhere. ..If i wasn't effected by peer pressure - I was in love but mostly i blame our governme (Male, 26)*
>
> [It would be easier to improve my health behaviour(s) if] *our government stopped treating food as a commodity rather than a necessity for human well-being. Modern agriculture has made the production of food a centralized and industrialized process. Food production should be focused on the local, with*

> *minimal to no use of pesticides, fertilizers, or growth hormones. Food should not be produced at an industrial level, and preservatives and food additives should never be included in a human diet. Obesity and ill-health are often caused by the consumption of cheap, subsidized foods that have little to no nutritional value. Our current system of food production has made unhealthy food the most affordable, while it becomes increasingly expensive to eat healthily. (Male, 21)*

Expectations of government support emerged via suggestions for improved health policies such as tax breaks for gym memberships, improved health insurance coverage, and incentives/rewards for making healthy decisions and adopting healthy lifestyles. One illustration of this point came from a student who suggested her health might improve if "you received some sort of benefit from eating healthy and taking care of yourself directly instead of falling sick when you don't" (Female, 18). Survey respondents did not clarify which level of government would be responsible for these changes nor did they distinguish between provincial or national sectors.

Information about health can be unclear and confusing. Finally, young adults emphasized that the health information they need to build healthy lifestyles often seem ambiguous or even unreliable. One student intimated that her health could be enhanced if "I knew what would help me and what would harm me. The reports all contradict each other" (Female, 29). Others students expressed parallel observations:

> [It would be easier to improve my health behaviour(s) if] *I knew exactly what was good and what was not, without information being flawed or*

misunderstood. There are too many things that claim to be good for you that actually are not- there's no real way to tell what is true. (Female, 19)

[It would be easier to improve my health behaviour(s) if] *it were more clear as to what is healthy and what is not. New studies are constantly being published which contridict others, making it hard to figure out what should be avoided and what is good for you. Also, every doctor you see and TV show you watch has different, and somtimes conflicting, adivce on how to maintain a healthy life style. (Female, 25)*

Similar sentiments about health information and messaging were also captured in Question 42 when students were asked to specifically identify strengths and weaknesses of current health promotion messages in long-answer format (below).

Health Promotion Messages

The responses to the long answer question about improving health promotion messages were categorized into six major themes: 1) messages should be relevant to the target age group, 2) messages should be tailored to reflect young adulthood and university culture, 3) personal motivation can be tweaked by focussing on immediate health concerns, 4) messages that also identify a strategy may prompt more sustainable behaviour change, 5) messages should be accurate and reliable and 6) messages should target government and industries that contribute to poor health. When offering their responses, young adults typically chose to highlight barriers to current health promotion messages and/or offer suggestions for improvement.

Health promotion messages should be relevant to the target age group. Age-appropriateness was one of the most commonly identified weaknesses of current health promotion messaging. Young adults expressed that their age group was under-represented in social marketing campaigns and advertisements. For example, they disclosed that messages would be better if "they were directed at people my age instead of people over 60 and/or children" (Female, 23) or if "they depicted young people and not just middle-aged folk" (Female, 24). Further, many young adults suggested that the tone and relevance of the messages could be improved by providing testimonials and messages that came directly "from someone within the same age group" (Female, 22).

Messages should be tailored to reflect young adulthood and university culture. Young adult culture has unique characteristics that impact the relevance and accessibility of health information. Student responses suggested that the customization of health promotion messages could be enhanced by delivering messages pertinent to their life stage and social contexts as young adults and students. A common example of a student-identified health promotion topic was the risk of contracting a sexually transmitted infection:

> *Also, people are quite uninformed about sexual health. For example, many people I have spoken with don't know that certain STDs can be transmitted even while using condoms. A lot of people also don't realize that you may be carrying an STD but it won't necessarily show up on your pap test. It's common to hear 'Oh, I'm clean, I have regular pap tests', though they may actually be unknowingly carrying something. (Female, 22)*

Other health promotion topics prevalent in student responses were alcohol consumption, physical activity and nutrition.

Many students expanded the concept of 'relevance' to include various communication mechanisms to make health-related information more accessible: "University aged people often think they are too busy or don't have time. The resources really need to come to us, or be easily accessed... and free" (Female, 22). The notion of bringing the message directly to the core audience was perceived as strategically important and responses proposed that message delivery could be improved if:

> *...the means of conveying the message to the public was more relevant. Maybe targeting my age group in schools (i.e., universities, mandatory frosh week attendances, etc.). When I moved out to Banff after high school and attended job orientation at a ski resort, during our mandatory orientation session they warned us about the high incidence rate of STIs in Banff (since Banff has one of the highest STI rates in Canada). This made me practice having protective sex all the time. (Female, 22)*
>
> *...they were required by the university to take a sexual health class, as well as an overall health class that covered nutrition, physical fitness, etc. Another thing might be just having more pamphlets/posters around. Maybe even a 'health exposition'. (Female, 22)*
>
> *...those promotions held in my University Campus or in my working place. This is because when these kind of promotions or health messages held around the*

University campus or working place, my friends and I can share the information among ourselves and I hope the others will do the same. Thanks. (Female, 19)

These examples highlight the importance of considering the academic, employment and social environments when framing and delivering health information for young adults.

A final way to enhance the accessibility and reach of health messaging is to consider the *virtual* environments of young adults. One student noted that messages would be more relevant if "they [public health] used media that I was more responsive to" (Male, 21). This feedback was echoed and explained by others who touted the value of electronic media:

Commercials are great, but my age group is constantly on the go, so we may never see them. I feel that my age group has a greater connection to the Internet than to TV. I find that Newsletters often work best for me, there is a student newsletter (Health 101) that I receive via e-mail and I can read it at my convenience. The fact that it's a newsletter written by students for students, does peak my interest and feel more connected to the content. (Female, 24)

I don't often go out and look for health information, I just don't have the time, but i always check the Dalnews e-mails to see what is going on at Dal. Perhaps a weekly article if the goal was regular exposure to the information (Female, 18)

Capitalizing on the ubiquity of electronic media was often described as a way to increase relevance and reduce barriers related to health messaging. One student suggested that people who design health messaging could be more effective if "they have websites, facebook group, constantly sending email so people can get the information while at

work, at home, cell phone.... instead of having to find someone to talk to" (Male,19). In addition to the avenues described above, YouTube and Twitter were also mentioned by several students as feasible modes for message delivery.

Personal motivation can be tweaked by focussing on immediate health concerns. One of the most prominent perceptions offered by young adults was that their peers enjoy a sense of everlasting health. For example, current behaviours were perceived to be viewed as separate from long-term health status: "I do not think that my age group understands that what they do now does effect their health in the future" (Female, 18), and young adults often perceive themselves to be resistant to harm or illness: "I can't speak for everyone my age but many of my friends including myself sometimes have this notion that we're indestructible and the belief that 'oh that won't ever happen to me'" (Female, 20). Thus, many students expressed that health promotion messaging may be more relevant for their age group if:

> *...they focused on short-term. Most people my age don't think long term. Show them people who developed melanomas at 23 from sun/tanning beds, or got high blood pressure at 28 from poor diet and exercise and people might pay more attention (Female, 22).*

Thus, health promotion messaging may be perceived as more motivating if it depicted age-appropriate information about how current behaviours can impact their health status during young adulthood.

Messages that include a strategy may prompt more sustainable behaviour change. Responses indicated that many people possessed various types of health

information, “Most people I know are very aware of what needs to be done to be healthy NOW but do not do what they need to do” (Female, 18) but also needed to feel empowered in order to successfully sustain healthy behaviours. One student wrote that the relevance of health information could be improved if: “...the message and the strategy were multi-level and part of a strategy that provided resources that made it easier to adopt healthier behaviours. BEHAVIOUR CHANGE and not just education” (Female, 26).

Other students reiterated the need for specific support in sustaining healthy behaviours and many also emphasized the importance of demonstrating an understanding of the limitations of busy lifestyles and strict budgets when framing messages. Examples of approaches to better facilitate health promotion included the creation of messages that “made me more aware of how I can get cheaper and more convenient access [to healthy options]” (Female, 19) and “involved tips regarding eating without money” (Male, 23).

Tone and content is important. Another important aspect of health promotion messaging for this population is tone and content. Many responses indicated sensitivities to judgment or negativity and suggested that messages could be improved if “they were less accusatory ('YOU ARE DOING THIS BAD THING') and involved presenting options that people could choose instead of 'telling' what people 'should do'” (Female 21) or if “they did not seem to be thrust upon us. Incorporate into things not dictating would allow information to be better received” (Female, 28).

Several female students mentioned they disliked messages that seemed to promote gender biases and stereotypes:

I also think that public health messages do a very poor job at encouraging healthy sexuality. Most ads advise WOMEN to get checked out for STDs and get pap tests. I have never seen something that places any responsibility on the man to get checked out, and I have also never seen a message towards women that is actually about sexuality. (Female, 18)

I believe at my age group the fit/healthy message is geared to woman being slim and skinny for a bikini and about what others view them as. Once you past 40 it seems it focuses more on health and avoiding heart attack and to me thats more cause to get active then if some shallow male digs me or not. (Female, 19)

Other students focussed on how tone could help messages be more memorable or engaging by offering suggestions like: “Don't be preachy. Use humour. The mumps ad campaign a few years ago was effective because it was funny” (Female, 21). It was also suggested messaging should assume a “...rational, no nonsense approach of conveying accurate information instead of attempting to appear 'cool' and 'hip' or relying on scare tactics” (Male, 20).

Messages featuring positive and affirmative themes were seen by many as a more constructive route to promoting health:

Everyhting is told in a very negative way, so it is hard to tell what we can do at the end and also hard to say if what we are doing is okay. Being positive in recommendations could increase the way people see their health by a positive behaviour instead of always being feared by everything we hear from everywhere. (Female, 18)

Celebrating those who are already benefiting from healthy living was described as a way to enhance relevance through a positive tone. It was suggested that messages should focus on "young adults who are healthy. Too many public health messages focus on unhealthy people but they do not positively reinforce healthy behaviors enough" (Female, 24).

Messages should target government and industries that contribute to poor health. Many young adults feel that governments and industries contribute to poor health and should be held accountable in health promotion messaging:

> *I think health promotion/public health messages about improving my own health would be more relevant to my age group if they focused more on targeting the advertisers that promote processed/fast food, tobacco, and activities that promote alcohol consumption (Female, 25).*
>
> *i know its hard to convince others about health, when the government doesn't care about us, and if that could change then people my age might give a shit about living a better life. but when something seems unchangable, there their doesn't seem like any point to change. The first is to give hope, then spark the change. And i think start with the big things, and then worry about the small things (Male, 26).*
>
> *I'm sorry but I'm going to take an indirect approach to this statement... I do not listen to health promotion/public health messages because I generally think they are all in some way tied into the pharmaceutical industries who run a business upon making money off of sick or easily influenced people and convincing them*

that they NEED their drugs/vaccines in order to get better rather than upon getting better by or even better prevention of getting sick in the first place by eating right and exercising. I personally think that the less individuals listen to the advertisements the better off they will be (Female, 29).

Students often used their answers to advocate for the de-normalization of the practices of the tobacco and alcohol industries. Many thought that tobacco and "alcohol advertising marketed toward youth" (Female, 25) were confusing and harmful mechanisms that countered the positive messages offered by more authentic sources such as Public Health.

Chapter Summary:

This chapter reviewed and summarized the descriptive statistics, tests for differences, and qualitative analyses of the quantitative and qualitative data obtained from the online survey tool. The results indicated that most students reported good health behaviours, students new to Nova Scotia reported better health behaviours than local students, and while 'health' was a priority, 'cancer' was not. Students also described influences on health and health behaviours as related to their social context, intrapersonal factors, and broader societal and cultural factors. The final chapter will offer a discussion linking the results and analyses to the concepts of health promotion and Population Health as they relate to young adult cancer prevention.

Chapter Four: Discussion

Empowering young adults to understand and manage cancer prevention is a valuable health promotion strategy. In order to develop effective health promotion initiatives, it is important to appreciate that being 'healthy' is not exclusively a biomedical condition but is dependent on the interaction of several determinants. To demonstrate these relationships within a young adult framework, a research prototype was constructed by blending the tenets of health promotion and population health with some key predictive components of several health behaviour paradigms (Health Behaviour Model, Theory of Planned Behaviour, Theory of Reasoned Action and Self-Determination Theory). Using this set of constructs, it was possible to explore several important components of the socio-ecological determinants of young adult health, their lifestyles, cancer-protective behaviours and motivations and identify potential entry points for support and interventions.

Health Behaviours and Hypothesis Testing

The young adults in this sample reported moderately frequent adoption of healthy behaviours. While the results did not support the premise that younger students would report higher levels of physical activity than older students, the underlying concepts behind the other hypotheses were corroborated. As predicted (with the exception of tanning bed use) young adult females reported adopting healthier behaviours than males and, as expected, young adult males reported higher levels of alcohol consumption than females.

Alcohol use was lower than expected. Although the results indicated that males were more likely to report high-risk drinking behaviour than females, and many students expressed concern over drinking which they perceive as an embedded component of their social context, the self-reported drinking rates for this sample seem relatively moderate. Using the CAMH drinking guidelines as a gauge, most students (85%) reported consuming less than nine alcoholic beverages per week and 33% said that they do not consume alcohol at all. Even considering the subjective limitations of self-reporting (young people have been found to exaggerate actual behaviour) (Bennetts, Borland, & Swerrisen, 1992; Wendt, 2005), these results seem to challenge previous studies and reports of the use and misuse of alcohol for this age group. As seen in Chapter One , the *2004 Canadian Campus Survey* (Adlaf et al., 2005) indicated that young adults (aged 19-24) had the highest rates of non-compliance with the low-risk drinking guidelines (49.1%). Similarly (although the measures used were different than those used in this study), adults aged 25-29 years had the highest current drinking rates (90.9% - 91.1%) followed by young adults aged 19-24 years (89.2%-92.3%).

This study did not pursue an in-depth analysis of alcohol use (students were simply asked to indicate their weekly consumption rates), but a review of the long-answer responses did imply that lack of time and money were key influences of health-related behaviours. It may be reasonable to assume that many students either do not have the budget or the time to consume high amounts of alcohol. Further, student responses indicated that school and academic success are also important priorities at this life stage, therefore perhaps the after effects of drinking alcohol are not conducive to being mentally

prepared to tackle a heavy course load. Another factor that may influence rates of alcohol consumption is the influence of religion on health behaviours but religious edicts were not investigated here.

Future studies to examine the motivations and perceptions of young adult alcohol use/misuse may inform health promotion interventions. When students in this sample were asked to rank alcohol consumption as a risk factor for cancer most described it as "low risk" behaviour. Students also described their perceptions that alcohol use (and misuse) is a prominent part of their social culture. It is known that tobacco research indicates that young people have a tendency to overestimate their peer's use of tobacco products which can contribute to the initiation and continuation of tobacco usage (Leatherdale, Hammond, & Ahmed, 2008). Thus, if young adults are developing perceptions of normalized alcohol use then there may be an opportunity to promote more proactive behaviours by providing a factual depiction of peer behaviours and preferences.

Does "Gender" Warrant an Isolated Focus as a Predictor of Health Behaviour?

Perhaps unsurprisingly, the young adult females in this study reported healthier practices than their male counterparts. This is valuable information when it comes to cancer prevention given that adolescent girls and young adult women (aged 15-29) tend to be diagnosed with cancer more often than males (PHAC, 2011). Although the study results presented here are from a convenience sample, these findings may help influence more tailored social marketing, prevention and screening interventions according to gender and may also inform recommendations for behaviour-change strategies.

These findings however, although helpful, do not seem to tell the whole story. What is it about being female that supports positive health behaviours? Are young adult females making more intentional choices about their health or are they more responsive or resilient to the socio-ecological factors? One of the assertions presented in this thesis was that the social and cultural context has an influence on health. While gender may play an important role in determining health behaviours, it is the confluence of various other factors that provide a more edifying depiction of risk predictors. The multiple methods approach adopted in this study allowed for a broader analysis and the opportunity to marry health behaviours with tangible components of young adulthood such as transition from the home province, self-determination and motivation and perceived self-efficacy. This supports the notion that individual factors (such as gender) fail to account fully for cancer protective health behaviours and that contextual factors will help inform a bigger picture.

Nova Scotia as a Predictor of Health

One of the attention-grabbing results from the data analysis was the inference that young adults from Nova Scotia practice less optimal health behaviours when compared to those who were new to the province. Because students were not asked to identify their region of origin, direct comparisons with different provinces or countries could not be completed. However, an overview of provincial health profiles may provide a basis for contextual inferences. Compared to national averages, Nova Scotia employs more general/family physicians and specialist physicians and reports higher access rates and visits to a regular medical doctor (Statistics Canada, 2011b). Despite these encouraging

statistics, Nova Scotians (aged 12 and over) nonetheless report higher levels of perceived stress, obesity, arthritis, asthma, high blood pressure, tobacco use, heavy drinking and lower levels of fruit and vegetable consumption (Statistics Canada, 2011b).

The province also experiences higher rates of deaths due to cancer, circulatory diseases, and unintentional injuries (Statistics Canada, 2011b). The geographic differences in disease and injury have been attributed to a combination of factors such as: lower socio-economic status, disparities in *access to* and *quality of* treatment, discrepancies in early disease detection, and regional variations in the prevalence of cancer risk factors (CCS/National Cancer Institute of Canada, 2008; CCS, 2007; Wardle et al., 2003). Unemployment rates are higher than in other parts of the country (Statistics Canada, 2011b) and, although the percentage of Nova Scotians living in low-income situations is the lowest it has been in a decade and is lower than the Canadian average (Nova Scotia's Poverty Reduction Strategy, 2009), being unemployed still has a significant impact on individual and family health. Another factor that may play a significant role in health outcomes is a higher percentage of people living in rural areas (Statistics Canada, 2011b) which can impact access to care and health services, employment, education and social support.

According to Statistics Canada (2011b), when compared to national averages, Nova Scotians report comparable rates of 'good to very good' rates of perceived physical and mental health. They also report higher rates of 'sense of community belonging' and lower rates of 'perceived life stress'. Together, these indicators should point to a more optimistic snapshot of health in this province. However, the results from this study

suggest that the influence of provincial health disparities have had an early and significant impact on health behaviours.

Health is a Priority - Cancer is *Not*

Generally, this sample of young adults offered positive self reports about their health status and wellbeing (more than half rated their personal health as 'average'). They also reported high levels of perceived control over their health: virtually every student in this sample agreed that the behaviors they adopt at this stage of their life will impact their long-term health and that they can control their own actions that directly influence their health. Further, most students reported moderate levels of perceived personal cancer risk and maintained a competent knowledge base of key risk factors. Knowing that young adults viewed their health and health behaviours as important, and that they have an active interest in their own health is good news for health promoters. These characteristics demonstrate an openness to messages and strategies related to health and wellbeing while also indicating a positive level of proactive attitudes related to personal health.

Another notable outcome is the lack of precedence attached to 'cancer' when compared to the general concept of 'health'. Despite electing to voluntarily participate in a cancer-related survey, the overwhelming majority of students indicated that cancer is not an important current priority nor is it expected to be a priority in the future. Instead, school, family and happiness outranked health and cancer as their top three *current* priorities and family, health and job security were the top three *future* priorities. Similar reactions were tallied when students were asked to rank the influences that guide health-

related decision making: personal desire to be 'fit and healthy' followed by 'physical appearance.' A 'fear of death/illness' was a distant third. Further, the topic of cancer was only mentioned twice in the long answer, open-ended responses.

This is important information because it helps us understand key components of young adult culture and behaviour. The categorization of self-reported personal priorities can be used as an indirect measure of the immediacy of the concerns identified, it can be related to young adult decision-making behaviour and it can assist in identifying key motivational factors that link to behaviour change. All of these findings support health promotion strategies: by designing interventions that reflect the personal and social constructs of the target group then there is a better chance for health promoters to gain (and retain) captive audiences.

Given that the young adults in this sample reported healthy behaviours (the same healthy behaviours directly linked to cancer prevention), should it matter that they are not all that interested in cancer itself? Probably. Risk perception is also linked to behaviour, motivation and decision making (Craciun, Schüz, Lippke, & Schwarzer, 2010; McQueen, Vernon, Meissner, & Rakowski, 2008; Mevissen et al., 2010) and this study indicated that young adult awareness of the health implications linked to cancer risk factors was not always adequate. Many students indicated that they were unaware that alcohol and obesity were cancer risk factors. This may not be surprising given that the links between obesity and cancer have not been widely promoted and the connection between drinking and cancer has primarily focused on mature women and breast cancer (Chen et al., 2011).

However, other rankings were a bit more troubling. For example, despite national and provincial immunization programs and health promotion campaigns to raise awareness of the link between HPV and cervical cancer, almost 35% ranked sexual behaviour as a low-level risk factor and almost 20% said it had *no* influence on cancer risk. Also, as seen in one example, when gynecological screening was mentioned in the open-ended questions it was with respect to concern over sexually transmitted infections and not cancer risk. These results are not unlike those found in the literature where it is widely reported that young women lack fundamental knowledge about the risks of HPV(CCS, 2008a; Caskey, Lindau, & Alexander, 2009).

Additionally, although tobacco awareness and tobacco control have been staples of health promotion interventions for several decades, almost 19% of students rated tobacco use as having *no* influence on cancer risk. Although several studies have suggested that tobacco users tend to underestimate tobacco-related health risk (such as cancer) (Oncken et al., 2005), this percentage does not account for the findings of this study since 8% of the sample self-identified as 'current smokers'.

In order for individuals to have a perception about risk and risk factors, they need to develop a knowledge base about the potential harms (Lamanna, 2004). The results from this study may indicate that more education is needed about cancer prevention at or before this life stage or that more effective risk communication strategies are needed to engage the core audience. This challenge is made more difficult given the apparent lack of significance placed on cancer risk by the young adults in this sample.

So, Where Does Cancer Fit?

The reasons for cancer to be an understated concern in the lives of the young adults in this study could be due to multiple factors highlighted in this study. Influences such as perceived risk, perceived control, and information seeking all play a role in individual priority setting. While these results may seem discouraging, other results from this study indicate an alternative route for providing cancer prevention support to this unique population: implementing targeted cancer prevention interventions through health care providers.

The qualitative data presented here indicated that young adults value health promotion messages that are accurate and reliable. They also expressed that they often need support to understand, adopt and adhere to personal health strategies. Opportunely, the quantitative data indicated that over 57% of young adults valued their health care provider as a key and trusted source of information and that over 60% reported visiting a health care provider two or more times in a regular year.

This information may identify health care providers as an optimal vector for the provision of cancer prevention information and support. However, health care providers may need some support of their own to be successful in this task. For example, in Caskey et al.'s 2009 study on HPV and young adult women, respondents identified their health care provider as a trusted source of medical information. Further, most reported being likely to get the HPV vaccine if a doctor or nurse integrated a recommendation for the vaccine into a positive discussion about sexual health. However, for care providers to operate effectively and disseminate information about any cancer-relevant behaviours (such as HPV vaccine uptake, tobacco use, and physical activity), they need to be

empowered with the information and skills necessary to meaningfully engage with their young adult clients. From a health promotion perspective, building supportive multidisciplinary relationships is conducive to achieving sustainable health outcomes. Thus, helping build the capacities of health care providers to effectively champion cancer prevention messages at the local level would be an ideal assignment for health promotion specialists.

Barriers and Facilitators to Wellbeing Reflect the Determinants of Health

The examination of university students is an interesting focal point from a Population Health standpoint given that many of the key determinants could be assumed to be satisfied: this is a highly literate and educated group of young adults living in an urban centre with access to core services and the economic resources/support to attend a post-secondary institution. This study has provided an opportunity to explore the unique characteristics of young adult culture (and campus culture) that impact health behaviours and cancer prevention even with this relatively privileged group.

Student responses reflected the elements outlined in the Population Health model (Figure 1) that was used to inform the research design of this study. They described layers of obstacles and supports related to intrapersonal determinants, their social contexts, and societal and cultural norms:

> **Intrapersonal determinants.** From an individual perspective, many students discussed their internal locus of control, knowledge base about healthy, sense of self-efficacy and motivation as underlying drivers of their health behaviour.

Social context. Achieving and maintaining health was also described as a social experience in that peer pressure, peer support, romantic partners and family relationships were strong components of behaviour and decision-making strategies.

Society/culture. Students defined their 'communities' in different ways. For example the 'Halifax' community was referenced in terms of access to farmers' markets, bike lanes and hiking trails while the 'campus' community was often discussed when describing the student context (e.g. access to Dalplex, the campus smoking ban, cafeteria food).

Although most young adults were aware of many cancer risk factors and also reported healthy behaviours, these individual strengths were often counteracted by pressures that seemed out of their personal control. For example, while most students were non-smokers many students shared experiences of being unwillingly exposed to second-hand smoke at work and on campus. Perceived social norms (pressure to be thin, use tobacco, drink alcohol) and expectations of the government to promote healthy public policy were also cited by students as contributing factors to health.

These findings uphold the viewpoint health education is not enough to compel the adoption of healthy behaviours. Instead, effective health promotion strategies and interventions must permeate multiple levels of determinants to influence health outcomes for young adults.

The Role of Health Promoters: Knowledge Translation, Risk Communication & Advocacy

This research has provided a valuable foundation on which to base potential mechanisms for enabling improved health outcomes for the target group. Most young adults in this sample reported actively seeking health information (only about 2% of the sample reported that they did not). It was learned that the young adults in this sample are receptive to health promotion messages and interventions. For instance, student reports indicated that they are open to changing their health behaviours and they also believe that there is a lot that they can do to lower their cancer risk. Additionally, most reported knowing a friend or family member with cancer. Research indicates that these experiences also influence young adults to be sensitive and responsive to positive to health campaigns and/or programming (Bendelow et al., 1996; Lykins et al., 2008).

The importance of 'health' to this sample of young adults was also demonstrated through the receipt of over 500 responses to a summer online survey about cancer prevention. This high level of engagement could signify one or many things: these young adults were interested in sharing their experiences and opinions on health and cancer; they felt a sense of obligation to a fellow Dalhousie student, and/or they felt a sense of obligation to contribute to local research on a topic that related to their own health. Regardless, the robust input demonstrated a strong sense of conscientiousness and interest in the survey topic.

Health promotion professionals in Nova Scotia are in a prime position to influence short and long-term health outcomes for this target population. In addition to provincial investments in evidence-based policies to support tobacco control, poverty,

healthy eating, sun safety and obesity, this study has provided some baseline information to enhance our health promotion communications and knowledge translation practices specific to the young adult context.

We know where young adults access their health information. When asked about information materials, the Web was the most reported source of information followed by academic journals, health and fitness magazines, and television. As a generation who grew up with technology, the fact that only a small proportion indicated that their search for information was frustrating or required effort was not surprising. About 40% said they found the information they were looking for easily and they trusted the source but 43% said they were concerned with the quality of the information they accessed. It was unfortunate that this study did not offer a central focus on young adult use of web-based media tools (online library services, Smartphone use, social networking sites such as Facebook). However, this feedback is valuable for health promoters in that it informs a more relevant description about the characteristics and information seeking strategies to help customize information dissemination/sharing strategies.

We know who young adults rely on for information. Supporting young adults to properly find accurate health information and navigate the health care system is an important first step in encouraging lifelong health practices. Because friends and family members were identified as key knowledge brokers, it is crucial that these contacts build their knowledge base and capacities for holding informed conversations so that the information exchanged is correct and relevant. Hence, it is possible that *peer engagement* and *family engagement* strategies could represent inexpensive and successful

mechanisms for enhancing health support. Given that many students are new to Nova Scotia, and considering the high levels of positive health behaviours and conscientiousness of the young adults in this sample, peer-to-peer approaches may offer the best return on investment.

It is also known that healthcare providers are a primary contact point for: social support, the provision of credible health information and advice on improving personal health skills and practices (Mulye et al., 2009). The students in this study disclosed that they value health care providers as important sources for health information and, because most young adults reported visiting a health care provider at least once each a year, understanding this relationship is especially important. Health care provider visits decrease as independence increases (e.g. moving to another region such relocating to a different province for school) thus, knowing more about where and why young adults visited (or *did not* visit) a health care provider is crucial to improving access to health services. Although this study provides a baseline description of the frequency of visits, it would have been useful to ask where and who they visited (e.g. Did students utilize the Dalhousie health clinic? Did local students visit their own family doctor? Did visiting students visit their health care provider in their home province?). It also would have been optimal to ask about the motivation behind the visit (e.g. was it a proactive check-up or prompted by a specific concern?).

If health promoters knew more about the physical, social and psychological barriers to access to health services we could potentially help increase the value and relevance of (even brief and infrequent) visits by enhancing the quality of the interactions

between clinicians and young adult clients. Suggestions for improvement might include: designing risk communication tools on pertinent topics (such as sexually transmitted infections), using communication formats that are relevant to young adults (such as Facebook), and advocating for supplemented clinic services (such as a wellness counsellor or nutritionist who specialize in young adult health needs).

We know how to customize health promotion messages and interventions. According to the students surveyed in this study, the effectiveness of health promotion communication and strategies is enhanced when people feel that what is being conveyed is perceived as *relevant*. This study has shown that the young adult health experience in Nova Scotia is heterogeneous and complex and should not be generalized from one group to another without respecting certain cautions. Based on the reported inconsistency between individuals, groups of people and dynamic social contexts, influencing behaviours may be better managed by considering young adults as members of different audiences.

The long-answer responses to the questions about barriers and facilitators to 'health' revealed a variety of intrinsic and extrinsic factors that influence the probability of adopting healthy behaviours. This information allows health promoters to strategically categorize the young adults in this sample as: people who are prone to practice healthy behaviours and have the resources and capacities to act; people who are resistant to adopting healthy practices regardless of resources and capacities, and people who are aware of healthy options and motivated to make change but experience too many barriers to respond (Rothschild, 2010; Schmid, Rivers, Latimer, & Salovey, 2008). By adopting

this segmented approach, the risk of designing a health promotion intervention based on a one-dimensional variable (such as age or gender) is eliminated and interventions can be tailored to best fit the unique experiences and perspectives of each group.

These categories are extremely helpful given the personal qualities and characteristics revealed by the young adults in this study who offered important information about their perceived control, self-determination and motivation. Most students reported healthy behaviours, good levels of awareness of health information and some candidly preferred to have health messages affirm their current investments in proactive lifestyles. Some students reported that they knew their behaviours were suboptimal (many described how much they enjoy using marijuana, eating junk food and the taste of beer) but had no immediate ambitions for adopting more favourable alternatives. Many students revealed that, although they were aware of key health messages, they also needed to be empowered with the required information to be successful in their personal follow-through strategies. For instance, knowing that carrots are a healthy food choice is good but knowing where carrots are on sale and having some direction on how to store, prepare and freeze carrots would be even better.

Having health promotion and protection policies that are respected and enforced was also identified as form of support and empowerment. For example, policies that encourage smoke-free campuses and workplaces were perceived as valuable in limiting unwanted exposure to tobacco products.

This study also provided an opportunity for young adults to delineate their own recommendations for increasing the uptake, relevance and meaning of health-related

messages. Numerous examples of expectations and preferences for the tone, content and mechanisms for knowledge translation and communication were provided from a first-voice perspective. Suggestions included designing interventions and campaigns that reflected not only the target age group but also young adult and university *culture*. Perceived accuracy and trustworthiness were prerequisites, as were using appropriate communication methods and technology. Many young adults in this sample also suggested that bringing messages directly to the audience (in their work, social and school settings) is a preferred dissemination approach.

Finally, one of the key roles of a health promoter is knowledge translation and this study has presented an abundance of information and insight with respect to young adult health and cancer prevention. In an effort to exchange and apply the lessons gleaned from this research, a summary report of key messages will be developed and shared with partners in my professional network at Public Health Services, CDHA and with the NS Department of Health and Wellness). Additionally, given the richness and direct relevance of the feedback provided on the 'student' and 'campus' contexts at Dalhousie University, a report will also be provided to the Dalhousie Health Promotion office.

Methodological Limitations

Several limitations should be noted when considering the findings presented in this study. Although the description of this sample mirrors the broad description of young adults in Canada (PHAC, 2011; Statistics Canada, 2011b), this study featured a single cohort of students attending a large university in Nova Scotia and results may not be

relevant to campuses in other regions nor may they be appropriate comparisons for young adults *not* attending university. For example, it could be assumed that young adults enrolled in post-secondary education are wealthier and better educated than their non-student counterparts and therefore enjoy different capacities for maintaining their health.

Attrition analyses indicated that those at greatest risk were least likely to complete all assessments in the survey. Although a range of behavioural risks was still evident among those who completed all assessments, findings should be tempered to acknowledge that they may not be applicable to those at greatest risk (Fromme et al., 2008). It is also possible that some individuals may have under or overstated their behaviours or that incorrect responses were inputted due to a misunderstanding of the question(s) or rating scales (Steptoe et al., 2002).

Further, most survey participants self-identified as part of the majority culture therefore the results may not be representative of behavioural patterns from across different ethnicities. The results of this study may not be generalizeable broadly to all Dalhousie students because this was not a random sample nor was there an attempt made to achieve a random sample. Nonetheless, a large number of responses from male and female respondents of different age ranges and socio-economic backgrounds is useful from the perspective of health promoters.

It is also important to note that the student participants were not asked to declare their faculty of study and levels of behaviour may differ among university students when their dedicated academic focus is considered (e.g. health science students may have an enhanced knowledge about cancer risks when compared to engineering majors). Students

were not asked to identify their year of study or if they lived on or off campus but comparisons between undergraduate and graduate students were not the focus of this project.

It is also important to carefully consider the potential of the effects sampling bias. It is feasible to assume that many students who responded to an email invitation to participate in a "cancer prevention awareness survey" were already committed to cancer and/or health-related topics and their views may be overrepresented. Further, because there is no way to track how many students received and/or reviewed the email invitation to participate in the survey the response rate cannot be predicted with confidence. It is difficult to estimate how many students use their Dalhousie email accounts as their primary messaging account or how many monitored their Dalhousie email accounts over the summer period when the survey was released. Additionally, given the fact that Dalhousie University's student population is approximately 17,000 (Dalhousie University, 2011), if I did assume that every Dalhousie students aged 17-29 received the invite then the final response rate (n=484) was relatively low.

Although the use of composite scores for behaviour, perceived control and perceived susceptibility has the advantage of tapping diverse aspects of each domain, each index measure was somewhat limited in the scope of the health components examined. Additionally, while the composite scores fell short of a psychometrically sound scale (comparatively low Cronbach's alpha ratings), these measures adequately provided a general composite indices for the purposes of this study.

In future studies featuring young adult health cancer prevention and health promotion it will be advisable to ask more comprehensive questions about health behaviours and related intrapersonal factors. For example, with respect to tobacco use, 78% of young adults in this sample identified as having never smoked and 14% reported being current non-smokers. This reflects national and provincial statistics for tobacco use (Health Canada, 2011). However, this query may have extracted slightly different responses had the definition of 'tobacco' been expanded from 'cigarettes' to include all tobacco products such as smokeless tobacco, flavoured tobacco products, and marijuana wrapped in tobacco. Likewise, the data compiled about alcohol consumption could be enhanced by asking more questions about the number of drinks per sitting and/or the types of alcohol consumed. As a way of increasing our understanding of all aspects of young adult experience, it would be useful to ask about their perceived stability in life (e.g. married/with children) and employment status.

Finally, upcoming studies on young adult health should focus more on the role of web-based information seeking and sharing. As of 2009, 80% of Canadians aged 16 and older use the Internet for personal reasons and this number (presumably) has grown (Statistics Canada, 2011a). The recent *Cisco Connected World Technology Report* polled young adults from 14 countries (including Canada) about their Internet use and almost half of the students surveyed considered the Internet to be "close in importance to water, food, air, and shelter in their lives (Cisco Systems, 2011, p.4)." Web-based technologies are growing and evolving at a dizzying pace and are becoming more affordable and accessible. Because they represent such a prominent focal point in young adult culture for

learning, communicating and social networking, it is no longer optional to consider the Internet as an integral part of young adult health promotion paradigms.

What This Study Adds (Implications for Health Promotion and Future Research)

The definition of 'young adulthood' is evolving, the transitions to mature adulthood are complex, and the health and well-being of young adults is a key concern for health care providers and government agencies (Franke, 2010; Gaudet, 2007). What is missing is a consideration of how young adult perceptions of their life situations may support or obstruct their ability to practice cancer-relevant health behaviours. In order to contribute to an advanced understanding of the needs and strengths of this population, it was essential to design a study that provided young adults an opportunity to offer their unique perspectives on an important health topic. By capitalizing on quantitative and qualitive mechanisms of self-report, it was possible to glean discrete data for comparisons of behavioural and intrapersonal variables while also collecting personalized and subjective input. These results will foster a contemporary depiction of young adult health essential for developing tailored cancer prevention and health promotion strategies.

This study was designed in part to highlight the formulation of age classifications as barriers within young adult health. Canadian age-banding categories are somewhat ambiguous and are often limiting in their scope by the obsolete histories behind the age-groupings and the lack of cohesive definitions between sectors. For example, Canada's Census uses the following age groups: 0-14 (child), 15-24 (adolescent), and 25-64 (adult) (Statistics Canada, 2008). This classification is primarily symbolic of age 15 being

considered the beginning of 'working life' and the end of childhood (Gaudet, 2007). For comparison, Health Canada's Canadian Tobacco Use Monitoring Survey (CTUMS) categorizes 'youth' as between ages 15 and 19, and 'young adults' as between ages 20 and 24 (Health Canada, 2006a). The Canadian school system designates 'youth' as between the ages of 12 and 18 (or grades 7 to 12) and health promotion strategies aimed at school-aged youth (such as Nova Scotia's *Active Kids, Healthy Kids* physical activity strategy) typically follow suit (NSHPP, 2007a).

These traditional methods for age classification are not always consistent with modern definitions of life transitions or contemporary social expectations. Further, socio-cultural shifts are loosening the linkages between health, psychosocial and career transitions which differentiate adolescence from young adulthood making them less age-related and more complex (Jordan & McDonagh, 2007). Technology and consumer empowerment have provided young people with unprecedented social influence, modes of communication and expression, and options for career and education. With increasing numbers going on to higher education, the transition into employment is also delayed thereby prolonging their entry into 'work life' or 'family life' (Arnett, 2001; Jordan & McDonagh, 2007). It is also important to note that this life stage has changed considerably over the past 30 years and health and social policies have not necessarily kept pace with the new realities and experiences of early adulthood (Gaudet, 2007). Therefore, it would be reasonable to assume that self-efficacy and health empowerment may be inhibited by social norms and expectations that are culturally inappropriate for this life stage.

This socioeconomic phenomenon also demands the re-evaluation of 'young adult culture' so that health promotion professionals can achieve a higher level of understanding on how young adults receive, retain, and process information that is relevant to their health. In addition to being able to better predict relevant health outcomes for this age group, enhancing our own perspectives by gleaning the previously under-explored perspectives of young adults will augment current conceptions of health behaviour and (possibly) stimulate a reorientation of health policy and current cancer prevention programs. For example, young adults do not share the same socio-economical contexts as adolescents, or mature adults, yet they are frequently blended and overlapped into the same categories out of programming convenience.

In this context, due to the absence of an adequate definition and understanding, it could be argued that 'young adulthood' is in itself a unique health disparity that challenges the intentions of sustainable empowerment and behavioural change interventions. However, the multiple methods approach allowed for a better understanding of how young adults understand and manage cancer risk and how they think about their health. Using qualitative and quantitative methods to validate interpretations of student responses through the triangulation of results added a boost of analytical power to this study. For example while most (52%) students reported consuming less than 9 alcoholic beverages per week and 32% reported completely abstaining from alcohol use, many students expressed concern over the role alcohol use and misuse plays in their social contexts. Healthy eating was another example of how the descriptive statistics were augmented with student narratives. While most (87%) reported

that they eat a balanced diet, the qualitative descriptions depicted many perceived barriers and obstacles that either limited or prevented students from regulatory eating a well-balanced diet. By wrapping the young adult context around the descriptive statistics, it was possible to inform a more contemporary and complete depiction of cancer-related behaviours for this population.

Conclusion

Health promotion and Public Health practitioners share a significant responsibility in creating the conditions to achieve positive health outcomes. To be more effective as catalysts for increasing health equity, our work demands that we actively mainstream contemporary approaches and offer relevant solutions. Health promotion is a two-way street: information and evidence need to flow *to* and *from* the populations we aim to support. Therefore, this study was designed to engage young adults in research to provide critical insights about how they understand and manage cancer risk. Consequently, this exploration has contributed valuable information about how young adult perceptions, intentions, expectations and experiences relate to health behaviour.

More specifically, this study showed that, although this sample of young adults reported practicing healthy behaviours that are recommended in cancer prevention strategies, they did not necessarily adopt these behaviours in a deliberate attempt to prevent or manage their cancer risk. Instead, the motivation behind many of their activities and behaviours were more directly related to their unique social and economic contexts. The results of this study demonstrate that health promotion is not just about health education and the creation of one-dimensional interventions. Socio-demographics

(age, gender) should not be examined in isolation with respect to cancer risk factors (such as tobacco use, alcohol consumption, and obesity); to be effective it is important to be aware of the *multiple* determinants of health and how these factors interact. Intrapersonal factors (perceived susceptibly, perceived control, motivation and information seeking) and the socio-ecological context (culture, policy, physical and social environments) also play a major role in moderating the cancer-relevant health behaviours of young adults. Accordingly, tackling issues related to the broad determinants of health requires a collective strategy that transcends the boundaries of conventional 'health' fields. To truly incorporate a Population Health approach to support healthy living, initiatives targeting young adults need to integrate the community, employment, education, technology and government sectors.

The information gained from this study can help us tether our efforts and objectives to the defined needs of our target population. Young adults maintain a diverse range of beliefs and behaviours that should be continuously explored in an effort to develop opportunities for meaningful and compelling interactions. Thus, it is imperative that health promoters demonstrate an enhanced appreciation for the unique experiences of young adults when engaging in program design, research, evaluation, policy development, and knowledge exchange. Ultimately, by building our own capacities and competencies in understanding the dimensions of the young adult context, we can authentically earn their trust and confidence because they will be able to see themselves in the work that we do.

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Appendix A: University Student Cancer Awareness and Prevention Survey

1) This survey is currently open only to people who: a) are actively registered as a student at Dalhousie University (OR were at Dalhousie University during at least one of the 2009/10 terms) and b) are 17-29 years of age. If you do not fit into these categories or do not wish to participate in this survey at this time, please click the link below to exit. If you have read the terms and explanations provided in the consent form and agree to take part in this study, please click the NEXT button to begin the survey.

2) If you agree that quotations may be used in the final report, please click the button below.
   - ☐ Agree
   - ☐ Disagree

3) What is your gender?
   - ☐ Female
   - ☐ Male
   - ☐ Other

4) Please indicate your age at your last birthday.
   - ☐ [number field] years old

5) Have you lived in Nova Scotia for at least half of your life?
   - ☐ Yes
   - ☐ No

6) Please indicate the ethnic/cultural background with which you most identify.
   - ☐ Caucasian
   - ☐ African Canadian
   - ☐ Aboriginal Origins
   - ☐ Lebanese
   - ☐ Ukrainian
   - ☐ South Asian Origins
   - ☐ Chinese
   - ☐ Other: [blank field]
   - ☐ Prefer not to answer

7) Please indicate your socio-economic status by estimating your family's annual household income:
   - ☐ Less than 61,000
   - ☐ 61 – 80,000
   - ☐ 81-100,000
   - ☐ More than 100,000
   - ☐ Independent
   - ☐ Prefer not to answer

8) How much do you weigh without your shoes?
   - ☐ [number field] lbs

9) How tall are you without your shoes?
   - ☐ [number field] feet
   - ☐ [number field] inches

10) Please rate your overall health:

- ☐ Poor
- ☐ Fair
- ☐ Average
- ☐ Excellent

11) Have you ever been diagnosed with cancer?

- ☐ Yes
- ☐ No

12) Have any of your family members or close friends ever had cancer?

- ☐ Yes
- ☐ No

13) From the list below, please check your TOP 3 current most important concerns:

- ☐ Job security
- ☐ Death of friend/loved one
- ☐ Environmental issues
- ☐ Happiness
- ☐ Cancer
- ☐ Health
- ☐ Violence
- ☐ Financial independence
- ☐ Peace of mind
- ☐ Money
- ☐ Friends
- ☐ Love
- ☐ Family
- ☐ Illness/injury
- ☐ School
- ☐ Other: [blank field]

14) From the list below, please check the TOP 3 items that best represent what you believe will be your biggest concerns in the FUTURE.

- ☐ Job security
- ☐ Death of friend/loved one
- ☐ Environmental issues
- ☐ Happiness
- ☐ Cancer
- ☐ Health
- ☐ Violence
- ☐ Financial independence
- ☐ Peace of mind
- ☐ Money
- ☐ Friends
- ☐ Love
- ☐ Family
- ☐ Illness/injury
- ☐ School
- ☐ Other: [blank field]

15) Please rank how strongly you dis/agree with the following statement: "I can control my own actions that directly influence my health."

- ☐ Disagree strongly
- ☐ Disagree
- ☐ Disagree somewhat
- ☐ Agree Somewhat
- ☐ Agree
- ☐ Strongly agree

16) Please rank how strongly you dis/agree with the following statement: "My behaviour at this stage of my life will influence my long-term health."

- ☐ Disagree strongly
- ☐ Disagree
- ☐ Disagree somewhat
- ☐ Agree somewhat
- ☐ Agree
- ☐ Strongly agree

17) For the following questions, please rank (mark the box that applies to you) each item according to how much you believe it can influence your cancer risk:

	High Risk	Medium Risk	Low Risk	No influence	Don't Know
UV exposure	☐	☐	☐	☐	☐
Secondhand tobacco smoke	☐	☐	☐	☐	☐
Tobacco use	☐	☐	☐	☐	☐
Sexual behaviour and safe sex practices	☐	☐	☐	☐	☐
Obesity	☐	☐	☐	☐	☐
Dietary intake	☐	☐	☐	☐	☐
Alcohol consumption	☐	☐	☐	☐	☐
Physical activity	☐	☐	☐	☐	☐
Family history of illness/cancer	☐	☐	☐	☐	☐

18) When you compare yourself to other students your age at Dalhousie University, what do you think are YOUR chances of being diagnosed with cancer in the future?

☐ No chance
☐ Below average
☐ Average
☐ Higher than average

19) How strongly do you dis/agree with the following statement: "By the time I am old enough to get cancer, there will be a cure and/or effective treatment for the disease."

☐ Disagree strongly
☐ Disagree
☐ Disagree somewhat
☐ Agree Somewhat
☐ Agree
☐ Strongly agree
☐ No opinion

20) How strongly do you dis/agree with the following statement: "It seems like everything causes cancer."

- ☐ Disagree strongly
- ☐ Disagree
- ☐ Disagree somewhat
- ☐ Agree Somewhat
- ☐ Agree
- ☐ Strongly agree
- ☐ No opinion

21) How strongly do you dis/agree with the following statement: “There's not much people can do to lower their chances of getting cancer."

- ☐ Disagree strongly
- ☐ Disagree
- ☐ Disagree somewhat
- ☐ Agree Somewhat
- ☐ Agree
- ☐ Strongly agree
- ☐ No opinion

22) How strongly do you dis/agree with the following statement: "There are so many recommendations about preventing cancer it is hard to know which ones to follow."

- ☐ Disagree strongly
- ☐ Disagree
- ☐ Disagree somewhat
- ☐ Agree Somewhat
- ☐ Agree
- ☐ Strongly agree
- ☐ No opinion

23) Which person/people do you turn to MOST for health information?

- ☐ Teacher(s)/professor(s)
- ☐ Healthcare professional(s)
- ☐ Friend(s)
- ☐ Parent(s)/family
- ☐ I don’t seek information
- ☐ Other: [blank field]

24) Thinking about the most recent time you looked for health information, where did you look first?

- ☐ Random Internet search
- ☐ Specific Internet site
- ☐ Academic journal(s)
- ☐ Television
- ☐ Health/fitness magazine
- ☐ Newspaper
- ☐ Never looked for info
- ☐ Other: [blank field]

25) Please check the TOP 3 sources that you use to retrieve information about health and wellbeing:

- ☐ Random Internet search
- ☐ Specific Internet site
- ☐ Academic journal(s)
- ☐ Television
- ☐ Health/fitness magazine
- ☐ Newspaper
- ☐ Never looked for info
- ☐ Other: [blank field]

26) Thinking of how you responded to the previous question about how you retrieve information about health and wellbeing, please indicate the statement you MOST agree with:

- ☐ "I found the information I needed easily and trusted the source."
- ☐ "It took a lot of effort to get the information I needed."
- ☐ "I felt frustrated during my search for information."
- ☐ "The information I found was hard to read/difficult to understand."
- ☐ "I was concerned with the quality of the information."
- ☐ "I have never searched for health information."

27) Have you ever changed any of your personal health behaviours?

- ☐ Yes
- ☐ No

28) Without the assistance of a parent or guardian, how many times have you arranged to visit a healthcare professional (doctor/nurse/clinic) in the past year (365 days)?

- ☐ Zero
- ☐ One time
- ☐ Two times
- ☐ Three or more times

29) In the past year (365 days), how many times have you performed self-assessment exams (such as breast exams or testicular exams)?

- ☐ Zero
- ☐ One time
- ☐ Two times
- ☐ Three or more times

30) In a typical week, how many days do you do moderate-intensity physical activity or exercise (comparable to walking as if you were in a hurry) for more than 20 minutes?

- ☐ Zero
- ☐ One day
- ☐ Two days
- ☐ Three or more days

31) Thinking about your food consumption in a typical week, how much do you dis/agree with the following statement: "I generally eat a well-balanced diet that includes fruits, vegetables, whole grains and protein sources."

- ☐ Disagree strongly
- ☐ Disagree somewhat
- ☐ Agree Somewhat
- ☐ Strongly agree

32) Thinking about your outdoor activities, please select the option that best describes how you relate to the following statement: "When I go outside for more than one hour on a sunny day I make an effort to protect myself from the sun's rays (e.g. wear a hat, wear a long-sleeved shirt, wear sunscreen, etc."

- ☐ Never
- ☐ Rarely
- ☐ Often
- ☐ Always

33) With the exception of medical reasons, how many times in the past 12 months have you used artificial tanning equipment (such as a sun lamp, sun bed, or tanning booth) for the purpose of getting a tan?

- ☐ Never
- ☐ 1-2 times
- ☐ 3-4 times
- ☐ 5+ times

34) During June to August of LAST SUMMER (2009): When you were in the sun for 30 minutes or more, how frequently did you seek shade between 11am and 4pm?

- ☐ Always
- ☐ Often
- ☐ Rarely
- ☐ Never
- ☐ Don't know

35) How would you rate your weekly alcohol consumption? NOTE: a standard drink of alcohol is defined as 13.6 grams of alcohol or:

- A small glass of wine (5 oz/142 mL wine (12% alcohol))
- A shot of alcohol (1.5 oz/43 mL of spirits (40% alcohol))
- A bottle/can of beer (12 oz/341 mL of regular-strength beer (5% alcohol))

- ☐ Zero
- ☐ No more than 9 drinks
- ☐ No more than 14 drinks
- ☐ More than 14 drinks

36) How would you rate your current tobacco use?

- ☐ Never smoked/used tobacco
- ☐ Current non-smoker/non tobacco user
- ☐ Daily/occasional tobacco user (I have smoked 100 cigarettes in my entire life and at least 1 cigartette in the last 30 days)

37) If you identified in question 36 that you are a daily or occasional tobacco user....do you ONLY smoke when you drink alcohol?

- ☐ Yes
- ☐ No

38) Have you ever stopped smoking because you were trying to stop/quit smoking?

- ☐ Yes
- ☐ No

39) How often do you willingly/knowingly expose yourself to second hand smoke (also known as environmental tobacco smoke)? For example, how often might you attend gatherings where other people are smoking?

- ☐ Never
- ☐ Rarely
- ☐ Often
- ☐ Regularly

40) Please check what you would describe as the TOP 3 influences that guide your health-related decision making behaviour:

- ☐ My spirituality
- ☐ My sense of adventure
- ☐ My desire to be fit/healthy
- ☐ Peer pressure
- ☐ Responsibility to my family
- ☐ My career
- ☐ Fear of death/illness
- ☐ Physical appearance
- ☐ Academic studies
- ☐ Other: [blank field]

41) Please write a brief response (255 words max) to the following statement: "It would be easier to improve my health behaviour(s) IF..."

42) Please write a brief response (255 words max) to the following statement: "I think health promotion/public health messages about improving my own health would be more relevant to my age group IF..."

Appendix B: Summary of Deleted Cases by Age and Gender

Category	# of cases deleted	Female	Male
Deleted from survey due to early withdrawal	43	incomplete	incomplete
Deleted from BMI calculations due to outliers	3	1	2
Cases excluded from grouped variables:			
• Current/future health concerns (Q13-14)	5	3	2
• Perceived control (Q15, Q16)	1	1	-
• Perceived risk factors Q17	1	-	1
• Information Seeking (Q24-Q26)	1	1	-
• Perceived vulnerability (Q18-22)	22	20	2
• Health behaviour (Q27-Q39)	2	2	-

Appendix C: Survey Dissemination Request

Hello: My name is Heather and I'm a Grad student working on my MA in Health Promotion and have designed a survey on the topic of student cancer awareness. I have received ethics approval to design a summer email appeal to share the survey with Dalhousie students and I am hoping that your department can help me reach students of different ages and academic backgrounds.

If time permits, would you mind copying the prepared text (below the dotted line) and sending my survey information through your email student distribution lists?

If you have any questions please feel free to contact me. Thank you for your time and assistance!

Heather

.....

Hello:

My name is Heather McPeake and I am a graduate student in the School of Health and Human Performance. Your faculty department has kindly offered to circulate this email for me to encourage student participation in my thesis research on student cancer awareness.

I have developed an anonymous online survey for people aged 17-29 who are currently enrolled at Dalhousie University (or who were enrolled during the 2009/2010 terms).

This email appeal is part of a multi-component approach to collect the opinions of a wide variety of students on the topic of cancer and cancer awareness and it would be appreciated if you could share this information with your social networks.Here is the survey link: https://surveys.dal.ca/opinio/s?s=7767

The survey should take about 15-25 minutes to complete but you can quit at any time.The opening page on the survey provides more info about the project if you're interested.

Please share this email with your networks! As a 'thank you' for taking part, eligible participants can enter a prize draw for a $200 gift card at the Future Shop at the end of the survey.

If you have any questions please feel free to contact me directly.

Thanks for your input and have a great summer!

Heather McPeake (email: hmcpeake@dal.ca)

Appendix D: University Student Cancer Awareness and Prevention Survey (Pilot Test)

Q#:	Questions (Predictor Variables: Demographics)			Understandable?		Adequate?		Only one response?		Obvious/loaded?		Offensive?		Notes
1.	1. Male 2. Female		Gender	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
2.	1.17 2.18 3.19 4.20 5.21	6.22 7.23 8.24 9.25	Please indicate your age at your last birthday (if <17 or >25 then exclude from survey)	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
3.	1. Yes 2. No		Have you lived in Nova Scotia for at least half of your life?	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
4.	1.Caucasian 2.African Canadian 3.Aboriginal origins 4.Lebanese 5.Ukrainian 6.South Asian origins 7.Chinese 8.Prefer not to answer			Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	

5.	1. Less than 60,000 2. 61,000-80,000 3. 81, 000 – 100,000 4. 100,000+ 5. Have lived independently for 5 (?) or more years 6. Prefer not to answer	Please indicate your socio-economic status by estimating your family's annual household income.	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	

Q#:	Questions (Predictor Variables: Personal and Family History)		Understandable?		Adequate?		Only one response?		Obvious/loaded?		Offensive?		Notes
6.	1. poor 2. fair 3. average 4. excellent	Please rate your overall health (poor/fair/average/excellent)(Oak Bendelow, Barnes, Buchanan, & Hussein, 1995)	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
7.	1. Yes 2. No	Have you ever been diagnosed with cancer? (HINTS CH-4) **Students who answer yes to be excluded from survey as their knowledge will skew results?*	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
8.	1. Yes 2. No	Have any of your brothers, sisters, parents, or other close family members/friends ever had cancer? (HINTS CH-4)	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	

Lead in: "I would like to ask you some questions regarding your current perceptions about your own health..."

Q#:	Questions (Outcome Variables: Current knowledge/assessment of risk)		Understandable?		Adequate?		Only one response?		Obvious/loaded?		Offensive?		Notes
9.	_ job security _death of self/friend/relative _ environmental issues _ happiness _cancer _ health _violence _ financial independence _ peace of mind _ money _ friends _ love _ family _illness/injury _other _____	From the list below, please rate (with "10" being the most important and "1" being of least importance) your CURRENT most important concern(s).	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	

10.	_ job security _death of self/friend/relative _ environmental issues _ happiness _cancer _ health _violence _ financial independence _ peace of mind _ money _ friends _ love _ family _illness/injury _other	From the list below, please rate (with "10" being the most important and "1" being of least importance) your biggest concern(s) in the FUTURE.	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
11.	1. disagree strongly 2. disagree 3. agree 4. strongly agree 5. no opinion	Please rank how strongly you dis/agree: "I can control my actions that directly influence my health."	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
12.	1. disagree strongly 2. disagree 3. agree 4. strongly agree 5. no opinion	Please rank how strongly you dis/agree: "My behaviour at this stage of my life will influence my long-term health."	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	

Q#:	Questions (Outcome Variables: Current knowledge/assessment of risk)		Understandable?		Adequate?		Only one response?		Obvious/loaded?		Offensive?		Notes
13.	○ Ultra Violet exposure ○ SHS ○ Tobacco use ○ Sexual behaviour ○ Obesity ○ Dietary intake ○ Alcohol consumption ○ Physical activity Family history	With 10 being the highest and 1 being the lowest, please RATE each item according to how much you believe it to influence your personal cancer risk.	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	

Lead in: "I would like to ask you a few questions about your current knowledge and perceptions of cancer..."

Q#:	Questions (Outcome Variables: Current knowledge/assessment of risk)		Understandable?		Adequate?		Only one response?		Obvious/loaded?		Offensive?		Notes
14.	1. poor 2. fair 3. average 4. excellent	Please rate your current knowledge of cancer risks?	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
15.	1. disagree strongly 2. disagree 3. agree 4. strongly agree 5. no opinion	How strongly do you agree/ disagree with the following statement: "By the time I am old enough to get cancer, there will be a cure and/or effective treatment for the disease."	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
16.	1. disagree strongly 2. disagree 3. agree 4. strongly agree 5. no opinion	How strongly do you agree or disagree with the following statement: "It seems like everything causes cancer."	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
17.	1. disagree strongly 2. disagree 3. agree 4. strongly agree 5. no opinion	How strongly do you agree or disagree with the following statement: "There's not much people can do to lower their chances of getting cancer."	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
18.	1. disagree strongly 2. disagree 3. agree 4. strongly agree 5. no opinion	How strongly do you agree or disagree with the following statement: "There are so many recommendations about preventing cancer; it is hard to know which ones to follow."	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	

19.	1. Yes 2. No 3. Not sure	Have you ever changed any of your health behaviours (i.e.,: made an effort to make healthier food or lifestyle choices) to reduce your cancer risk?	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
20.	1. Below average 2. Average 3. Higher than average	When you compare yourself to other students your age at Dalhousie University, what do you think are <u>your</u> chances of being diagnosed with cancer in the future?	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	

Lead in: "I would like to ask you a few questions about how and where you get information about health."

Q#:			Understandable?		Adequate?		Only one response?		Obvious/loaded?		Offensive?		Notes
21.	○ Teacher(s)/prof(s) ○ Health care professional(s) ○ Friends ○ Parent/family member ○ I don't seek out health information. ○ Other (please describe)	Which person/people do you turn to MOST for health information?	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
22.	○ Never looked for	Thinking about the most	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	

	cancer info. o Random Internet search (e.g.: Google) o Specific Internet website o Academic journals o Television o Health/fitness magazines o Newspaper o Other	recent time you looked for health information, where did you look first?											
23	o Never looked for cancer info. o Random Internet search (e.g.: Google) o Specific Internet website o Academic journals o Television o Health/fitness magazines o Newspaper Other	Please rank in order of priority the key sources that you use to retrieve information about health and well-being.	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
24	o "I found the information I needed easily and trusted the source." o I have never	Based on your results from your search on health from all sources, please indicate the statement you <u>most</u> agree with:	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	

	searched for health information. ○ "It took a lot of effort to get the information I needed." ○ "I felt frustrated during my search for information." ○ "I was concerned with the quality of the information." ○ "The information I found was hard to read/difficult to understand."	Note: added a "positive" response											

Lead in: "I would like to ask you a few questions about your health-related activities and lifestyle."

Q#:	Questions (Outcome Variables: behaviour and personal lifestyle)		Understandable?		Adequate?		Only one response?		Obvious/loaded?		Offensive?		Notes
25	○ Zero ○ One ○ Two ○ Three ○ Four times or more	Without the assistance of a parent/guardian, how often have you arranged did you visit a health care professional (doctor/nurse/health clinic) in the past year?	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	

26	○ Zero ○ One ○ Two ○ Three ○ Four or more	How often have you performed self-assessment exams (such as breast exams or testicular exams) in the past year?	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
27	○ A lot ○ A little ○ Not at all ○ No opinion	Do you think that having many sexual partners increases a person's chances of getting cancer a lot, a little, or not at all or do you have no opinion?	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
28	○ Never ○ Rarely ○ Often ○ Regularly	How often do you willingly/knowingly expose yourself to second-hand smoke/environmental tobacco smoke (for example – attend gatherings where other people are smoking)?	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
29	○ Zero ○ One ○ Two ○ Three or more	In a typical week, how many days do you do any moderate-intensity physical activity or exercise (comparable to walking as if you were in a hurry) for more than 20 minutes?	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	

30	1. disagree strongly 2. disagree 3. agree 4. strongly agree 5. no opinion	Thinking about your food consumption in a typical week, how much do you agree/disagree with the following statement: "I generally eat a well-balanced diet that includes fruits, vegetables, whole grains and protein sources."	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
31	1. disagree strongly 2. disagree 3. agree 4. strongly agree 5. no opinion	How much do you agree/disagree with the following statement: "When I go outside for more than one hour on a sunny day I make an effort to protect myself from the sun's rays (e.g.: wear a hat, wear long-sleeved shirt, wear sunscreen, etc.)."	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
32	o Never o One time o Two times o Three times o Four times o Five or more times	How many times in the past 12 months have you used indoor tanning devices such as a sun lamp, sun bed, or tanning booth?	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	

33	_Myself _My parent(s) _My romantic partner _My friends _My boss and/or co-workers _Other (please specify)	With 1 being the most important, please rank the top 3 person/people who influence your health-related decision making the most.	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
34	_My spirituality _My sense of adventure _My quest to be fit/healthy _Peer pressure _Responsibility to family _My career _My studies\ _Other (please specify)	With 1 being the most important, please rank the top 3 influences that guide your health-related decision making behaviour.	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	

Lead in: "Now I would like to ask you some questions about tobacco use."

Q#:	Questions (Outcome Variables: behaviour and personal lifestyle)		Understandable?		Adequate?		Only one response?		Obvious/loaded?		Offensive?		Notes
35	o Never smoked o Current non-smoker o Daily/occasional smoker (have smoked 100 cigarettes in my entire life and at least 1 cigarette in the past 30 days)	How would you rate your current tobacco use?	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
36	1. Yes 2. No	If you identified as a daily/occasional smoker....Do you ONLY smoke when you drink alcohol?	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
37	1. Yes 2. No	Have you ever stopped smoking for one day or longer because you were trying to quit smoking?	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	

38	o strongly agree o somewhat agree o somewhat disagree o disagree strongly o have no opinion	Would you say you strongly agree, somewhat agree, somewhat disagree, disagree strongly, or have no opinion on the statement: *"Spit tobacco/chewing tobacco offers a healthier option to cigarettes."*	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
39	o strongly agree o somewhat agree o somewhat disagree o disagree strongly o have no opinion	Would you say you strongly agree, somewhat agree, somewhat disagree, disagree strongly, or have no opinion on the statement: *"Smoking casually (i.e.,: a few cigarettes when I drink alcohol) does not contribute to cancer."*	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
40	o strongly agree o somewhat agree o somewhat disagree o disagree strongly o have no opinion	Would you say you strongly agree, somewhat agree, somewhat disagree, disagree strongly, or have no opinion on the statement: *"There's no risk of getting cancer if someone only smokes for a few years."*	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	

41	o strongly agree o somewhat agree o somewhat disagree o disagree strongly o have no opinion	Would you say you strongly agree, somewhat agree, somewhat disagree, disagree strongly, or have no opinion on the statement: *"Second-hand smoke does not contribute to cancer."*	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
42	o strongly agree o somewhat agree o somewhat disagree o disagree strongly o have no opinion	Would you say you strongly agree, somewhat agree, somewhat disagree, disagree strongly, or have no opinion on the statement: *"Smoking 'lite' cigarettes offers a healthier alternative to smoking regular cigarettes."*	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	

Potential open-ended questions:

Q#:	Questions (Outcome Variables: behaviour and personal lifestyle)	Understandable?		Adequate?		Only one response?		Obvious/loaded?		Offensive?		Notes
43	Please write a brief response to the following statement: *"It would be easier to improve my health behaviour(s) if..."*	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
44.	Please write a brief response to the following statement: *"Health promotion/public health messages about improving my own health would be more relevant to my age group if..."*	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	

Appendix E: Survey Consent Form

ONLINE CONSENT FORM

Date:

Title: CANCER PREVENTION AWARENESS & BEHAVIOURS OF A NOVA SCOTIA UNIVERSITY POPULATION

Local Principal Investigator: Heather McPeake, BA, BSc, MA (International Development Studies), MA (Health Promotion Candidate). School of Health and Human Performance, Dalhousie University, 6230 South Street, Halifax, NS, B3H 1J5, Tel: (902) 229-3696. Email: hmcpeake@dal.ca

Degree Program: Master of Arts, Health Promotion

Supervisor: Lynne Robinson, PhD, School of Health and human Performance, Dalhousie University, 6230 South Street, Halifax, NS, B3H 1J5, Tel: 902 - 494-1157. Email: lynne.robinson@dal.ca

Contact person: Heather McPeake, Tel: 902-229-3696; email: hmcpeake@dal.ca (please contact this person if you have any questions or concerns regarding this study).

Introduction:
You are invited to take part in a study conducted by Heather McPeake as part of her Master of Arts degree in Health Promotion at Dalhousie University. Your participation in this study is voluntary and you may withdraw from the study at any time. Your academic performance evaluation will not be affected by whether or not you participate. The study description below tells you about the risks, inconvenience or discomfort which you might experience. Participating in this study might not benefit you, but we might learn things that will benefit others. You should discuss any questions you have about this study with Heather McPeake.

Purpose of this study:
I want to understand how people your age think about cancer and cancer prevention in order to develop new health promotion strategies that are relevant to people like you.

Study Design:
This is an online questionnaire and I expect about 250 Dalhousie students, between the ages of 17 and 29, to take part.

Who can participate in this study?
This study is open to all full and part-time Dalhousie students aged 17-29 who are able to read English well enough to understand and respond to the questions.

Who will be conducting the Research?
Heather McPeake (MA Health Promotion Student) will be conducting this research and will be responsible for student recruitment, data analysis, final reporting, and the dissemination of final results.

What you will be asked to do:
Now that you have logged onto the Opinio survey website, you will gain access to the 42 questions in the survey. It should take about 25 minutes to answer the questions.

Possible risks and discomforts:
It is possible that some of the questions on the survey may make you feel uncomfortable, but you don't have to answer all of the questions and you are free to exit the survey at any time.

Possible benefits:
Aside from increasing your interest and awareness in cancer prevention, there will be no direct benefit to you from participating in this study. However, it is expected that your input will help highlight what people your age know about cancer so health messages and programs can be created to better suit your age group.

Compensation/reimbursement:
There will be no costs to you as a result of taking part in this study, nor will you be reimbursed for your participation in this study. As compensation for your time, you will have the chance enter a draw for a $200 gift card at Future Shop (winner to be announced as soon as data collection is finished).

Confidentiality & Anonymity:
You will not be asked to put your name or any other personal identifier(s) on the survey and therefore participation will be anonymous and confidential. No individual identities will be used in any reports or publications resulting from the study. If you give permission, I may use direct quotations from your answers to open-ended questions. You may still be in the study even if you do not agree that I can use your quotes. Study records will be kept as private as is possible and study information will be coded and kept in locked files at all times. Only study personnel will have access to the files.

Questions:
If you have any questions about this study please contact Heather McPeake (principal researcher): 902-229-3696. Your question(s) will be addressed quickly and you will be provided with any new information which may affect your participation.

Problems or concerns:
If you have any difficulties or concerns with any aspect of your participation in this study, you may contact Patricia Lindley, Director of Dalhousie University's Office of

Human Research Ethics Administration, for assistance at (902) 494-1462, Email: patricia.lindley@dal.ca

[Online] SIGNATURE PAGE

NOTE: when students visit the Opinio link to participate in the survey they will be first be prompted to read the online consent form and then receive two pop-up windows with the following messages:

Study Title: CANCER PREVENTION AWARENESS & BEHAVIOURS OF A NOVA SCOTIA UNIVERSITY POPULATION

"I have read and understood the terms and explanations provided in the consent form and I agree to take part in this study"

☐ I agree to take part in this study.

☐ I do not agree to participate in this study. (If you do not agree, you may leave the Opinio survey now).

Study Title: CANCER PREVENTION AWARENESS & BEHAVIOURS OF A NOVA SCOTIA UNIVERSITY POPULATION
If you agree that I can use direct quotations from your questionnaire in the final report, please click the button below:

☐ I agree that direct quotations may be used in the final report.

☐ I do not wish for my personal quotations to be used in the final report. (You may still be in the study even if you do not agree).