

**Health literacy, language and understanding of colon cancer prevention information  
among English-as-a-second language older Chinese immigrant women to Canada**

by

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## **Author's Declaration**

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

## ABSTRACT

**Introduction:** Colon cancer incidence and mortality rates in Canada are among the highest worldwide. If detected early colon cancer is highly curable and regular screening can significantly decrease risk of colon cancer mortality. Despite this, screening rates in Canada are consistently low and immigrant and senior populations are particularly vulnerable due to low health literacy and language barriers. This research consists of three studies that were designed to explore the cancer prevention experiences of older English-as-a-Second Language (ESL) Chinese immigrant women in Canada. This includes an investigation of colon and breast cancer screening utilization, health literacy skills and comprehension of colon cancer prevention information, and experiences and preferences when seeking cancer information by these immigrant women.

**Methods:** A convenience sample of 110 Mandarin and Cantonese-speaking ESL immigrant women were recruited from two Southern Ontario communities. For study inclusion participants were required to: (1) be 50 years of age or older, (2) have immigrated to Canada, (3) have Cantonese or Mandarin as their first language and English as their second language, and (4) be able to read in English. Participants were excluded if they or their spouse had been previously diagnosed with any type of cancer. Participants completed a battery of questionnaires assessing demographic characteristics, use of breast and colon cancer screening, acculturation, self-efficacy, health beliefs and health literacy. Health literacy was assessed using the Short Test of Functional Health Literacy in Adults (S-TOFHLA) and comprehension of a colon cancer prevention information sheet from Cancer Care Ontario was assessed using the cloze procedure. Participants participated in a semi-structured interview to explore cancer information seeking preferences and experiences, and their understanding of cancer prevention information. Multivariate logistic regression was used to identify predictors of colon and breast cancer screening. To identify variables significantly associated with performance on the S-TOFHLA and cloze test regression analyses were performed. Directed content analysis was used to identify themes associated with barriers to cancer information seeking and understanding that emerged from the interviews.

**Results:** Study #1: There was high self-reported screening for breast and colon cancer. Eighty-five percent of the women were current mammography screeners and 75% were current colon cancer screeners. Recommendation from a physician (OR=.140; 95% CI=

.044, -.448), having a female physician (OR=.141; 95% CI= .033, .591), and high or moderate proficiency in English (OR=.283; 95% CI= .089, .902) significantly predicted mammography screening. Physician recommendation (OR=.103; 95% CI= .031, .349), first language (OR= 1.85; 95% CI= .055, .628) and higher self-efficacy (OR= 3.613; 95% CI= 1.179, 11.070) predicted use of colon cancer screening. Other important predictors included greater health literacy and longer residency in Canada. Study #2: Only 38.7% of the women had adequate health literacy on S-TOFHLA and 54.3% had adequate comprehension of the colon cancer information. Comprehension of the colon cancer information was significantly lower among women who received the information in English, compared to those who received the information in Chinese ( $p<0.01$ ). Age, acculturation, self-reported proficiency reading English, and education were significant predictors of health literacy but varied depending on the measure (S-TOFHLA, cloze) and language of information (English, Chinese). Study #3: There were unique health information seeking preferences among the older Chinese immigrant women including a strong preference for interpersonal and interactive cancer information from their physician and trusted others, such as friends and family. Barriers to cancer information seeking included language difficulties and limited time with physicians. Differences in health literacy did not distinguish the women on any of the major themes.

**Conclusion:** Language, culture, health literacy and the role of the physician emerged across all three studies examining the cancer prevention experiences of older Chinese immigrant women. While language concordant educational materials may improve understanding of cancer information, the results from this study suggest that it is important to consider factors other than language alone and to address important cultural issues that play a role in the access, use, and understanding of cancer information.

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## INTRODUCTION

Canada boasts an ever-growing ethno-cultural mosaic. In 2006, the proportion of the Canadian population born outside the country reached its highest level in 75 years with almost 20% of the total population being foreign-born. This percentage of foreign-born residents is much higher than that observed in the United States (U.S) with 12.5% of the population being foreign-born (Statistics Canada, 2008).

The Chinese community comprises the second largest ethnic group in Canada, second only to South Asians. According to the 2006 Census, persons who self-identified as Chinese accounted for 24% of the visible minority population and 3.9% of the total Canadian population. Further, the number of individuals who self-identify as Chinese has increased by 18.2% between 2001 and 2006. Chinese, including Mandarin and Cantonese dialects, is now the third most common language spoken in Canada (Statistics Canada, 2008). Cantonese speakers used to make up the majority of Chinese immigrants to Canada (88.1% between 1980-1990); they now account for about 16.5% of new immigrants. In comparison, 60.5% of newcomers identify themselves as Mandarin speakers (Guo & Voretz, 2007). This is due to shifting immigration patterns as there was a large increase in immigrants from Hong Kong in the mid-1980s and early 1990s amid concerns about the return of the colony to the People's Republic of China. Currently, new immigrants come mainly from the People's Republic of China and Taiwan.

As the Canadian population becomes increasingly diverse, health-care professionals, policy-makers, and researchers face the challenge of ensuring relevant health information is accessible to those who need it. Unfortunately, there is considerable evidence that indicates vulnerable populations, including ethnic/racial minorities and immigrants, lack access to

culturally appropriate and motivating health information, including cancer prevention materials (Neuhauser & Kreps, 2008). Lack of access to information about cancer prevention and early detection is thought to contribute to disparities in cancer incidence and mortality reported among U.S. minority populations (Kagawa-Singer & Pourat, 2000; Li, Malone & Daling, 2003; Miller, Chu, Hankey, & Ries, 2008). Similar data are not available on the Canadian experience, as statistics on cancer incidence and mortality are not typically disaggregated by race or ethnicity (with the exception of First Nations/Inuit/Métis peoples).

Colorectal cancer (CRC) is the second leading cause of cancer death in Canada (Canadian Cancer Society, 2008). Among Asian Americans, CRC is the second most commonly diagnosed cancer and the second most prevalent cause of cancer-related mortality (Miller et al., 2008). Despite the proven impact of CRC screening tests on detecting cancer early and, as a consequence, reducing mortality, screening uptake is low in the general population and even lower among Chinese Americans (Jerant, Fenton, & Franks, 2008; Kandula, Wen, Jacobs, & Lauderdale, 2006; McGregor, Hilsden, Li, Bryant, & Murray, 2007; Rabeneck & Paszat, 2004). There are no large population-based studies of colon cancer screening among Chinese immigrants to Canada.

Written health communication is one channel through which health information, including colorectal cancer prevention, is provided to the general population. However, there are no studies to date that consider comprehension of written cancer information by Chinese ESL immigrants to Canada. Not surprisingly, the complex independent and interactive roles of culture, language, and literacy in the comprehension of cancer prevention materials are unknown. The provision of relevant and motivating cancer prevention information to vulnerable immigrant populations has the potential to reduce screening

disparities, improve long-term outcomes and ultimately reduce cancer burden (Neuhauser & Kreps, 2008).

The first chapter of this thesis presents a review of the literature on colon cancer incidence in Canada, ethnic/racial disparities in cancer burden and screening utilization, and the potential influences of health literacy, culture, and language on health behaviours. In Chapter 2, the overall project rationale and objectives for the three studies presented in this thesis are outlined. In Chapter 3, predictors of self-reported breast and colon cancer screening among older Chinese immigrant women are presented and discussed. Chapter 4 describes the health literacy skills of older ESL immigrant women, including predictors of comprehension of colon cancer information. Chapter 5 explores the cancer information seeking experiences, including sources, barriers and strategies, of older Chinese immigrant women. Lastly, Chapter 6 provides a discussion of key findings and how these findings inform each other, the implications, limitations, and future directions for research in this area.

## **CHAPTER 1: LITERATURE REVIEW**

### **1.1 Colorectal Cancer- Descriptive Epidemiology**

Colorectal cancer is the second leading cause of death from cancer in Canada. The incidence and mortality rates of CRC in Canadians are among the highest in the world with an estimated 21,500 new cases and 8,900 deaths in 2008 (Canadian Cancer Society, 2008).

Data from randomized trials indicate that CRC screening in the form of an annual or biennial FOBT (when followed by colonoscopy after positive results) significantly reduces mortality (Hewiston, Glasziou, Watson, Towler, & Irwig, 2008; Mandel, Church, Ederer, & Bond, 1999; Winawer et al., 2003). As a result, organizations such as the U.S. Preventive Services Task Force and the European Union Council consistently recommend CRC screening for average risk individuals (U.S Preventive Services Task Force, 2008; European Union, 2000). In 2001, the Canadian Task Force on Preventive Health Care released national guidelines recommending that average risk men and women over 50 years of age receive annual or biennial FOBT or flexible sigmoidoscopy.

Organized colorectal cancer screening programs using FOBT (the least invasive procedure) have been implemented in the United Kingdom, Australia, France, and Finland. In January 2007 the Ontario government launched ColonCancerCheck, a public awareness campaign, designed to educate Ontarians about the importance of early screening and detection for CRC. This made Ontario the first jurisdiction in North America with an organized colorectal cancer screening program. The campaign involved an extensive television advertising campaign, the availability of FOBT tests for all Ontarians and a new

website with information on colorectal cancer, risk factors, and prevention (Cancer Care Ontario, 2008)

Despite the considerable evidence that screening can reduce both incidence of and mortality from CRC and the development of national guidelines and screening programs, colon cancer screening rates are consistently low in Canada (Wilkins & Shields, 2009; Sewitch, Fournier, Ciampi, & Dyachenko, 2008). In 2008 a report on national estimates of CRC screening found that only 40% of Canadians aged 50 or older had reported up-to-date testing (Wilkins & Shields, 2009). This is less than in the United States where, according to 2006 data, screening surpassed 50% in every state and 60% in 21 states (Centers for Disease Control and Prevention, 2008). A lack of awareness of FOBT testing is apparent as a recent Ontario study found 46% of women and 55% of men (aged 50 and over) had never heard of FOBT and were not considering screening (Ritvo et al., 2009).

While screening for CRC is low in the general population, there is additional evidence to suggest that immigrants and racial/ethnic minorities have even lower CRC screening participation (Jackson et al., 2003; Jerant et al., 2008; Kandula et al., 2006). This disparity in screening may translate into later stage at diagnosis and affect a patient's ultimate prognosis.

## **1.2 Ethnic and Racial Disparities in Cancer Screening**

Despite reports from various agencies indicating favourable trends in cancer control and prevention (e.g., Canadian Cancer Society, 2008), there is a solid body of evidence that racial/ethnic disparities in cancer burden are growing (Kagawa-Singer & Pourat, 2000; Kreps & Sparks, 2008; Li et al., 2003; Miller et al., 2008). For instance, in the U.S., Hispanic and

Asian women experience higher cervical cancer incidence and mortality, a greater risk of diagnosis at later stages of breast cancer, and a greater risk of dying from breast cancer than do non-Hispanic white women (Kagawa-Singer & Pourat, 2000; Li et al., 2003). Increased mortality and later stage at diagnosis may be suggestive of differential use of cancer prevention strategies (Miller et al., 2008).

### **1.2.1 Cancer Screening in the Asian Community**

Differential screening rates for cervical and breast cancer in ethnic and racial minorities in the United States and Canada (including within the Asian community) have been reported (Hislop et al., 2003; Kandula et al., 2006; Jerant et al., 2008; Tu et al., 2003; Sun et al., 2010). For example, one large U.S. study reported 64.9% of Chinese, 53.1% of Korean, and 68.6% of Vietnamese Americans had mammography screening compared to 78% of non-Hispanic whites (Kandula et al., 2006). A small number of studies from Canada have examined mammography and Papanicolaou (Pap) testing in the Asian community. These studies also show that Chinese Canadian women are less likely to undergo cancer prevention screening. Nearly half of a national sample of Chinese Canadian women 50 to 75 years old did not undergo routine mammography (Jackson et al., 2003). There were also significantly lower rates of Pap testing among Chinese Canadian women compared to the general population (Hislop et al., 2003) and lower rates among immigrant women in general compared to native-born Canadians (Woltman & Newbold, 2007).

Less is known about CRC screening uptake in minority populations. Nevertheless, there has been increased interest in this area, likely the result of greater awareness by the public of national screening guidelines and the implementation of population based



screening programs. The limited research available indicates that similar to breast and cervical cancer screening there are 1) ethnic and racial disparities in CRC screening (FOBT, sigmoidoscopy and colonoscopy) and 2) lower CRC screening behaviours in the Asian community. Unfortunately, there are no studies in Canada examining the use of colorectal cancer screening in Chinese Canadians but findings from Chinese Americans may be indicative of the Canadian experience.

Asian Americans are less likely to have undergone colorectal cancer screening compared to non-Hispanic Whites (NHWs) (Ma, Shive, Wang, & Tan, 2009; Teng, Friedman, & Green, 2006; Yip, Tu, Chun, Yasui, & Taylor, 2006). Jerant et al. (2008) using data from the National Health Interview Survey found only 33.8% of Asian Americans had CRC screening compared to 57.2% of non-white Hispanic, 48.2% of African Americans and 36.7% of Hispanics. A number of studies specific to Chinese Americans show the same trend of lower CRC screening (Kandula et al., 2006; Sung et al., 2003; Teng et al., 2006; Yip et al., 2006). For example, one large population-based study with over 1200 Chinese Americans enrolled indicated only 49.2% of Chinese respondents had sigmoidoscopy or FOBT testing compared to 62% of NHWs (Kandula et al., 2006).

Despite the lack of data on CRC screening among Chinese Canadians, it would be naïve to assume that such disparities do not exist in Canada. As noted earlier, Chinese Canadian women were much less likely to undergo mammography and Pap testing than the general population (Hislop et al., 2003; Sun et al., 2010). Despite universal health care coverage and baseline characteristics typically associated with greater utilization of preventive health services screening (e.g., English fluency, education, income), Chinese women in Vancouver did not have higher rates of screening mammography and Pap testing than

women in Seattle; in fact, women in Seattle had a greater likelihood of having a Pap screen compared to women in Vancouver (O.R.= 1.5; 95% CI, 1.0-2.4) (Tu et al., 2005).

### **1.2.2 Colorectal Cancer and the Chinese Community**

The under-utilization of CRC screening in Chinese immigrants is worrisome given the burden that CRC poses to this community. Cancer is the number one cause of death among Asian American women, and among Asian Americans, CRC is the second most commonly diagnosed cancer and second cause of cancer-related mortality (Miller et al., 2008). Unfortunately, there has been a widespread misconception that Asians are less likely to get cancer (Kim et al., 2008; Kwok & Sullivan, 2006). This misconception may be due, in part, to a lack of awareness that risk increases after immigrating to North America. Compared to Asian immigrant women born outside of the U.S., U.S.-born Asian women had a 60% increase in cancer incidence rates (Flood et al., 2000). Studies of migrants from low-risk to high-risk areas indicate a rapid increase of CRC incidence within the first generation (Beiser, 2005). This highlights the strong role of environmental and lifestyle factors in CRC etiology. Migrants often adopt a Western diet that is higher in calories and fat and lower in fiber than their previous diet and this change in diet has been linked to the increased risk of developing CRC (Flood et al., 2000; Potter, Slattery, Bostick & Gapstur, 1993). In addition, the assumption that Asian immigrants have a low risk of CRC is being challenged: over the past few decades there have been marked increases in CRC incidence reported in Asian countries, particularly in those countries whose populations have adopted a more westernized lifestyle (Sung, Lau, Goh, & Leung, 2005).

The colorectal cancer incidence and mortality rates among Chinese Canadians are not available, largely because these data are not separated by race/ethnicity. However, two large population-based surveys suggest the threat cancer poses to this community. A review of mortality, causes of death, and life expectancy among immigrant and Canadian-born Chinese in Alberta found that similar to other Canadians the leading cause of death was cancer (Quan, Wang, Schopflocher, & De Coster, 2007). In addition, a ten-year old study reviewing cancer mortality among Canadians of European, south Asian and Chinese heritages indicated the most common types of cancer in Chinese Canadians to be lung, colorectal, liver, nasopharyngeal and stomach cancer (Sheth, Nair, Nargundkar, Anand, & Yusuf, 1999). Similar to the U.S., studies from Canada indicate the presence of the “healthy immigrant effect” in which positive health characteristics deteriorate after arrival in the destination country (Beiser, 2005). Indeed, among Italian immigrants, a dose-response effect was noted where an immigrant’s risk of developing colon cancer increased with length of residency in Canada (Balzi, Geddes, Brancker, & Parkin, 1995).

The effect of differential use of cancer screening in racial/ethnic minorities, including the Chinese community, can be powerful. Diagnosis at a later stage of the disease has been reported in Asian populations in the U.S. for breast, cervical, prostate, colon and rectum cancers (Miller et al., 2008). Given that colorectal cancer is highly curable if caught early, there is an urgent need to develop effective strategies to increase screening in vulnerable populations including Chinese immigrants.

### **1.3 Role of Written Health Communication**

In recent years, medical decision making has moved toward models of shared-decision making (Charles, Gafni, & Whelan, 1997). Physicians are no longer viewed as the keepers of medical information and sole decision makers. Ideally, patients share in the decision-making process, discuss the current evidence on options, and arrive at a mutually agreed on decision with their health care provider (Stacey, Samant, & Bennett, 2008). Moreover, patients are encouraged to acquire health information outside of the physician's office.

These changes have been accompanied by developments in the area of health communication, which is the process by which relevant health information is accessed and applied by patients (Kreps, 2006). Public education campaigns, like ColonCheck launched by Cancer Care Ontario, seek to change the social climate and to encourage healthy behaviours, create awareness, change attitudes, and motivate individuals to adopt recommended behaviours. One strategy by which public health educators disseminate health information is through the use of printed health education materials. Despite printed materials being a standard channel to provide health information, there has been limited evaluation of whether people actually understand the messages in public health campaigns and even less about the comprehension of these materials by ESL immigrants.

#### **1.3.1 Health Belief Model (HBM)**

A theoretical framework that underlies many health communication education campaigns is the Health Belief Model (HBM). The HBM postulates that people perform

health related actions if they perceive they are susceptible, if they believe taking action will produce a positive result, and if they believe they are able (have the self-efficacy) to perform the health action needed (Rosentock, 1974).

Perceived susceptibility refers to the assessment of individuals about their risk of getting a disease (e.g., colorectal cancer). Communication of cancer risk has the potential to increase screening behaviour as an individual's perceived risk for cancer is an important factor in the decision to undergo screening (Kim et al., 2008; Wong, 2009). For example, one large prospective study found that women who believed their susceptibility was low were less likely to undergo mammography screening than women who reported moderate susceptibility (Calcocressi et al., 2004). Higher CRC risk perception and fear have been associated with screening (Sun, Bach, Wolf, & Li, 2004). However, a recent study revealed that Asian American women had the lowest risk perception of breast and colon cancer compared to Hispanic and non-Hispanic white women and that lower perceived risk was correlated with less self-reported use of screening tests (Kim et al., 2008).

Poor knowledge of the specific cancer and associated screening tests negatively affects screening uptake by individuals (Beydoun & Beydoun, 2008; Kandula et al., 2006; Peterson, Dwyer, Mulvaney, Dietrich, & Rothman, 2007). A study investigating facilitators and barriers to cervical cancer screening among Chinese Canadian woman showed that the belief that a Pap test prevented cancer and general knowledge about the Pap test was associated with screening (Hislop et al., 2003). Moreover, interventions that aim to improve patient knowledge have led to increased population participation in cancer screening. Tu et al. (2006) developed an educational intervention for Chinese Americans that involved a health educator and the use of educational materials (including written pamphlets).

Participants who were part of the educational intervention group had a six-fold increase in FOBT completion compared to those in the control group.

Health communication campaigns have the potential to increase the participation of ethnic/racial minorities in cancer screening. Giving individuals information on the risk of developing cancer and the screening options available can help alleviate the disparities that exist in cancer screening. Armed with adequate information individuals can make informed decisions about cancer prevention. However, in order to develop effective and useful cancer prevention materials for diverse audiences one must understand the information needs and preferences of the specific target population. These needs and preferences include issues around literacy, language and culture.

#### **1.4 Literacy**

Health information is only useful if an individual can understand it. Prose literacy is defined as “using printed and written information to function in society, to achieve one’s goals, and to develop one’s knowledge and potential” [52,p.198]. The 2003 International Adult Literacy and Skills Survey (IALSS) assessed the ability of 23,000 adult Canadians, age 16+ years, to read and comprehend prose and numeric materials. The IALSS divides respondents scores into five proficiency levels ranging from Level 1 (individuals who are functional but have great difficulty in reading and understanding simple text) to Level 5 (individuals who can read and comprehend complex materials at the highest level) (Institute of Medicine Committee on Health Literacy, 2004).

The IALSS revealed some troubling statistics regarding literacy levels among adult Canadians. Nationally, 48 percent of the adult population performs below Level 3 on prose

and document literacy scales with some provincial variation (e.g., residents of British Columbia scored significantly higher and residents of New Brunswick scored significantly lower than the national average). Level 3 proficiency is considered to be the desired level of competence for coping with the increasing skill demands of the emerging knowledge and information economy (Statistics Canada, 2009).

The 2003 IALSS also provided an interesting examination of literacy levels in Canadian immigrants. Sixty percent of immigrants scored at Levels 1 and 2 compared to 37% of the Canadian-born population. Surprisingly, duration of residence in Canada did not significantly affect literacy scores of immigrants on any of the four domains assessed (prose, document, problem solving, and numeracy). In addition, the proportion of immigrants whose mother tongue was neither English nor French and who scored at Level 1 on the prose literacy scale was twice that of immigrants with a mother tongue of English or French and over three times that of the Canadian-born population (Statistics Canada, 2009).

#### **1.4.1 Health Literacy**

Literacy is a key social determinant of health. Results from the Canadian IALSS indicated that respondents reporting poor health scored lower on the document literacy scale compared to those reporting fair, good or excellent health (Statistics Canada, 2009). The acknowledgement of the relationship between literacy and health has led to the development of the field of health literacy.

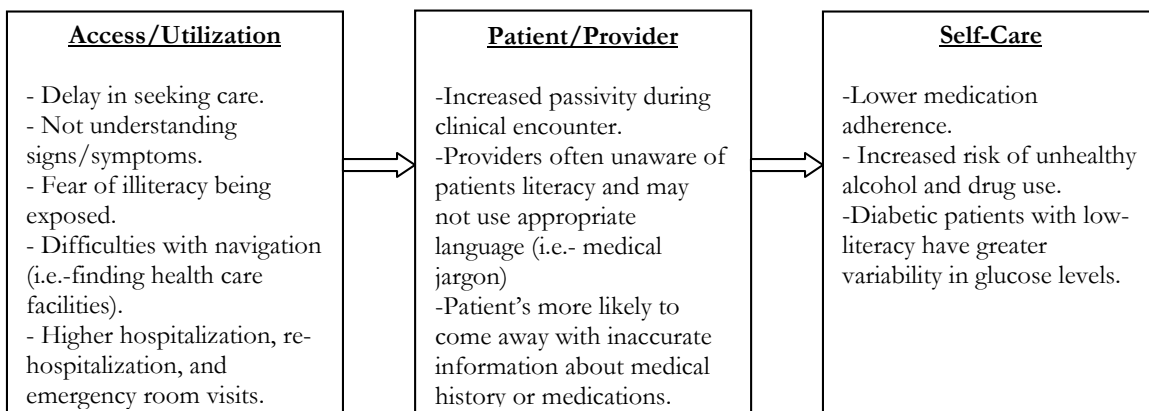
Health literacy has been defined by the U.S Institute of Medicine (IOM) as, “the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions” (Institute of

Medicine, 2004). A more comprehensive definition has been put forth by Nutbeam et al. (2000) who define health literacy as “the cognitive and social skills which determine the ability of individuals to gain access to, understand, and use information to promote and maintain good health. Health literacy means more than being able to read pamphlets and successfully make appointments. By improving people’s access to health information and their capacity to use it effectively, health literacy is critical to empowerment”.

Similar to national scores on literacy and numeracy, health literacy among Canadians is low (Canadian Council on Learning, 2007). The international Adult Literacy and Life Skills Survey (ALL), which includes several refinements to the IALSS with items about health literacy, indicated that just over 60% of non-institutionalized adult Canadians cannot obtain, understand and act upon health information and services nor make appropriate health decisions on their own (Canadian Council on Learning, 2007).

These statistics are startling given the documented poor health outcomes associated with low health literacy. Paasche-Orlow and Wolf (2007) describe three distinct points along the continuum of health care that are influenced by health literacy: 1) access and utilization of health care, 2) patient-provider relationships, and 3) self-care. Figure 1 outlines obstacles that low-literacy patients face across the health care continuum.

**Figure 1. Health Outcomes Associated with Low Health Literacy (modified from Paasche-Orlow & Wolf, 2007)**





### 1.4.2 Health Literacy and Cancer Screening

Of particular interest is the role of health literacy in access and utilization of health care services. Patients with limited literacy skills are less likely to be knowledgeable about CRC screening (Miller, Brownlee, McCoy, & Pignone, 2007; Peterson et al., 2007) and report more barriers to completing FOBT and colonoscopy (Peterson et al., 2007).

The link between limited knowledge of CRC and limited health literacy may reflect differences in information seeking behaviours between patients of varying literacy levels (von Wanger, Semmler, Good, & Wardle, 2009). Adults with limited literacy often avoid seeking health information and especially printed materials such as leaflets or booklets (Shaw, Ibrahim, Reid, Ussher, & Rowlands, 2009; von Wanger et al., 2009). Von Wanger et al. (2009) found that persons with limited health literacy had greater effort in reading CRC information as well as had reduced information seeking.

Printed cancer information is often written at or beyond high school reading levels, despite the low average literacy abilities of the public. Readability of online cancer information was shown to be, on average, at or above the college reading level (Friedman, Hoffman-Goetz, & Arocha, 2006). Compared with breast cancer, the most difficult websites were those giving information on colorectal cancer. Given that patient comprehension decreases when text is presented at higher readability levels (Friedman & Hoffman-Goetz, 2006), the ability of people with limited literacy to engage with such materials is likely quite low. As a consequence, the ability of individuals with limited literacy to acquire relevant information and to make informed decisions regarding screening based on relevant information is problematic. This has lead researchers and policy-makers to recommend the use of simple English and the avoidance of medical jargon when developing educational

materials (Friedman & Hoffman-Goetz, 2007; Neuhauser & Kreps, 2009; Stableford & Mettger, 2007).

Seniors, immigrants, and Aboriginal people are three distinct groups who have low literacy skills relative to other subpopulations in Canada (Statistics Canada, 2009). For immigrants language barriers may further increase literacy difficulties. Given that 70.2% of the foreign-born population in Canada reported a mother tongue other than English or French in the 2006 Census (Statistics Canada, 2008), distinguishing health literacy challenges from language barriers is crucial.

The ways in which literacy and language interact to influence comprehension and health behaviours are likely complex. Individuals could have high health literacy skills in their first language, but may experience problems in the Canadian language environment because of difficulties with one or both of the official languages (English or French) (Andrulis & Brach, 2007). On the other hand, individuals may have limited literacy in their first language and encounter difficulties even when health information is translated into that language.

## **1.5 Language**

Language barriers contribute to racial and ethnic disparities in cancer screening (Andrulis & Brach, 2007; Jacobs, Karavolos, Rathouz, Ferris, & Powell, 2005; Kreps & Sparks, 2008; Neuhauser & Kreps, 2008). A large body of research documents the challenges that individuals with limited English proficiency face within the healthcare system and the resulting poorer health outcomes. Patients who do not speak English are less likely to have a regular source of primary care (Jacobs et al., 2005), to receive preventive care (Jacobs et al., 2005), are less satisfied with their physicians and the care they do receive

(Gregg & Saha, 2007; Ngo-Metzger et al., 2007), are less likely to understand medical information (Wilson, Chen, Grumbach, Wang, & Fernandez, 2005), and are more likely to have adverse medication reactions due to failure to understand the provided instructions (Wilson et al., 2005). Language barriers for Chinese- and Vietnamese-American patients were associated with less health education, worse interpersonal care, and lower patient satisfaction (Ngo-Metzger et al., 2007). Non-English speaking Asian Americans were also substantially less likely than the English speaking population to receive needed mental health services (Sentell, Shumway, & Snowden, 2007). There are similar findings from the Longitudinal Survey of Immigrants to Canada that showed an association between poor language proficiency and poor self-reported health (Pottie, Ng, Spitzer, Mohammed & Glazier, 2008).

English language proficiency may also be related to uptake of cancer screening. Limited English proficiency has been associated with decreased screening participation for breast (Jackson et al., 2003; Jacobs et al., 2005; Liang et al. 2009), cervical (Jacobs et al., 2005), and colorectal (Jerant et al., 2009; Kandula et al., 2006; Ma et al., 2009) cancers. This language proficiency-screening relationship occurs in both Asian Americans and Chinese Canadians. Chinese Canadian women who were not fluent in English were less aware of mammography (Jackson et al., 2005); moreover, English fluency was an independent predictor of routine mammography among Asian and Chinese Canadian women (Jackson et al., 2005; Sun et al., 2010).

### **1.5.1 Translation**

Attempts to resolve language barriers have focused on the use of professional translators in the clinical encounter. Although professional translators are superior to *ad hoc*

translators (e.g., family members) (Karliner, Jacobs, Chen, & Mutha, 2007), research suggests they are not equivalent to language concordant interactions between patient and health care provider (Ngo-Metzger et al., 2007). Language concordant encounters, in which the patient and provider speak the same language, are associated with better interpersonal care, greater patient satisfaction with the clinical encounter, and greater discussion of health promotion issues. Some researchers suggest that the simple translation of language during a clinical encounter is a necessary but not sufficient condition for overcoming language barriers in care (Gregg & Saha, 2007).

The limitations of translation may rest in the very nature of the translation process. Gregg and Saha (2007) discuss the crucial difference between *langue* and *parole* as outlined in the field of linguistics. *Langue* is what is commonly thought of as language (e.g., English, Chinese, Spanish) and includes the database and lexicon of words that people use and the formal rules associated with these words. *Parole*, on the other hand, includes the social, cultural and historical context that give words and phrases meaning. When language barriers are viewed simply as *langue* (e.g., words and grammar) the assumption is that translating words from one language into equivalent words in another language will solve the problem. An example of this is illustrated by Dohan and Levintova (2007) where the word “cancer” holds different meanings for Russian immigrants in California than it does for medical providers. For medical providers the word “cancer” represents a treatable condition; for Russian immigrants the word “cancer” represents a far more ominous condition- a death sentence and loss of hope. So while the word cancer may be amendable to direct translation (*langue*), the meaning associated with the word varied dramatically between the two cultures (*parole*).

Similar issues of langue and parole must be considered with printed health materials. A review of over 87 health documents that had been translated into Spanish found a high number of translation errors related to both the use of text and the actual text itself, a high number of language errors, incorrect words, and false cognates (pairs of words that look similar but with meanings that are very different) (Hablos Juntas, 2007). Not surprisingly, the translations were done word-by-word from the English to Spanish version resulting in texts that lacked any cultural relevance for the intended target population.

There is no consensus on the translation process. Researchers acknowledge that literal translations may not be effective at communicating complex health concepts and motivating behaviour change for diverse linguistic audiences (Kreps, 2006). However, as many organizations have limited resources for the development of patient education materials, literal or “word for word” translations are often the easiest and most cost-effective option. Ideally, health content needs to be both linguistically and culturally adapted to meet the needs of the intended audience. Indeed, language is the lowest common denominator of cultural sensitivity (Rogler, Malgady, Costantino, & Blumenthal, 1987).

While it can be argued that language concordance is crucial to ensure high quality care and patient education, language translation alone does not answer racial and ethnic disparities in health. Individuals who spoke Spanish at home were less likely than non-Hispanic white individuals to receive recommended care. This disparity was also evident when comparing non-Hispanic white patients to limited English proficiency Hispanics and to those who spoke Spanish at home but were also comfortable conversing in English (Cheng, Chen, & Cunningham, 2007). These findings suggest that other factors had a role in receipt of health care. Some have argued that the role of culture is crucial in understanding racial and ethnic disparities in screening and for understanding how health communication

campaigns can successfully translate pertinent health information (Kwok & Sullivan, 2006; Kwok, Sullivan, & Cant, 2006; Wang et al., 2006).

## **1.6 Culture**

Culture affects how individuals conceptualize health and illness. An individual's concept of health may differ from the dominant cultural norm and this can affect the way individuals receive, process, and accept (or reject) information (Andrulis & Brach, 2007). Indeed, studies show that culture plays a significant role in determining how an individual is likely to understand and explain breast cancer, which can impact on cancer screening behaviour (Kwok et al., 2006; Liang et al., 2009). For example, the belief that breast cancer is a “white disease” has been reported among African American and Asian American women and this may lead to low risk-perception and the feeling that screening is irrelevant to them (Kim et al., 2008; Kwok & Sullivan, 2006). Cultural considerations surrounding modesty have also been reported as a barrier to breast cancer screening among women from minority populations (Tang et al., 2000). Information on key cultural factors can provide contextual information for determining how to best design and target information to diverse populations.

### **1.6.1 Cultural Beliefs in the Chinese Community**

The impact of cultural beliefs on cancer screening has been examined in the Chinese immigrant community (Hislop et al., 2003). Women who held more Chinese/Eastern cultural views were significantly less likely to have had regular mammography than those

women with more Western cultural views (Liang et al., 2009). A similar relationship among older Chinese American women in relation to colon cancer screening was reported by Wang et al. (2006): women with lower educational attainment were significantly more likely to have an Eastern view of care and were less likely to adhere to colon cancer screening guidelines than Chinese women with postsecondary education and Western views of health.

Understanding why Eastern views of health are associated with non-compliance with cancer screening guidelines has been the focus of several studies (Choe, Tu, Lim Burke, Acorda, & Taylor, 2006; Kwok & Sullivan, 2006; Wang et al., 2006). In western societies there is an emphasis on “health” rather than illness and people are encouraged to lead healthy lifestyles and engage in disease prevention. The concept of screening for a disease when people are asymptomatic is commonly accepted as evidenced by population-based programs for breast and colorectal cancer screening. In contrast, the concept of detecting hidden or asymptomatic disease by medical measures such as screening does not exist in traditional Chinese health perspectives (Kwok & Sullivan, 2006). A population-based study in the U.S found that when Asian Americans were asked what the most important reason for not having undergone cancer screening they reported that they “didn’t have problems/symptoms” (Kandula et al., 2006). A study of older Canadian adults also found absence of symptoms to be a common reason for declining colon cancer screening (Hoffman-Goetz, Thomson & Donnelle, 2008). Cancer beliefs among Chinese Australian women show that Chinese women have a more holistic view of health promotion and believe in the importance of strengthening overall health and well being rather than attempting to find a hidden disease (Kwok & Sullivan, 2006; Kwok et al., 2006).

There are other unique cultural beliefs that may influence cancer prevention behaviours in the Chinese immigrant community. Some Chinese women believe that

contracting disease, including cancer, is inevitable and therefore prevention is impossible (fatalism) (Choe et al., 2006; Jackson et al., 2003). The belief that thoughts about cancer may eventually lead to cancer and cancer screening thus, threatens the harmonious status of health has been reported (Wang et al., 2006; Kwok & Sullivan, 2006). Another frequently held view is that CRC is caused by diets high with “heat” (Choe et al., 2006; Paisley et al., 2002) and that positive energy and spirit can prevent this cancer (Kwok & Sullivan, 2006; Kwok et al., 2006). Issues of modesty are also an important consideration as older Chinese women report being uncomfortable with undressing for procedures and discussing their breasts (Kwok et al., 2006).

Interestingly, Kwok and colleagues (2006) found that despite exposure to Western culture for considerable periods of time, traditional Chinese beliefs continued to influence Chinese Australian women’s understanding of health and illness. Researchers reported that despite varying lengths of residency in Australia the women shared similar beliefs to their counterparts in Hong Kong and Singapore.

### **1.6.2 Acculturation**

Acculturation refers to “the extent to which ethnic minorities retain their indigenous culture vs. adopt the alternative host culture” (Landrine & Klonoff, 2004). Acculturation is a frequently studied variable in health research and behavioural medicine, as it is linked to morbidities and health behaviours (Landrine & Klonoff, 2004). Problems with defining and measuring the concept of acculturation have been described in a recent systemic review (Thomson & Hoffman-Goetz, 2009). A review of the literature on acculturation and health in Asian immigrant population suggests that the literature is fragmented in how acculturation



is assessed in the heterogeneous Asian population and also how acculturation relates to health (Salant & Lauderdale, 2003).

Variability in the measures to determine acculturation makes comparison of findings difficult. Studies in the area of health services use have frequently used acculturation scales based on theoretical models that are designed to produce a summary measurement of acculturation (Landrine & Klonoff, 2004). These scales typically measure language use and proficiency, medical preferences, cultural participation, and social contacts. Two commonly used acculturation scales created specifically for Asian populations are the Suinn-Lew Self-Identity Scale, (Suinn, Ahuna, & Khoo, 1993) and the more recently developed Asian American Multidimensional Acculturation Scale (Chung, Kim, & Abreu, 2004) Other studies, especially in physical and behavioural health, use proxy measures such as time since immigration, birthplace, or language (Landrine & Klonoff, 2004).

Research examining the role acculturation plays in cancer screening behaviours has produced mixed findings. While some studies find that acculturation significantly predicts screening adherence (Kandula et al., 2006; Tang, Solomon, & McCracken, 2001; Maxwell, Bastani, & Warda, 2000), other studies do not find such a relationship (Teng et al., 2006; Shah, Zhu, & Potter, 2006; Yepes-Rios, Reimann, Talavera, Ruiz de Esparza, & Talavera, 2006). Studies examining cancer screening specifically in the Asian population also lack agreement on the relationship between acculturation and screening, and are complicated by different measures, conceptualizations of acculturation, and different Asian populations.

The majority of the studies examining acculturation in Chinese Americans have used non-scale acculturation (proxy) measures, such as years of residency in Canada (for example the studies by Kandula et al., 2006; Sun et al., 2004; Tu et al., 2005). However, two studies used standard acculturation instruments. Tang et al. (2001) measured acculturation using the

Suinn-Lew Self-Identity Acculturation Scale and found that greater acculturation among Chinese American women was a significant predictor of having with an FOBT or sigmoidoscopy. In contrast, Teng et al. (2006) found that acculturation did not predict obtaining colorectal cancer screening procedures among male and female Chinese Americans when using the Brief Acculturation Scale (BAS). This discrepancy may be attributed to the acculturation scales used and mean age of the participants. The scale used by Tang et al. was designed specifically for Asian populations and the mean age of the participants was 72 years. On the other hand, the scale employed by Teng et al. was not developed specifically for Asian Americans and the average age of participants was much younger 57.5 years.

Studies using proxy measures of acculturation have also given mixed, and in some cases conflicting, results. Significantly lower rates of cervical and breast cancer screening have been reported among ethnic Chinese born outside the United States and those living for fewer years in the United States (or Canada) (Hislop et al., 2004; Kandula et al., 2006; Ma et al., 2009; Tu et al., 2005). In contrast, Sun and colleagues (2004) found that receipt of a FOBT within the prior 12 months was associated with fewer years of residency in the United States. The researchers postulated that this was because most early Chinese immigrants came to the U.S because of a family relationship or as labour immigrants and generally had less education and poorer English skills. After the U.S.-China scholar exchange in the 1980s more recent immigrants had better English skills and greater education. Other studies report no relationship between duration since immigration and cancer screening uptake (Jackson et al., 2003; Tu et al., 2005).

Thus, the relationship between cancer screening and acculturation among Asian immigrants remains unclear. This ambiguity is further complicated by the variability in the measures of acculturation used and conceptualizations of this construct. Nonetheless, how

cultural beliefs and acculturation affect an individual's concept of health, illness, and disease prevention is crucial in the development of effective educational materials that elicit positive behaviour change.

## **CHAPTER TWO: RESEARCH OBJECTIVES, THESIS COMPONENTS AND RATIONALE**

### **2.1 Research Objectives**

Given the rapidly growing Chinese immigrant population in Canada and the paucity of information available on their health status and health behaviours, including preventive cancer screening, this thesis research addressed three specific objectives. The first objective was to describe self-reported breast and colon cancer screening utilization among older ESL Chinese immigrant women to Canada and explore predictors of self-reported screening, including why some women who start to screen do not continue to screen. The second objective was to examine basic (functional) health literacy among older Chinese immigrant women to Canada, predictors of health literacy, and how colon cancer prevention information presented in one's first versus second language affects comprehension. The third objective was to describe the self-reported cancer information seeking behaviours of older ESL Chinese immigrant women in Canada and examine whether cancer information seeking preferences and experiences reflect differences in their health literacy. The overall goal of this research was to contribute to: (a) the knowledge on ways to promote positive health behaviours, such as use of preventive cancer screening, among diverse cultural groups and (b) the understanding of how to develop culturally and linguistically appropriate, and motivating, cancer information for diverse immigrant audiences.

### **2.2 Thesis Components and Rationale**

As outlined in Figure 2 three studies were conducted to address the research objectives.

### **2.2.1 Study #1**

In Study #1, the use of colon and breast cancer screening and predictors of screening were examined. This included an exploration of why some women start to screen but not continue.

The rationale for Study #1 was based on the extensive research that indicates low cancer screening utilization in racial/ethnic minorities in the United States and the lack of information on Chinese immigrant health or health behaviours, including use of cancer prevention services. While there are only a limited number of studies on the use of breast and cervical cancer screening among Chinese Canadians (e.g.- Jackson et al., 2003; Sun et al., 2010), there have been there are no published accounts on colon cancer screening behaviours of Chinese-Canadians. Understanding the specific barriers to cancer screening that ESL Chinese immigrant women face when accessing colon cancer screening services can help to inform interventions to increase their participation.

### **2.2.2 Study #2**

In Study #2, health literacy skill, including comprehension of colon cancer information, was assessed. Women were randomly assigned to receive printed colon cancer prevention information in English or Chinese (Simplified or Traditional) in order to evaluate the impact of language on comprehension.

The rationale for Study #2 was based on the lack of information about comprehension of cancer prevention information as a function of language in which the information is delivered to diverse audiences. To date, there have been no published studies

that measure health literacy and comprehension of colon cancer information by ESL Chinese immigrants in Canada. This is despite the fact that print materials are a primary (and relatively cost-effective) means to provide cancer prevention information. Considerable resources are allocated to the development of multi-language cancer education materials. For example, the Canadian Cancer Society and Cancer Care Ontario produce an array of written health information pamphlets and online materials in a number of different languages (Cancer Care Ontario's ColonCancerCheck program features fact sheets in 28 different languages).

To successfully acquire the knowledge to make the best decision possible about cancer screening, it is important for people to understand health information. Clarification about the impact of first versus second language educational materials on comprehension could provide insights as to whether language or knowledge about cancer, or both, are key factors in enhancing screening uptake among ESL groups.

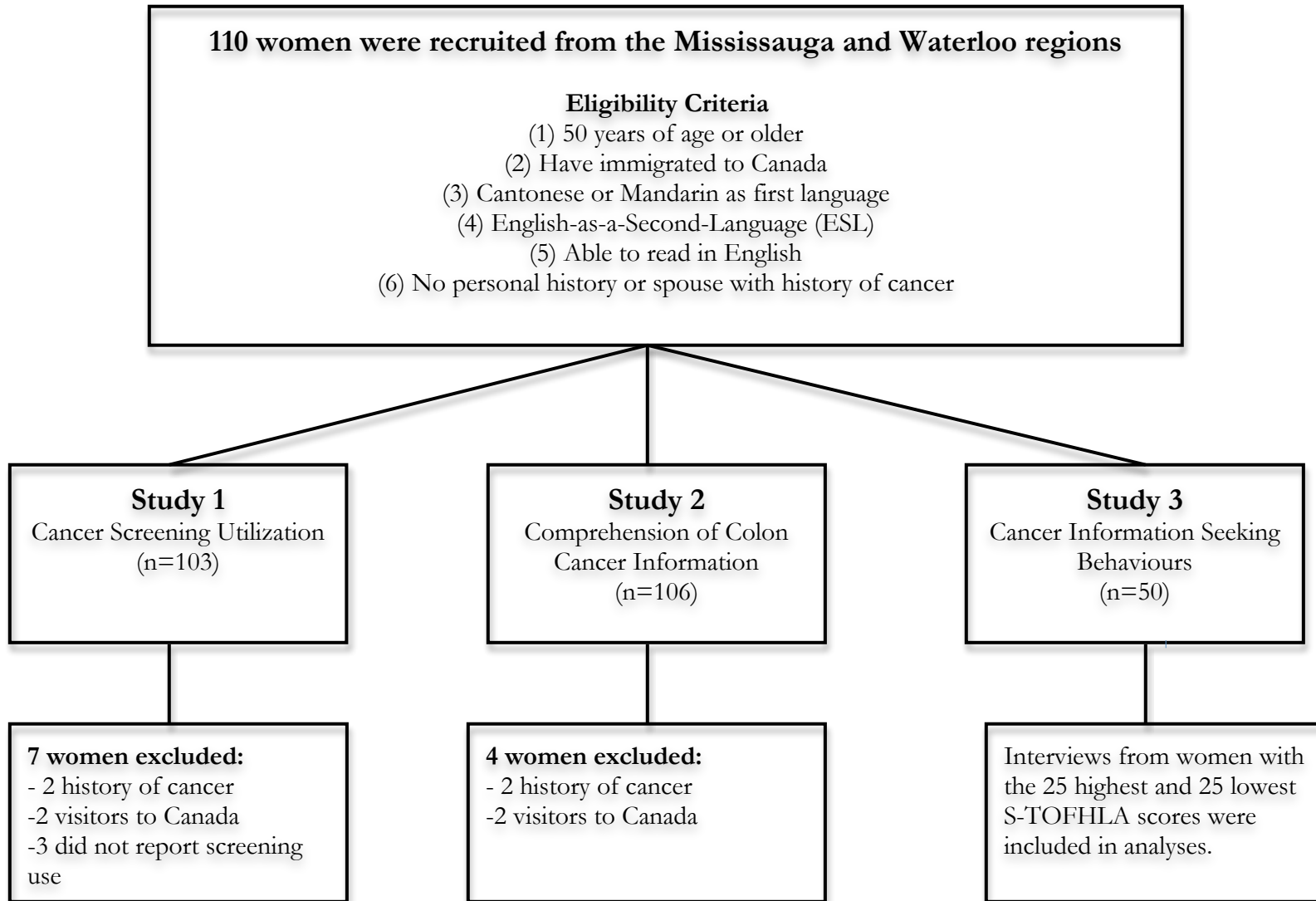
### **2.2.3 Study #3**

In Study #3, semi-structured interviews were conducted with ESL older Chinese immigrant women to Canada to explore their cancer information seeking preferences and experiences within the context of different levels of health literacy.

The rationale for Study #3 was based on the lack of research examining the cancer information seeking behaviours among ESL Chinese immigrants. To successfully acquire the knowledge to make an informed decision about cancer screening one must be able to successfully access and act on health information. The limited information that has been published indicates that some ethnic/racial groups have unique health information seeking

behaviours and strategies (Kakai, Maskarinec, Shumay, Tatsumara, & Tasaki, 2003; Nguyen & Bellamy, 2006) that differ from the general population. For example, Kakai et al. (2003) reported that non-Japanese Asians and Pacific Islander cancer patients preferred person-to-person communication with physicians and other members of their social group to information from medical journals, newsletters or the Internet. Articulating the specific needs and unique preferences for health information of older ESL Chinese immigrant women may help public health and cancer prevention educators tailor interventions to increase participation in preventive cancer services.

Figure 2. Thesis components\*



\* each study involved different aspects/questions and drew on data collected from the total sample (unless otherwise specified)



## **CHAPTER 3: CANCER SCREENING UTILIZATION AMONG ESL IMMIGRANT WOMEN**

The work presented in the remainder of this chapter has been accepted for publication as:

Todd, L., Harvey, E., & Hoffman-Goetz, L. (2010). Predicting breast and colon cancer screening among English-as-a-second language older Chinese immigrant women to Canada. *Journal of Cancer Education*; DOI: 10.1007/s13187-010-0141-7.

### **3.1 Chapter Overview**

Little is known about the cancer screening behaviours of older ESL Chinese immigrant women. To explore predictors of colon and breast cancer screening in this population 103 Mandarin and Cantonese-speaking immigrant women ages 50 years and older were recruited. Participants completed questionnaires to evaluate screening behaviours, health literacy and demographic characteristics. Eighty-five percent of the participants self-reported that they were current breast cancer screeners and 75% were current colon cancer screeners. Recommendation from a physician, having a female physician, and high or moderate proficiency in English predicted current mammography screening. Physician recommendation, first language, and self-efficacy predicted use of colon cancer screening. Bivariate analyses also revealed an association between use of colon cancer screening and greater health literacy and longer residency in Canada. Important predictors of screening emerged that potentially informs interventions to increase cancer prevention among older Chinese immigrants. The essential role of physician recommendation was identified for both breast and colon cancer screening.

### 3.2 Introduction

Breast and colon cancers are among the most commonly diagnosed cancers in Canadian women (Canadian Cancer Society, 2008). Regular mammography and fecal occult blood testing (FOBT) (when followed by a colonoscopy after positive results) significantly reduce breast and colon cancer mortality (Gotzsche & Nielsen, 2009; Hewitson et al., 2008; Mandel et al., 1993; Tabar et al., 2003). In Canada national screening programs for breast cancer and, in Ontario, a province-wide colon cancer screening program have been implemented. However, participation in these screening programs is low: in 2008, an estimated 60% of Canadians aged 50 or older reported never having been screened for colon cancer and 28% of Canadian women ages 50-69 reported never having had a mammogram [Shields & Wilkins, 2009; Wilkins & Shields, 2009].

While screening in the general population is lower than desired, immigrants and racial/ethnic minorities are at an even greater risk of not being screened. Numerous studies in the United States and Canada suggest lower participation rates in preventive cancer screening among many ethnic immigrant groups, including Chinese women (Do, Taylor, Yasui, Jackson, & Tu, 2001; Hislop et al., 2003; Jackson et al., 2003; Yu, Kim, Chen, & Brintnall, 2001). Asian immigrant women to Canada had significantly lower rates of breast cancer screening than non-immigrant women (Sun et al., 2010), consistent with identified disparities in mammography use among Asian-American and Chinese-American women (Kandula et al., 2006; Ma et al., 2009; Tu et al., 2003). Chinese-Americans have also been shown to be less likely to undergo colon cancer screening than the general population (Jerant et al., 2008; Sung et al., 2003; Yip et al., 2006). To date, there are no published reports about colon cancer screening among Chinese-Canadians.

The Chinese community comprises the second largest ethnic group in Canada and Chinese dialects (Mandarin, Cantonese) are the third most commonly spoken language in Canada, after English and French (Statistics Canada, 2008). Despite this, little is known about Chinese immigrant health or health behaviours, including use of cancer prevention services. The purpose of this pilot study was to describe among older English-as-a-Second-Language (ESL) Chinese immigrant women to Canada: 1) breast and colon cancer screening rates, 2) predictors of self-reported breast and colon cancer screening, and 3) why some women who start to screen do not continue to screen.

### **3.3 Methods**

#### **3.3.1 Participants & Procedures**

A convenience sample of 103 women was recruited from two Southern Ontario communities from October 2009 to February 2010. For study inclusion participants were required: (1) be 50 years of age or older, (2) have immigrated to Canada, (3) have Cantonese or Mandarin as their first language and English as their Second Language (ESL), and (4) be able to read in English. Individuals were excluded if they or their spouse had been previously diagnosed with any type of cancer. Participants were recruited from community organizations and venues catering to the Chinese community. These community organizations provide activities and events, including recreation and entertainment, for Chinese older adults. This study was part of a larger study to evaluate the roles of literacy, culture and language among Chinese ESL immigrants in their comprehension of colon cancer education materials. The research was approved by the University ethics review

board. Study information was provided to participants in English and Chinese and informed consent was obtained from all women.

Eligible women attended a 90-minute interview and completed questionnaires designed to assess cancer screening behaviours, demographic characteristics, cancer worry, health literacy, and self-efficacy about performing cancer screening tests. A trilingual (English, Mandarin and Cantonese) research assistant was present at all interviews. Each participant received an honorarium of \$30 in appreciation of her time.

### **3.3.2 Outcome Variable: Screening Behaviours**

The primary outcome variables of interest were self-reported current and past use of colon and breast cancer screening. Current screening was defined according to Ontario breast and colon cancer screening guidelines for test interval and reimbursement under provincial health insurance coverage (Cancer Care Ontario, 2010). Questions about cancer screening were derived from published studies (National Cancer Institute, 2007). Participants were asked if they have ever had the cancer screening test (e.g., - “Have you ever done a stool blood test, also known as a fecal occult blood test (FOBT)?” and “Have you ever had a mammogram (breast cancer test) done?”). Participants who responded “yes” were assigned a score 1 (“ever screened”), while those who reported “no” scored 0 (“never screened”). Women who were classified as “ever screened” were asked to indicate the most recent time they had the screening test (e.g.-“When was the last time you had a mammogram test done?” and “When did you do your most recent stool blood test/fecal occult blood test?”). Women were considered “current” screeners if they had completed an FOBT and /or mammogram within the past two years, and/or a colonoscopy/ sigmoidoscopy in the past five years.

### **3.3.3 Demographic Variables**

Age, educational level, marital status, employment status, annual income, length of residence in Canada, self-reported English language proficiency, and cancer worry were assessed using items adapted from the HINTS 2003 questionnaire from the National Cancer Institute (2006) and which we have used elsewhere (Donelle, Hoffman-Goetz, & Arocha, 2007; Hoffman-Goetz, Meissner, & Thompson, 2009). Women were also asked the gender of their physician and the language they used when talking with their doctor (English, Chinese). Women who reported using both languages with their physician were classified as Chinese language.

### **3.3.4 Functional Health Literacy**

Functional health literacy was assessed using the Short Test of Functional Health Literacy for Adults (S-TOFHLA) (Parker, Baker, Williams, & Nurss, 1995). This 36-item test measures an individual's ability to read and understand health care-related passages. The test is timed (7 minutes) and uses a modified cloze procedure where every 5<sup>th</sup> to 7<sup>th</sup> word is omitted and replaced with a blank space. The participant must select a word to fit into the blank spaces from 4 multiple-choice options provided for each space. S-TOFHLA is scored on a scale of 0 to 36, and patients are categorized as having adequate health literacy (score of 23-36), marginal health literacy (score of 17-22) or inadequate health literacy (score of 0-16). The S-TOFHLA has high internal consistency (Cronbach's alpha=0.97) and correlates well with the full TOFHLA ( $R^2=0.91$ ).

### **3.3.5 Self-efficacy Scale**

A published instrument that assesses self-efficacy in using colon cancer screening tests was utilized (McQueen, Tiro, & Vernon, 2008). This instrument includes 8 items (e.g., “How confident are you that you can complete the colon cancer testing?” and “How confident are you that you can find the time to complete colon cancer testing?”) with responses assessed on a 4-point Likert scale. The Cronbach’s alpha for reliability is 0.91 [26].

### **3.4 Statistical Analysis**

Data were analyzed using SPSS software (Version 17.0; SPSS Inc. Chicago). Fisher’s exact tests and independent sample t-tests were conducted to investigate the associations between predictor variables and outcomes of interest (breast and colon cancer screening). Because a very small number of women reported never having had a mammogram (8 out of the 103 participants), there was an insufficient amount of data to examine the associations between ever and never users of mammography. However, analyses were carried out for current vs. non-current screeners with respect to mammography use. Significant variables from these analyses were used in multivariate logistic regression with separate analyses conducted for each screening test (breast, colon). Odds ratios (OR) with 95% confidence intervals (CI) were used to examine the association between the various predictor variables and self-reported breast and colon cancer screening. Unless otherwise indicated a p value of 0.05 was considered significantly different from chance alone.

## **3.5 Results**

### **3.5.1 Sample Characteristics**

Table 1 shows demographic characteristics of the ESL Chinese-language older immigrant women enrolled in this study. The mean age of the participants was 63.6 years (SD=8.0). The average length of residence in Canada was 25.2 years (SD=14.4). All participants were foreign born and 37% were Mandarin speakers and 63% spoke Cantonese.

### **3.5.2 Screening Behaviours**

Mammography use among the ESL Chinese immigrant women was high, with 95 participants (92%) ever having a mammogram. Eighty-five percent (81 women) were current screeners. Table 2 presents the Fisher's exact tests between the demographic variables and self-reported current mammography screening. Women with high or moderate English-language proficiency were more likely to be current screeners than women with low English-language proficiency ( $p=0.047$ ). Women who had a female physician were also more likely to be current screeners than women with a male physician ( $p=0.005$ ). There was a significant association between physician recommendation and current mammography screening status; moreover, only 12% of non-current screeners received physician recommendations for screening in the past 2 years compared with 88% of current users ( $p<0.001$ ).

Table 2 presents the Fisher's exact tests between the demographic variables and women who self-reported ever having had a mammogram but who were not current screeners (referred to as "drop outs"). These women were more likely to have a male

physician than women who remained current screeners ( $p=0.033$ ), were more likely to report that they rarely or never worried about getting cancer ( $p=0.043$ ), and had not received a recommendation for a mammogram screen in the past two years ( $p=0.002$ ).

Self-reported colon cancer screening was lower than for breast cancer screening, with only 80 women (78%) having reported FOBT, colonoscopy or sigmoidoscopy screening. Of these 80 women, 60 (75%) were current screeners. Table 3 presents the Fisher's exact tests between the demographic variables and ever having undergone colon cancer screening. Longer length of residence in Canada was associated with having ever had colon cancer screening: 62% of women who had been in Canada < than 15 years had ever screened compared to 86% of women who had been in Canada > than 15 years ( $p=0.011$ ). Cantonese speakers were more likely to have ever had screened for colon cancer than Mandarin speakers ( $p=0.027$ ). Physician recommendation was a strong predictor of screening with only 9% of never screeners reporting receipt of a physician recommendation in the past 5 years compared with 91% of ever users ( $p<0.001$ ). Health literacy scores, as determined by s-TOFHLA, were significantly higher in those who had ever screened (mean=19.2 out of 36) than those who had never screened (mean=13.7) ( $t=2.160$ ,  $df=101$ ,  $p=0.038$ ). Self-efficacy scores were significantly higher for ever screened (mean=3.41) relative to never screened (mean=3.09) ( $t=2.447$ ,  $df=100$ ,  $p=0.02$ ).

When comparing current to non-current colon cancer screeners, women who had received a physician recommendation in the past 5 years were more likely to be current screeners ( $p<0.001$ ). Women who were current screeners had higher health literacy scores ( $p=0.042$ ) and reported greater self-efficacy to perform a colon cancer screening test (e.g., FOBT) ( $p=0.013$ ).



**Table 1.** Participant Demographics (N=103)

| <b>Sample Characteristic</b>    | <b>% or Mean (SD)</b> |
|---------------------------------|-----------------------|
| <b>Age</b>                      | 63.61 (8.0)           |
| <b>Years in Canada</b>          | 25.20 (14.41)         |
| <b>First Language</b>           |                       |
| Mandarin                        | 37%                   |
| Cantonese                       | 63%                   |
| <b>Education</b>                |                       |
| Up to and including high school | 34%                   |
| Some college or higher          | 67%                   |
| <b>Marital Status</b>           |                       |
| Married                         | 76%                   |
| Divorced/Separated              | 12%                   |
| Widowed                         | 9%                    |
| Single                          | 3%                    |
| <b>Annual Income*</b>           |                       |
| >\$20,000                       | 52%                   |
| <\$20,000                       | 40%                   |
| Missing                         | 8%                    |
| <b>English Proficiency</b>      |                       |
| Low                             | 39%                   |
| Moderate                        | 48%                   |
| High                            | 13%                   |
| <b>Doctor Gender</b>            |                       |
| Male                            | 57%                   |
| Female                          | 42%                   |
| Missing                         | 1%                    |
| <b>Language with Doctor</b>     |                       |
| English                         | 70%                   |
| Chinese                         | 29%                   |
| Missing                         | 1%                    |

\*\$20,000 was selected based on national low-income cut-offs for a 2 adult family in 2006 (Statistics Canada, 2008).

**Table 2.** Characteristics of ESL Older Chinese Immigrant Women Who Were Non-Current versus Current Mammography Screeners\* and Screening Drop Outs<sup>+</sup>

|                             | All<br>N=103 | Mammography<br>Screening* |                  | P     | All<br>N=95 | Screening Drop<br>Outs <sup>+</sup> |            | P     |
|-----------------------------|--------------|---------------------------|------------------|-------|-------------|-------------------------------------|------------|-------|
|                             |              | Non-<br>Current<br>n=22   | Current<br>n= 81 |       |             | Yes<br>n=14                         | No<br>n=81 |       |
| <b>Age</b>                  |              |                           |                  | 0.632 |             |                                     |            | 0.146 |
| 50-64                       | 53           | 19%                       | 81%              |       | 47          | 9%                                  | 91%        |       |
| >65                         | 50           | 24%                       | 76%              |       | 48          | 21%                                 | 79%        |       |
| <b>Education</b>            |              |                           |                  | 0.312 | --          | --                                  | --         | --    |
| >High school                | 34           | 15%                       | 85%              |       |             |                                     |            |       |
| <High School                | 69           | 25%                       | 75%              |       |             |                                     |            |       |
| <b>Annual Income</b>        |              |                           |                  | 0.307 |             |                                     |            | 0.537 |
| >\$20,000                   | 54           | 24%                       | 76%              |       | 49          | 16%                                 | 84%        |       |
| >\$20,000                   | 41           | 15%                       | 85%              |       | 39          | 10%                                 | 90%        |       |
| <b>Years in Canada</b>      |              |                           |                  | 0.203 |             |                                     |            | 0.359 |
| >15 years                   | 34           | 29%                       | 71%              |       | 30          | 20%                                 | 80%        |       |
| <15 years                   | 69           | 17%                       | 83%              |       | 65          | 12%                                 | 88%        |       |
| <b>English Proficiency</b>  |              |                           |                  | 0.047 |             |                                     |            | 0.132 |
| Low                         | 40           | 32%                       | 68%              |       | 35          | 23%                                 | 77%        |       |
| Moderate/High               | 63           | 14%                       | 86%              |       | 60          | 10%                                 | 90%        |       |
| <b>First Language</b>       |              |                           |                  | 0.806 |             |                                     |            | 0.768 |
| Mandarin                    | 38           | 24%                       | 76%              |       | 35          | 17%                                 | 83%        |       |
| Cantonese                   | 62           | 21%                       | 79%              |       | 57          | 14%                                 | 86%        |       |
| <b>Language with Doctor</b> |              |                           |                  | 0.799 | --          | --                                  | --         | --    |
| English                     | 32           | 22%                       | 78%              |       |             |                                     |            |       |
| Chinese                     | 70           | 20%                       | 80%              |       |             |                                     |            |       |
| <b>Doctor Gender</b>        |              |                           |                  | 0.005 |             |                                     |            | 0.033 |
| Male                        | 59           | 31%                       | 69%              |       | 52          | 21%                                 | 79%        |       |
| Female                      | 43           | 7%                        | 93%              |       | 42          | 5%                                  | 95%        |       |
| <b>Cancer Worry</b>         |              |                           |                  | 0.455 |             |                                     |            | 0.043 |
| Low                         | 38           | 26%                       | 74%              |       | 37          | 24%                                 | 76%        |       |
| High                        | 65           | 19%                       | 81%              |       | 58          | 9%                                  | 91%        |       |

|                                 |     |       |       |        |    |       |       |       |
|---------------------------------|-----|-------|-------|--------|----|-------|-------|-------|
| <b>Physician Recommendation</b> |     |       |       | <0.001 |    |       |       | 0.002 |
| Yes                             | 77  | 12%   | 88%   |        | 74 | 8%    | 92%   |       |
| No                              | 26  | 50%   | 50%   |        | 21 | 38%   | 62%   |       |
| <b>Health Literacy</b>          | 103 |       |       | 0.193  | 95 |       |       | 0.386 |
| Mean                            |     | 15.27 | 18.68 |        |    | 61.56 | 63.68 |       |
| SD                              |     | 10.71 | 10.48 |        |    | 5.43  | 8.59  |       |

\*Current screeners had completed a mammogram in the past 2 years

+ “Screening Drop outs” are women who reported ever having had a mammogram but who were not current screeners

-- Fisher’s exact test was not valid due to 25% of the cells having an expected value of less than 5

**Table 3.** Characteristics of ESL Older Chinese Immigrant Women Who Were Never versus Ever Colon Cancer Screeners\* and Non-Current vs. Current Screeners<sup>+</sup>

|                             | All,<br>N=103 | Colon Cancer<br>Screening* |               | P     | Colon Cancer<br>Screening <sup>+</sup> |                 | P     |
|-----------------------------|---------------|----------------------------|---------------|-------|--|-----------------|-------|
|                             |               | Never<br>n=23              | Ever<br>n= 80 |       | Non-<br>Current<br>n=69                | Current<br>n=34 |       |
| <b>Age</b>                  |               |                            |               | 0.641 |  |                 | 1.000 |
| 50-64                       | 53            | 25%                        | 75%           |       | 32%                                    | 68%             |       |
| >65                         | 50            | 20%                        | 80%           |       | 34%                                    | 66%             |       |
| <b>Education</b>            |               |                            |               | 1.000 |  |                 | 1.000 |
| >High school                | 34            | 21%                        | 79%           |       | 32%                                    | 68%             |       |
| <High School                | 69            | 23%                        | 77%           |       | 33%                                    | 67%             |       |
| <b>Annual Income</b>        |               |                            |               | 0.326 |  |                 | 0.275 |
| >\$20,000                   | 54            | 28%                        | 72%           |       | 39%                                    | 61%             |       |
| >\$20,000                   | 41            | 17%                        | 83%           |       | 27%                                    | 73%             |       |
| <b>Years in Canada</b>      |               |                            |               | 0.011 |  |                 | 0.120 |
| >15 years                   | 34            | 38%                        | 62%           |       | 44%                                    | 56%             |       |
| <15 years                   | 69            | 14%                        | 86%           |       | 28%                                    | 72%             |       |
| <b>English Proficiency</b>  |               |                            |               | 0.152 |  |                 | 0.133 |
| Low                         | 40            | 30%                        | 70%           |       | 42%                                    | 58%             |       |
| Moderate/High               | 63            | 17%                        | 83%           |       | 27%                                    | 73%             |       |
| <b>First Language</b>       |               |                            |               | 0.027 |  |                 | 0.662 |
| Mandarin                    | 38            | 34%                        | 66%           |       | 37%                                    | 63%             |       |
| Cantonese                   | 62            | 15%                        | 85%           |       | 31%                                    | 69%             |       |
| <b>Language with Doctor</b> |               |                            |               | 0.125 |  |                 | 0.259 |
| English                     | 32            | 31%                        | 69%           |       | 41%                                    | 59%             |       |
| Chinese                     | 70            | 17%                        | 83%           |       | 29%                                    | 71%             |       |
| <b>Doctor Gender</b>        |               |                            |               | 1.000 |  |                 | 0.521 |
| Male                        | 59            | 22%                        | 78%           |       | 36%                                    | 64%             |       |
| Female                      | 43            | 21%                        | 79%           |       | 28%                                    | 72%             |       |
| <b>Cancer Worry</b>         |               |                            |               | 0.472 |  |                 | 0.385 |
| Low                         | 38            | 26%                        | 74%           |       | 40%                                    | 60%             |       |
| High                        | 65            | 20%                        | 80%           |       | 29%                                    | 71%             |       |

|                                 |     |       |       |        |       |       |        |
|---------------------------------|-----|-------|-------|--------|-------|-------|--------|
| <b>Physician Recommendation</b> |     |       |       | <0.001 |       |       | <0.001 |
| Yes                             | 67  | 9%    | 91%   |        | 12%   | 88%   |        |
| No                              | 36  | 47%   | 53%   |        | 72%   | 28%   |        |
| <b>Health Literacy</b>          | 103 |       |       | 0.038  |       |       | 0.042  |
| Mean                            |     | 13.70 | 19.18 |        | 14.91 | 19.45 |        |
| SD                              |     | 10.86 | 10.23 |        | 10.45 | 10.38 |        |
| <b>Self-Efficacy</b>            | 102 |       |       | 0.020  |       |       | 0.013  |
| Mean                            |     | 3.09  | 3.41  |        | 3.15  | 3.43  |        |
| SD                              |     | 0.57  | 0.49  |        | 0.52  | 0.50  |        |

\* Ever screeners refers to women who have ever had a FOBT, colonoscopy or sigmoidoscopy

+ Current screeners completed an FOBT in the past two years and/or a colonoscopy or sigmoidoscopy in past 5 years

### 3.5.3 Predictors of current mammography screening

Logistic regression analysis showed that physician recommendation (OR= .140; 95% CI= .044, .448;  $p < 0.001$ ), high or moderate English-language proficiency (OR= .283; 95% CI= .089, .902,  $p = 0.033$ ) and having a female physician (OR= .141; 95% CI= .033, .591,  $p = 0.007$ ) predicted current screening status. Together these variables explained about 35% of the variance in self-reported current mammogram screening status among older ESL Chinese immigrant women (Nagelkerke pseudo  $R^2 = .356$ ).

### 3.5.4 Predictors of past and current colon cancer screening

Logistic regression analysis indicated that physician recommendation (OR= .103; 95% CI= .031, .349,  $p < 0.001$ ), having Cantonese as a first language (OR= 1.85; 95% CI= .055, .628,  $p = 0.007$ ), and higher self-efficacy to perform colon cancer testing (OR= 3.613; 95% CI= 1.179, 11.070,  $p = 0.025$ ) predicted ever versus never screening status. Together these variables accounted for about 39% of the variance in ever vs. never screened status for older ESL Chinese immigrant women (Nagelkerke pseudo  $R^2 = .392$ ).

With respect to current vs. non-current colon cancer screening, physician recommendation (OR= 0.49; 95% CI= .016, .151,  $p < 0.001$ ) significantly explained the variation in this outcome measure (Nagelkerke pseudo  $R^2 = .437$ ). Although not significant independent predictors of current vs. non-current colon cancer screen, self-efficacy to perform a colon cancer test such as FOBT (OR = 2.860; 95% CI = .948, 8.633,  $p = 0.062$ ) and English-language proficiency (OR .342; 95% CI = .123, 1.187,  $p = 0.096$ ) contributed an

additional 6% of the overall variation in self-reported screening (final Nagelkerke pseudo  $R^2 = 0.497$ ).

### **3.6 Discussion**

The purpose of this study was to describe self-reported breast and colon cancer screening among older ESL Chinese immigrant women in Canada and to identify the predictors of this self-reported screening. Screening rates for mammography and colon cancer was high: 85% of the women being current mammography screeners and 75% being current colon cancer screeners. These high rates of colon and breast cancer screening may be partly due to the women being relatively well-educated (67% reported having at least a college education in China) and that most women had been in Canada for longer than 15 years (67%). In addition, since recruitment took place in a senior center and church the sample may not be representative of the general population as these women may have greater exposure to information about preventative health behaviours.

Despite the relatively high self-reported colon and breast screening, some women did not screen. We identified several factors associated with self-reported receipt of screening. Physician recommendation was an important predictor of screening for breast and colon cancer. Older ESL Chinese immigrant women who had a recent discussion with their physician about screening were more likely to report that they obtained screening and continued to screen. The importance of physician referral for cancer screening has been described in other studies including those with Chinese women (Hislop et al, 2003; Liang et al., 2009) but not previously for Chinese immigrant women to Canada. Physician recommendation may be especially important for older immigrant women as there is a high instrumental value placed on authority in Chinese culture (Lee, 1998). Therefore,

interventions that highlight the physician's role in promoting the use of disease prevention screening tests among ESL Chinese immigrant women may be especially effective.

Older ESL Chinese immigrant women with female physicians were also more likely to have mammograms than women with male physicians. Female physicians are more likely to discuss general health promotion activities than male physicians, especially when the issues are considered sensitive (Ramirez et al., 2009). Indeed, there have been reports that female physicians are more likely in general to recommend breast (Haggerty, Tamblyn, Arahamowicz, Beaulieu, & Kishchuk, 1999) and colon cancer screening (Shokar, Nguyen-Oghalai, & Wu, 2009) than their male counterparts. The importance of physician gender may be particularly salient for Chinese immigrants given strong cultural attitudes about modesty. Chinese women tend to be conservative with regard to modesty and privacy, and are less willing to reveal their breasts, even to health care providers (Kwok et al., 2005; Wu, Hsieh, & West, 2009). Physician gender was not a significant predictor for self-reported colon cancer screening in this immigrant sample; this finding suggests that modesty issues may be more pronounced surrounding sexual health, and hence, play a greater role in continuance of mammography use.

English language proficiency predicted current colon and breast cancer screeners. This finding is consistent with others showing limited English-language proficiency to be a significant barrier in obtaining preventive cancer screening tests among Chinese and Asian immigrants (Jacobs et al., 2005; Liang et al., 2009; Wang, Fang, Tan, Liu, & Ma, 2010). Not only can limited English language proficiency reduce a woman's ability to communicate with her physician and understand the need for regular screening, but also may also affect the level of exposure to cancer information in general (such as use of information pamphlets, websites etc).



We found that Mandarin speakers and women who had been in Canada less than 15 years were less likely to have screened for colon cancer using FOBT, colonoscopy, or sigmoidoscopy. Others also report fewer years of residency in the U.S to be associated with lower cancer screening in Chinese and Asian Americans (Kandula et al., 2006; Ma et al., 2009). Fewer years residency in Canada may be a marker of language ability, acculturation, knowledge, and even attitudes towards screening. Further research will be needed to identify how years in Canada is associated with screening behaviours. Regardless, new immigrants to Canada are likely to benefit from cancer screening education campaigns.

The finding that Mandarin speakers are less likely to have screened for colon cancer than Cantonese speakers may be attributable to years of residence in Canada. The number of immigrants from Hong Kong surged during the mid 1980's and early 1990's, while between 1991 and 2001 immigration from The People's Republic of China were the top source of newcomers to Canada (Chui, Tran, & Flanders, 2005). Indeed, Cantonese speakers in our sample had been in Canada a significantly greater number of years than Mandarin speakers (on average 31 vs. 16 years). While we speculate that this may partly explain our finding as to why Cantonese speakers were more likely to screen for colon cancer than Mandarin speakers, other unique factors may be important. For example, Cantonese speakers who emigrated from Hong Kong would likely be familiar with the British educational system compared to Mandarin speakers who emigrated from mainland China.

Self-efficacy was an important predictor of ever having screened for colon cancer and current colon cancer screening status. Self-efficacy refers to an individual's perception of her ability to carry out a specific behaviour or set of behaviours (Bandura, 1977). This finding agrees with studies linking efficacy perceptions and cancer prevention adherence (Wong, 2009). There are a number of factors that may have contributed to the women's

reported self-efficacy about colon cancer screening. These include English-language proficiency (women who have limited English may feel less confident in their ability to obtain screening) (Liang et al, 2009), and limited population knowledge about colon cancer screening (Ritvo et al., 2009). Further study is needed to better understand the role of self-efficacy in cancer screening behaviours among ESL immigrants. Nevertheless, cancer prevention campaigns to increase screening among ESL Chinese immigrant women may benefit from the use of messages that target self-efficacy beliefs.

We reported significantly lower health literacy scores among women who had never been screened for colon cancer compared to those who had been screened and also among women who were non-current screeners versus current screeners. This finding is consistent with research showing that patients with limited literacy skills are less likely to be knowledgeable about colon cancer screening (Miller et al., 2007; Peterson et al., 2007) and report more barriers to completing FOBT and colonoscopy testing (Peterson et al., 2007). It is interesting that current and non-current breast cancer screeners did not differ in health literacy scores. One reason that health literacy may be associated with colon but not breast cancer relates to prior knowledge. There is significant public awareness surrounding breast cancer and mammography screening, but public knowledge about colon cancer testing is low (Ritvo et al., 2007). Patients with limited literacy skills have been shown to be less likely to seek information about colon cancer testing and report greater difficulty in reading informational materials on colon cancer screening (von Wanger et al., 2009). Therefore, limited health literacy skills may be more pronounced, and perhaps more detrimental, for less familiar cancers (such as colon cancer) where more information seeking is required to be adequately informed.

This pilot study also sought to examine why some women may start to screen for colon or breast cancers but discontinue screening. The factors that predict whether a woman will ever start testing and why someone starts and then stops are likely different and complex. Our results indicated that there were no significant demographic differences between women who continue and those who did not continue to screen for colon cancer. However, ESL Chinese immigrant women who ever had a mammogram but were not current-screeners were more likely to report that they never or rarely worried about cancer. Chinese-American women who did not worry about getting cancer were also less likely to screen (Wang et al., 2006). It is possible that women who receive a negative test feel a false sense of security and don't feel continued screening is necessary. Cancer educational interventions should target this potential misconception to ensure women are aware of the importance of continued screening.

### **3.6.1 Limitations**

The primary strength of this study is that it offers an initial look at self-reported colon and breast cancer screening behaviours of ESL Chinese immigrant women in Canada. Predictors of self-reported colon cancer testing have not been published for this population. There are, however, several limitations to the study. First, screening determination is based on self-reports, which were not verified clinically; therefore, screening rates may be under or over-estimated. Second, a convenience sample was obtained and is likely not representative of the larger general Chinese Canadian immigrant population. Third, the overall small sample size and the small sample size of the never screened or non-current groups may have limited our power to detect differences between groups. Fourth, although functional health literacy

of the women was assessed using S-TOFHLA, their actual comprehension of the information presented in the questionnaires was not determined. Finally, there was no assessment of self-efficacy for mammography use as the larger study was designed to measure colon cancer rather than breast cancer comprehension. Although there is a self-efficacy instrument for mammography that has a high Cronbach's alpha (0.89), it has poor test-retest reliability (0.52) (Champion, Skinner, & Menon, 2005). Future studies will be needed to determine if self-efficacy for mammography is a significant predictor of self-reported screening similar to that observed for colon cancer screening.

### **3.6.2 Conclusion**

This study adds to the literature on cancer screening among ESL immigrants to North America, and is the first to examine colon cancer screening among older female Chinese immigrants in Canada. For cancer educators, understanding the specific barriers to cancer screening that ESL immigrant women face can help reduce disparities in access to preventive services. The current study highlights the importance of physician recommendation, self-efficacy, and adequate English-language proficiency in obtaining cancer screening. In addition, these results hint at cultural factors, such as modesty, that may influence the likelihood of obtaining and continuing screening among ESL Chinese immigrant women.

## **CHAPTER 4: COMPREHENSION OF CANCER INFORMATION BY ESL IMMIGRANT WOMEN**

The work presented in the remainder of this chapter has been accepted for publication as:

Todd, L & Hoffman-Goetz, L. (2010). Predicting health literacy among English-as-a-second-language older Chinese immigrant women to Canada: comprehension of colon cancer prevention information. *Journal of Cancer Education*; DOI: 10.1007/s13187-010-0162-2.

### **4.1 Chapter Overview**

Inadequate health literacy has been identified as a barrier to the utilization of health care services including cancer screening. This study examined predictors of health literacy among 106 older Chinese immigrant women to Canada and how colon cancer information presented in their first versus second language affected health literacy skill. Only 38.7% of the women had adequate health literacy based on S-TOFHLA and 54.3% had adequate comprehension of the colon cancer information. Comprehension of the cancer information was significantly lower among women who received the information in English compared to those who received the information in Chinese. Age, acculturation, self-reported proficiency reading English and education were significant predictors of health literacy but varied depending on the measure of health literacy used and language of the information. Presentation of cancer prevention information in one's first rather than second language improves health literacy but does not eliminate comprehension difficulties for older ESL Chinese immigrants.

## 4.2 Introduction

Colon cancer incidence and mortality rates in Canada are among the highest worldwide (Canadian Cancer Society, 2008). If detected early colon cancer is highly curable and biennial FOBT screening followed by a colonoscopy after positive results significantly reduces mortality (Hewitson et al., 2008; Mandel et al., 1993). Despite this, screening rates are consistently low in Canada; in 2008, an estimated 60% of Canadians aged 50 and older reported never to have screened for colon cancer (Wilkins & Shields, 2009). Even lower rates occur among many immigrant groups in North America (Kandula et al., 2006; Sun et al., 2010, including Chinese-Americans who have been shown to be less likely to undergo colon cancer screening than the general population (Jerant et al., 2008; Yip et al., 2006).

Limited literacy is associated with less knowledge about cancer-related health services and more negative attitudes (Davis et al., 2001; Peterson et al., 2007). Health literacy, an important determinant of health, is “the cognitive and social skills, which determine the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good health” (Nutbeam, 2000). The Canadian Council on Learning emphasizes the broad reach of health literacy which “includes whether individuals can read and act upon written health information, as well as whether they possess the speaking skills to communicate their health needs to physicians and the listening skills to understand and act on the instructions they receive”. Although conceptualized as being made up of many components (e.g., empowerment, self-efficacy), comprehension is fundamental for health literacy.

Seniors and immigrants in Canada are disproportionately affected by low health literacy (Statistics Canada, 2009). Printed health education materials are widely used to increase awareness and knowledge, and are often a core component of cancer education

campaigns. However, there is little known about the comprehension of these materials by diverse audiences. The Chinese community comprises the second largest ethnic group in Canada, and Chinese is the third most commonly spoken language (Statistics Canada, 2008). The primary objectives of this exploratory study were to examine basic health literacy among older Chinese immigrant women in Canada, predictors of health literacy, and how colon cancer prevention information presented in one's first versus second language affects health literacy.

### **4.3 Methods**

#### **4.3.1 Participants and Procedures**

A convenience sample of 110 women was recruited from two Southern Ontario communities from October 2009 to February 2010. Participants were required to: (1) be 50 years or older, (2) have immigrated to Canada, (3) have Cantonese or Mandarin as their first language and English-as-a-second-language (ESL), and (4) be able to read in English. After excluding women who had been previously diagnosed with cancer or who were visitors the final sample size was 106. Participants were recruited from organizations and venues that provide recreation and entertainment to Chinese older adults. The research was approved by the University ethics review board and informed consent was obtained.

Eligible women attended a 90-minute testing session and completed questionnaires to assess demographic characteristics, acculturation and health literacy. Following administration of the questionnaires the women read a short (2-page) consumer colon cancer information sheet in English or Chinese available from the Cancer Care Ontario (CCO) website (<http://coloncancercheck.ca/factsheets.html>). Prior to the start, women were

randomly assigned to receive this information in English or Chinese. Sixteen women who were randomized to the English language group refused to read the CCO sheet in English and were given the information in Chinese. Separate analyses including and excluding these women were conducted in order to determine if this lack of randomization of the 16 women affected results.

Immediately after reading the information page participants completed a standard cloze test (Taylor, 1953) to assess comprehension. This comprehension task was given in the same language in which the information was provided (English or Chinese). A trilingual (English, Mandarin, Cantonese) research assistant/translator was present at all testing sessions. Each participant received an honorarium of \$30 in appreciation of her time.

### **4.3.2 Measures**

#### *Health Literacy Measures*

The Short Test of Functional Health Literacy for Adults (S-TOFHLA) (Parker et al., 1995), a 7 minute (timed) 36-item test, measures an individual's ability to read and understand health-care related passages with a modified cloze procedure (every 5<sup>th</sup> to 7<sup>th</sup> word omitted and replaced with a blank space). The reader selects a word to fit into the blank spaces from 4 multiple-choice options. S-TOFHLA is scored on a scale of 0 to 36, with scores >22 as adequate, 17-22 as marginal, and <17 as inadequate health literacy. The S-TOFHLA has high internal consistency (Cronbach's alpha=0.97) and correlates well with the full TOFHLA ( $R^2=0.91$ ).

A second assessment of health literacy (comprehension) was developed based on the CCO colon cancer information page. Using a standard cloze procedure, every 6<sup>th</sup> word was



deleted for the English and Chinese versions and replaced with a blank line (Taylor, 1953). Participants completed the passage by inserting what they believed to be the deleted word. The standard cloze test is a reliable measure of patient comprehension (Estey, Musseau, & Keehn, 1994; Taylor 1953). Participants correctly answering >60% cloze units (i.e., missing words) have adequate comprehension, those answering 40%-59% have marginal comprehension (text is challenging), and those answering <40% cloze units have inadequate comprehension (great difficulty with comprehension of text) (Taylor, 1953).

#### *Acculturation*

Acculturation was measured using the Suinn-Lew Asian Self-Identity Acculturation Scale (SL-ASIA) (Suinn et al., 1987). This 21-item questionnaire includes items about language, identity, friendships, general and geographic background, and attitudes. Responses were assessed on a 5-point Likert scale and an average acculturation score was derived where scores ranged from 1 (low acculturation, greater Asian identification) to 5 (high acculturation, greater Western identification). The Cronbach's alpha (0.91) is high (Suinn et al., 1987).

#### **4.3.3 Statistical Analysis**

Data were analyzed using SPSS software (Version 17.0; SPSS Inc. Chicago). Descriptive and correlation analyses were conducted for demographic, acculturation, and health literacy measures. Independent sample t-tests identified differences in comprehension by language of the information. Multiple regression analysis was used to identify variables that were significantly associated with health literacy. Scores on the English and Chinese

cloze tests and the S-TOFHLA were the dependent variables. Predictor variables included acculturation, years of residency in Canada, age, self-reported proficiency reading English, income and education. Analyses of health literacy using the Chinese language cloze scores were carried out separately including and excluding the 16 women who could not be randomized. A p value of 0.05 or less was considered significant.

## **4.4 Results**

### **4.4.1 Sample Characteristics**

**Table 1** shows selected demographic characteristics of the participants. The women ranged in age from 50-81 years, with a mean ( $\pm$ SD) age of  $63.2\pm 8.2$ . Most were married (76.4%), retired (62.3%), and well educated (67.9% completed post-secondary education in China).

### **4.4.2 Acculturation**

Participant acculturation scores were low, ranging from 1-4.2, with a mean score of  $2.2\pm 0.5$  (maximum score of 5). Length of residency in Canada varied markedly from 1-51 years (average  $24.9\pm 14.3$  years).

**Table 4. Participant Demographics (n=106)**

| Characteristic                                      | %    |
|---|------|
| <b>Marital Status</b>                               |      |
| Married   | 76.4 |
| Divorced  | 11.3 |
| Widowed   | 8.5  |
| Single  | 3.8  |
| <b>Occupation</b>                                   |      |
| Employed  | 17.0 |
| Unemployed  | 5.7  |
| Homemaker   | 14.2 |
| Retired   | 62.3 |
| Other   | 1.0  |
| <b>Education</b>                                    |      |
| 12 years or less                                    | 32.1 |
| Post-secondary                                      | 67.9 |
| <b>Income Level *</b>                               |      |
| < \$20,000  | 51.9 |
| > \$20,000  | 40.6 |
| Missing   | 7.5  |
| <b>Language</b>                                     |      |
| Mandarin  | 37.7 |
| Cantonese   | 59.4 |
| Both  | 2.8  |
| <b>Self-reported health</b>                         |      |
| Excellent or very good                              | 31.2 |
| Good  | 39.6 |
| Fair  | 25.5 |
| Poor  | 3.8  |
| <b>Self-reported English Proficiency (speaking)</b> |      |
| High  | 13.2 |
| Moderate  | 49.1 |
| Low   | 37.7 |
| <b>Self-reported English Proficiency (reading)</b>  |      |
| High  | 14.2 |
| Moderate  | 52.8 |
| Low   | 33.0 |

\* \$20,000 was selected based on national low-income cut-offs for a 2 adult family in 2006 (Statistics Canada, 2006)

#### **4.4.3 Health Literacy Profiles**

Scores on the S-TOFHLA were between 0-36, with a mean score of  $18.1 \pm 10.6$ . Overall, 38.7% of participants had adequate, 17.0% had marginal and 44.3% had inadequate health literacy. Scores on the colon cancer cloze tests were low, ranging from 0-88 (mean  $55.2 \pm 20.9$ ). Just over 54% had adequate comprehension, whereas 22.9% had marginal and 22.9% had inadequate comprehension.

#### **4.4.4 Differences in Health Literacy by Language of Information**

Although health literacy as reflected in comprehension of the cancer information was generally low, a different picture emerges when broken out by language. Table 2 shows the percentage of women who had adequate, marginal, or inadequate comprehension on the English compared to the Chinese language versions. Fifty percent of the women who completed the English language cloze had inadequate comprehension, 34.2% had marginal comprehension, and 15.8% had adequate comprehension. In contrast, 7.5% of participants who completed the Chinese language cloze test had inadequate comprehension, 16.4% had marginal comprehension, and 76.1% had adequate comprehension. Mean comprehension scores were significantly lower in the English ( $39.9 \pm 17.9$ ) compared to the Chinese ( $63.9 \pm 17.2$ ) language cloze group ( $t=6.761$ ,  $df=103$ ,  $p < 0.01$ ).

**Table 5. Proportion of participants who had inadequate, marginal, or adequate comprehension of colon cancer information by language of test**

|   | cloze test group |                |                                    |
|---|------------------|----------------|------------------------------------|
|   | English          | Chinese (all)  | Chinese (excluding non-randomized) |
| Inadequate comprehension (score<40%)      | 50.0             | 7.5            | 7.8                                |
| Marginal comprehension (score of 40%-59%) | 34.2             | 16.4           | 13.7                               |
| Adequate comprehension (score≥60%)        | 15.8             | 76.1           | 78.4                               |
| Mean Score (SD)                           | 39.91 (17.91)    | 63.85 (17.17)* | 64.00 (17.80)*                     |

\*Score was significantly different than English cloze,  $p=0.0001$

#### 4.4.5 Regression modeling of comprehension

Table 6 shows that health literacy, as measured by S-TOFHLA, was significantly predicted ( $F_{4,101}=35.258$ ,  $p = 0.0001$ ) by acculturation, age, self-reported proficiency reading English, and education; these factors accounted for 56.6% of the variation in scores among the women. Table 6 also indicates that health literacy, reflected by scores on the colon cancer cloze test, was significantly predicted by acculturation for the English version of the test ( $F_{1,36}=12.947$ ,  $p = 0.001$ ) and by education for the Chinese version of the test ( $F_{1,65}=8.335$ ,  $p = 0.005$  and  $F_{1,49}=6.878$ ,  $p = 0.01$  for full sample and for sample excluding women who could not be randomized, respectively).

**Table 6. Multiple Regression modeling of health literacy among ESL Chinese immigrant women**

| Explanatory Variable          | S-TOFHLA                           | English cloze                        | Chinese cloze (all)                  | Chinese cloze (excluding non-randomized) |
|-------------------------------|------------------------------------|--------------------------------------|--------------------------------------|--|
|                               | Beta; p-value (95% CI)             | Beta; p-value (95% CI)               | Beta; p-value (95% CI)               | Beta; p-value (95% CI)                   |
| Constant                      | 9.490<br>0.142<br>(-3.219, 22.199) | -4.130<br>0.743<br>(-29.477, 21.217) | 57.071<br>0.0001<br>(50.925, 63.218) | 56.300<br>0.0001<br>(48.732, 63.868)     |
| Age                           | -.215<br>0.001<br>(-.445, -.109)   | --                                   | --                                   | --                                       |
| Education                     | .202<br>0.003<br>(1.599, 7.497)    | --                                   | .337<br>0.005<br>(3.590, 19.703)     | .351<br>0.012<br>(2.961, 22.374)         |
| Acculturation                 | .438<br>0.0001<br>(5.219, 11.974)  | .514<br>0.001<br>(7.787, 27.903)     | --                                   | --                                       |
| English Proficiency (reading) | .250<br>0.005<br>(1.744, 9.457)    | --                                   | --                                   | --                                       |
| <b>Overall model</b>          |                                    |                                      |                                      |  |
| F                             | 35.258                             | 12.947                               | 8.335                                | 6.878                                    |
| df                            | 105                                | 37                                   | 66                                   | 50                                       |
| p                             | 0.0001                             | 0.001                                | 0.01                                 | 0.012                                    |
| R <sup>2</sup>                | .566                               | .244                                 | .100                                 | .105                                     |

Note: One woman completed the S-TOFHLA but subsequently refused the cloze comprehension test

## 4.5 Discussion

The consequences of inadequate health literacy are extensive and include increased risk of hospitalization, poor adherence to medical regimens, and difficulty accessing health-care and prevention services. Older Chinese immigrant women had low health literacy scores on S-TOFHLA and poor comprehension of colon cancer prevention information. Only 39% had adequate health literacy on S-TOFHLA and only 54% had adequate comprehension of the cancer information.

These findings highlight the importance of language in health literacy skills among ESL immigrants. Women who received colon cancer information in their first language (Chinese) scored significantly higher on the health literacy test than those who received the same information in their second language (English). This finding is consistent with research showing language concordant medical encounters are associated with better comprehension by patients (Ngo-Metzger et al., 2007; Wilson et al., 2005). Nevertheless, health literacy even for the women who received the information in Chinese was still not satisfactory (mean score of 64%). These results and the findings of others suggest that language concordance mitigates but does not eliminate comprehension barriers for adult ESL speakers (Cheng et al., 2007; Wilson et al., 2005).

Acculturation was a significant predictor for the two health literacy measures assessed in English (S-TOFHLA and English cloze test). Acculturation refers to “the extent to which ethnic minorities retain their indigenous culture vs. adopt the alternative host culture” (Landrine & Klonoff, 2004). Older ESL Chinese immigrant women with lower acculturation scores had lower health literacy and greater difficulty understanding the information presented. Given that acculturation is a proxy for language skill this finding

emphasizes the risk of inadequate health literacy among women with limited English language proficiency. Women who self-reported low proficiency reading English also had lower scores on S-TOFHLA. Nevertheless, the acculturation measure includes other factors such as identity and attitudes. Therefore, aspects of acculturation other than language, such as deeply-held cultural beliefs, may affect health literacy skill among ESL immigrant women (Shaw, Huebner, Armin, Orzech, & Vivian, 2009; Zanchetta & Poureslami, 2006).

Older age was associated with lower health literacy on S-TOFHLA. Many studies among native English speakers provide similar results (Rootman & El-Bihbety, 2009; Williams et al., 1995). While declining cognitive abilities with age explain some of the loss in health literacy skills, Baker et al. found that cognitive abilities, visual acuity and health status cannot fully account for the decline (Baker, Gazamaraian, Sudano, & Paterson, 2000). Even less is known about aging and health literacy skill in a second language. Decline may be worse in one's second language compared to first language (Schrauf, 2009).

Not surprisingly, Chinese language education predicted performance on the Chinese cloze test. Chinese language education also predicted performance on S-TOFHLA, an English health literacy measure. Developing literacy in a second language is affected by literacy capabilities in the first language (Carson, Carrell, Siberstein, & Kroll, 1990). This may explain why more educated women had higher health literacy, even when tested in English.

The use of two different measures of health literacy provides an opportunity to consider the measurement of this complex concept. We expected that the factors important for predicting health literacy to be consistent across the two measures; however, this was not the case. There are a number of possible reasons for this inconsistency. First, the S-TOFHLA uses a multiple choice cloze test in which participants are given four options to complete the passage, whereas the cancer prevention information was assessed using a



standard cloze test in which no multiple choice options were given. While both formats have comparable reliabilities (Ilyin, Spurling, & Seymour, 1987) and correlate moderately well with one another (Cranney, 1972), the impact of response type among adult ESL readers is unknown. Second, the health information contained in S-TOFHLA is more general whereas the cloze test involved information specific to colon cancer prevention. Finally, there is the possibility that the small sample size in the English language cloze test group did not allow for adequate power to detect significant predictors as the larger sample size for S-TOFHLA.

#### **4.5.1 Limitations**

The primary strength of this exploratory study is that it offers an initial look at health literacy among older Chinese-Canadian immigrant women. There are also limitations. We used a convenience sample which is likely not representative of the larger Chinese-Canadian immigrant population. Not all women could be randomized due to refusal to complete the colon cancer comprehension test in English. We attempted to account for this by carrying out analyses with and without the sixteen women. S-TOFHLA and cloze tests are often used to assess health literacy but little is known about their validity in ESL populations. Participants may read and understand the information in English but lack written language skills to complete the cloze test (Porter, 1976). Chinese ESL learners often encounter difficulties acquiring English writing skills given the contrast between the Chinese ideographic and the Western alphabetic systems (Muljani, Koda, & Moates, 1998). S-TOFHLA is not available in Chinese and performance in English may reflect language abilities rather than health literacy skills. An individual may have high health literacy in their first language, but inferior English language proficiency, which would result in a poor score

on S-TOFHILA. Using a technique such as ‘teach-back’ would clarify the issue of language vs. comprehension. Finally, the S-TOFHILA is a health literacy instrument developed for U.S. audiences and many terms would not be familiar to Canadians.

#### **4.5.2 Cancer Education Practice Implications**

The provision of relevant and motivating cancer prevention information to vulnerable immigrant populations has the potential to reduce screening disparities, improve long-term outcomes and ultimately reduce cancer burden (Neuhauser & Kreps, 2008). Our findings suggest allocation of resources in Canada (and likely in the United States as well) into multi-language cancer education materials; however, our findings also emphasize the need to look beyond language translation alone and consider alternative methods to improve receipt and understanding of printed cancer education materials for diverse audiences. For instance, materials developed specifically for a target audience (e.g., Chinese Americans) and which are culturally as well as language appropriate, may be more effective than those which follow the one-size-fits-all approach (e.g., translation of generic English language written information into multiple languages). Such an approach has been successful for an innovative campaign designed to increase colon cancer screening among low-aculturated Chinese Americans (Tu et al., 2006). Finally, our findings highlight the need for cancer educators to consider that even if cancer information is presented in an English-as-a-Second Language patient’s first language, comprehension may still be lacking especially among older, less educated, and less acculturated immigrants.

### **4.5.3 Conclusion**

Given that print materials are often used to disseminate cancer prevention information, the low health literacy skills found among older Chinese immigrant women in this small study suggests cause for concern. Our results also indicate that printed health materials in one's first language rather than second language can have a significant positive impact on health literacy. Nonetheless, while translation improves comprehension, it does not eliminate health literacy difficulties. In addition to language, many factors affect health literacy among ESL immigrants including acculturation, age, and education. Providing language-appropriate materials may only be a first step in addressing low health literacy among ESL immigrants to North America.

## **CHAPTER 5: CANCER INFORMATION SEEKING BEHAVIOURS AMONG ESL IMMIGRANT WOMEN**

The work presented in the remainder of this chapter has been accepted for publication as:

Todd L & Hoffman-Goetz. (2010). A qualitative study of cancer information seeking among English-as-a-second language older Chinese immigrant women to Canada: sources, barriers, and strategies. *Journal of Cancer Education*, DOI: 10.1007/s13187-010-0174-y.

### **5.1 Chapter Overview**

Little is known about cancer information seeking experiences of Chinese immigrants despite reported disparities in cancer burden and use of cancer screening. This research used semi-structured interviews to explore cancer information seeking preferences and experiences of 50 ESL older Chinese immigrant women to Canada with different levels of health literacy. Directed content analysis was used to identify three main themes: sources of cancer information, barriers to cancer information seeking, and strategies used during information seeking. Health literacy did not distinguish the women on any of the major themes. The women expressed strong preferences for interpersonal and interactive cancer information from their physician and trusted others, such as friends and family. Barriers to cancer information seeking included language difficulties and limited time with physicians. The results emphasize the need for cancer information that reinforces cultural norms, language familiarity, and other values specific to cultural identities, such as interpersonally oriented values.

## 5.2 Introduction

Despite favourable trends in cancer control and prevention for North American populations overall, racial/ethnic disparities in cancer burden are increasing (Gomez et al., 2010). Statistics on cancer mortality in Canada are not disaggregated by race or ethnicity; however, a later stage at diagnosis and increased mortality have been reported among some Asian populations in the United States for breast, cervical, prostate, colon and rectal cancers (Li et al., 2003; Miller et al., 2008).

Although there are many factors contributing to increased risk of mortality and late stage at diagnosis among racial/ethnic minorities, less frequent use of prevention strategies is one important contributor (Miller et al., 2008). Lower participation rates in preventive cancer screening occur among many immigrant groups, including Chinese (Jackson et al, 2003), Vietnamese (Taylor et al., 2004), and Korean women (Sadler, Ryujin, Ko, & Nguyen, 2001). Asian immigrants to Canada had significantly lower rates of breast cancer screening than non-immigrant women (Sun et al., 2010), consistent with disparities in mammography use among Asian-Americans (Kandula et al, 2006). While there is no large population-based study of colon cancer screening among Chinese immigrants to Canada, Chinese-Americans are less likely to undergo colonoscopy than the general population (Jerant et al., 2008).

### *Health Information Seeking*

Health information seeking influences the extent to which individuals decide to engage in preventative behaviours, including cancer screening (Redmond, Baer, Clark, Lipsitz, & Hicks, 2010). Health information seeking behaviour [HISB] influences the number and types of actions known to individuals, knowledge about the pros and cons of different actions, and the available resources to carry out actions (Lambert & Loiselle, 2007).

Indeed, Chinese-American women with greater knowledge about mammography were more likely to report past mammography and future intention to perform screening (Wang et al., 2009).

There are two key features of HISB: (a) the information dimension and (b) the method dimension (Lambert & Loiselle, 2007). The information dimension refers to the content and diversity of the search (type) and how much information about a given topic one seeks (amount). For example, some individuals seek information on only one particular issue but avoid other types of health-related information. The method dimension focuses on the actions and strategies that people use to obtain the information. This dimension includes the sources that individuals access such as discussing and exchanging information with health care professionals, friends and family, television, Internet, information pamphlets and so forth. Little is known about either dimension of HISB among ESL Chinese language immigrants.

Data from the Health Information National Trends Survey provide valuable insights on cancer-related information seeking behaviours of the American public (Arora, Hesse, Rimer, Viswanath, Clayman & Croyle, 2008). However, ethnic/racial minorities may have behaviours and strategies that differ (Kakai et al., 2003; Nguyen & Bellamy, 2006). For instance, non-Japanese Asians and Pacific Islander cancer patients preferred information sources involving person-to-person communication with physicians and members of their social group; Caucasian patients preferred objective, scientific information from medical journals, newsletters or the Internet (Kakai et al., 2003). There are few published reports on the cancer information seeking experiences of ESL Chinese language immigrants. Understanding the unique needs and preferences for health information of this group will

help cancer educators tailor interventions to increase participation in preventive cancer services.

### *Health Literacy*

An important consideration when examining HISB is health literacy. The U.S. Institute of Medicine defines health literacy as “the degree to which individuals have the capacity to obtain, process, and understand basic health information”. A more comprehensive definition described by Nutbeam (2000) captures a broader constellation of skills: “Health literacy means more than being able to read pamphlets and successfully make appointments. By improving people’s access to health information and their capacity to use it effectively, health literacy is critical to empowerment”. It influences HISB: adults with limited literacy report they avoid seeking health information, especially printed materials such as leaflets or booklets (Shaw et al., 2009; von Wagner et al., 2009). Low health literacy is more prevalent among seniors and immigrants to Canada than the general population (Statistics Canada, 2009).

### *Study Aim*

The Chinese community is one of the fastest growing subpopulations in the Canada (Statistics Canada, 2008). Despite the increasing number of Chinese (Mandarin and Cantonese) language immigrants, little is known about their cancer information seeking behaviours and how they are affected by an individual’s health literacy skill. Our study aimed to: (1) describe the self-reported cancer information seeking behaviours of older ESL Chinese immigrant women in Canada including preferred sources of information and

experiences accessing and using this information, and (2) examine whether cancer information seeking preferences and experiences reflect differences in their health literacy.

### **5.3 Methods**

#### **5.3.1 Participants**

Participants (n = 50) were part of a larger study examining cancer screening utilization and comprehension of colon cancer information (Todd & Hoffman-Goetz, 2010; Todd, Harvey, & Hoffman-Goetz, 2010). Participants were recruited from two Ontario communities between October 2009 and February 2010. Eligible participants were: (1) female, (2) 50 years or older, (3) immigrants to Canada, (4) Cantonese or Mandarin speakers (first language) and (5) able to read in English. Participant accrual was from community recreation organizations for Chinese older adults. The research was approved by the University ethnics review board. Informed consent was obtained and each woman received a \$30 honorarium at study completion.

#### **5.3.2 Interviews**

Eligible women attended a single testing session that involved the administration of a demographic questionnaire, assessment of health literacy, and participation in a semi-structured interview to provide insight into their preferred sources of cancer information and experiences using and accessing it. Interviews from women with the 25 highest and 25 lowest S-TOFHLA scores (see below) were included in the exploratory analysis of



information seeking themes. It was determined that saturation had been met when no new themes emerged during coding (Sandelowski, 1995).

### **5.3.3 Health Literacy Assessment**

Health literacy was measured using The Short Test of Functional Health Literacy for Adults (S-TOFHLA) (Parker et al., 1995). Details about the use of S-TOFHLA with ESL Chinese language immigrants to Canada are described elsewhere (Todd & Hoffman-Goetz, 2010; Todd et al., 2010). S-TOFHLA is scored on a scale of 0 to 36, with scores >22 as adequate, 17-22 as marginal, and <17 as inadequate health literacy.

### **5.3.4 Qualitative Data Analysis and Descriptive Statistics**

The interviews were transcribed verbatim, cleaned, checked, and coded using a directed content analysis. Directed content analysis uses prior research or theory to explore hypothesized relationships between concepts (Hsieh & Shannon, 2005). Initial coding categories were refined into primary themes using an iterative method of data analysis. The initial coding categories were preferred sources of information, preferred delivery and features, and experiences accessing and using cancer information. These categories were delineated into the following themes: (1) Sources of cancer information, (2) Barriers to cancer information seeking, and (3) Strategies used during cancer information seeking. Through reiterative reading of the transcripts subthemes emerged. The researchers read transcripts independently and coding discrepancies were resolved through discussion until consensus was reached. Analyses used NVivo 8.0 (QSR, 2009) software. Chi-square and

Fisher's exact tests were used to determine significant differences between the low and high (S-TOFHLA) literacy groups. Analyses were completed using SPSS 17.0 (SPSS, 2009) software.

## **5.4 Findings**

### **5.4.1 Demographics**

The women ranged in age from 50-80 years, with a mean ( $\pm$ SD) of  $60.0\pm 7.3$  years and had resided in Canada for  $26.6\pm 13.6$  years. Most were married (76%), reported good or excellent health status (78%), and were well educated (70% completed post-secondary education in China). All women were foreign born, with 64% Mandarin, 28% Cantonese and 8% both Mandarin and Cantonese speakers. The mean S-TOFHLA score was  $14.3\pm 5.2$  for the low health literacy group and  $31.2\pm 4.2$  for the high health literacy group. There were no significant differences for S-TOFHLA score by age, years in Canada, education, health status, or income. Women with low health literacy were more likely to report low English language proficiency than women with high health literacy ( $p=.001$ ).

### **5.4.2 Directed Content Analysis**

Three overarching themes and related subthemes were identified during directed content analysis (Table 1). The themes were sources of cancer information, barriers to cancer information seeking, and strategies used during cancer information seeking.

## **(1) Sources of Cancer Information**

Women were asked about their preferred sources for cancer information. The most common sources were physicians (n=24), community centers and seminars (n=20), family and friends (n=15), and written pamphlets or books (n=14). Fewer women reported watching television (n=8) or using the Internet (n=8). Women discussed using multiple sources and those with low health literacy reported more frequent use of television for information. However, the sources were similar between higher and lower literacy participants with almost half of the sample reporting physicians to be the preferred source.

### *a) Physician*

“I think I usually ask my doctor. The doctor is the key.” (#56, high health literacy)

“I go to doctor. If the doctor, the family doctor recommend the people to do it, they will know that oh, I need to do it.” (#84, high health literacy)

“I go listen to the doctor. Yeah, and do everything they say to do.” (#36, low health literacy)

“I can always ask my doctor some question about colon cancer...In Chinese. Because he’s Chinese.” (#97, low health literacy)

### *b) Community Centre and Seminars*

“Yeah. Maybe Chinese community centre. Maybe here, the senior centre, so maybe more easier to, to get people to know the information.” (#74, high health literacy)

“I would prefer to go to a seminar. Yeah. Then you can ask questions and you know, you get more info that way. (#68, high health literacy)

“So giving to our Chinese community, it helps a lot. Yeah, that is the best way, the community centre very good.” (#12, low health literacy)

“Or some you know health knowledge seminar, something like that. So when the people interesting to listen. Yeah.” (#18, low health literacy)

*c) Friends/Family*

“Yeah, I think um, I don’t know other people, but among my own friends, we all, we talk about preventions. You know, anybody think of something or they heard of something and they find something useful, we just share the information.” (#2, high health literacy)

“From friends. Because I don’t have to read that much, they just tell me and then right offhand I know it.” (#43, high health literacy)

“Sometimes we talk about, yeah, like ..... colon cancer, sometimes we are friends talking about that, because I do the test and I ask my friend to do test, you know. We will give the information to each other.”(#41, low health literacy)

“I meet my friends and we talking about that. Yeah, the knowledge is from the people right.” (#69, low health literacy)

*d) Written Pamphlets/Books*

“Most time I will, if I will try, I will read the book. I will try to find the magazine.” (#81, high health literacy)

“If it is there I get the pamphlet from the doctor’s office.” (#87, high health literacy)

“And this time I read the Chinese book, one doctor he write many books, that’s in China very popular. That’s I read that kind of book, you know.” (#99, low health literacy)

“I think you should get that from the hospital, you know with the pamphlets.” (#71, low health literacy)

## **2. Barriers to Cancer Information Seeking**

Women described barriers they faced when attempting to access and understand cancer information. The participants discussed how language affected their understanding of the information (n=16), especially with medical terminology (n=13). Women from the low and high literacy groups highlighted the importance of having information available in Chinese. A second barrier identified was the limited time women had with their physicians despite physicians being their preferred source; many stated their doctor was rushed during

their interactions (n=6). Women also expressed discomfort asking questions because of the perceived time constraints (n=6).

*a) Language*

“Well, it’s important to be provided period, you know. Whether you speak any language, or different languages, besides Chinese. You know, so somebody else that speaks only Polish, you know would be good to have. But this would be good for everybody. I think it’s important to have it available to all the other languages.” (#7, high health literacy)

“It doesn’t matter. But maybe Chinese is better. But English I can, yeah, it’s okay. Yeah, maybe I just need to check some, you know wording I don’t know, that’s it. But maybe Chinese is more comfortable.” (#109, high health literacy)

“I really like more Chinese ..... Find out about all these disease in Canada, translated from Canadian information. I’ve been reading more..... much. .... very much. That’s why I go to a Chinese source, from China and mainland China. I know more. And here I, I know there’s a lot of information in English, but not enough in Chinese. And we have more translated in Chinese it would be very helpful. We need more. Not enough.” (#5, low health literacy)

“Yeah, yeah usually, because I come from Hong Kong, the most convenient is the first language. In my mind, you talk with me, especially this, about the serious things, yeah. You talking in Chinese it directly go to my brain. If you talk in English, sometimes I will, a little time to think or maybe need more time...” (#54, low health literacy)

*b) Difficulty with medical terms*

“Because some of the terms are medical terms, and it’s not commonly used in the community. So they need somebody really can explain them.” (#55, high health literacy)

“You get confused, sometimes you know the English term, we don’t know the Chinese term. Sometimes I know the Chinese term and then I don’t know the English term. Like now. I think it’s better (in Chinese) for the medical terms. ‘Cause I don’t know the medical terms.” (#27, low health literacy)

“Yeah. We don’t know how to talk to doctor in the English term about the sickness. That’s why we always go to a Chinese doctor to feel safe, to understand better what’s the term and what’s the problems.” (#5, low health literacy)

*c) Limited time with physicians*

“You know even my doctor, he’s very patient, you know, he spend time and then I know that his time is precious so I don’t really ask him that much questions.” (#2, high health literacy)

“You ask the doctor, but he’s always busy, busy. Yeah, you wait for an hour and it’s only in for five minutes. Make you feel like you’re so stupid in asking.” (#42, high health literacy)

“You, you worry whether you have sickness and you don’t know where to go to and the doctor doesn’t give you much time. Super busy and they don’t have much time to talk to you.” (#5, low health literacy)

“I never ask some question or any question with my doctor. Because he is very busy.” (#97, low health literacy)

### **3. Strategies Used During Cancer Information Seeking**

Women discussed strategies to use when encountering cancer information that they did not understand. These included consulting a dictionary or electronic translator (n=6) and asking friends or family for help (n=5). An additional strategy mentioned was that when available, they would take cancer information in both English and Chinese because this aided with their comprehension (n=6). In some instances this was done to ensure the information was understood in the English version, but a number of women discussed how Chinese translations were not always as accurate as English translations. They expressed the concern that it was important to know the English terms when discussing health issues with their physicians.

*a) Dictionary/translator*

“Yeah. Because English, you see some words you don’t know you have to check the dictionary.” (#32, high health literacy)

“Maybe I, when I get home I find the dictionary.” (#74, high health literacy)

“So, medical term is different, you know. Like a polyp. You don’t know what it is, you have to look for the dictionary, if you don’t know it, right.” (#27, low health literacy)

“I, usually I using the dictionary.” (#41, low health literacy)

*b) Friends/Family*

“Most time I would ask my daughter help me.” (#81, high health literacy)

“Yeah, if I, I read Chinese and the English, but if get only English, my daughter might read it and help”. (#39, high health literacy)

“Because sometimes you need to make appointment for the doctor, for another hospital not just my family doctor. This why sometime I just, little bit scared to call for English. If my daughter is home is okay.” (#103, low health literacy)

“The simple one I can handle, you know, but sometimes ..... to the hard ones and I, I look for help. So I ask my children, yeah.” (#41, low health literacy)

*c) Taking two language sources*

“Both. Yeah, because when I try to find out that English, sometimes they have, so much information, don’t know how to. Of course, my English not so well, I cannot pick up very fast. So, if I can download Chinese I will download Chinese too.” (#89, high health literacy).

“Yeah, both. Both. If you have both, I keep both. Because we think in Chinese.... Can go fast. You know I save my time.” (#77, high health literacy)

“Just, if you have the Chinese and English here, I will take the Chinese first, and then if, sometimes the Chinese I can’t understand, I will see the, both, the English to combine them. Then I’m very clear.” (#54, low health literacy)

“I will get both. English and Chinese. So that, if I want to communicate with my doctor, if Chinese I can’t use my Chinese one. And sometimes you go to the hospital ....., most of the doctor English. So that, if I have the English information that will be right.” (#12, low health literacy)

**Table 7. Themes identified by directed content analysis**

| Initial Themes  | Emergent Subthemes <sup>a</sup>   |
|---|---|
| <b>1. Sources of cancer information</b>                     | <ul style="list-style-type: none"> <li>a) Physicians (n=24)</li> <li>b) Community centers &amp; seminars (n=20)</li> <li>c) Friends and family (n=15)</li> <li>d) Written pamphlets (n=14)</li> <li>e) Television (n=8)</li> <li>f) Internet (n=8)</li> </ul> |
| <b>2. Barriers to cancer information seeking</b>            | <ul style="list-style-type: none"> <li>a) Language (n=16)</li> <li>b) Difficulty with medical words (n=13)</li> <li>c) Limited time with physician (n=6)</li> </ul>   |
| <b>3. Strategies used during cancer information seeking</b> | <ul style="list-style-type: none"> <li>a) Dictionary/translator (n=6)</li> <li>b) Friends and family (n=5)</li> <li>c) Taking both Chinese and English sources (n=6)</li> </ul>   |

<sup>a</sup>Number of women whose comments during the interview reflected this subtheme

## 5.5 Discussion

Our findings shed light on the experiences and preferences of older ESL Chinese-Canadian women when seeking cancer information and on the method dimension of HISB for this immigrant group. Discussions with the women revealed their preferred sources, barriers to obtaining information, and strategies used to deal with these barriers. Based on reports on information seeking as a function of health literacy among non-immigrants (von Wagner et al., 2009), we expected to find differences in the conversations of the women who had low versus high health literacy. However, there were minimal differences between the two health literacy groups of older ESL Chinese women across all three themes. The reasons for the lack of difference by health literacy level are not known but may reflect other factors



(e.g., self-efficacy, culture, vulnerability) (Chen, Kendall, & Shyu, 2010) characteristic of older female Chinese immigrants.

Doctors were identified as an important and reliable source for the women's cancer information. Others have shown that physicians are a primary source of health information for the general population and other non-Asian minority groups (Britigan, Murnan, & Rojas-Guyler, 2009; Hesse et al., 2005; Meissner, Potosky, & Convisser, 1992). Indeed, despite the rapid growth of online cancer and health information physicians remain the most trusted source of health information (Hesse et al., 2005). While physicians were the preferred source of information, women discussed limitations in having meaningful conversations with them due to time pressures. This concern is supported by research showing lower satisfaction with doctors and less comfort asking doctors questions for Chinese-Canadians than European-Canadians (Ahmad, Shik, Vanza, Cheung, George, & Stewart, 2004; Liu, So, & Quan, 2007). Understanding the reasons why women felt uncomfortable asking their physician questions or felt that they did not deserve their physician's limited time is important. Our discussions with the women do not provide insight into the reasons for this perception; however, low self-worth and the high instrumental value placed on authority in Chinese culture may be involved (Lee, 1998). Future research is needed to examine the potential role of these variables. Regardless, our finding that physicians are the preferred source of cancer information among older Chinese ESL immigrant women emphasizes the importance of improving patient-physician communication for better dissemination of cancer prevention information.

The strong reliance on physicians, friends and family for health information and the desire for interactive community seminars may reflect strong interpersonally oriented cultural values. Preferences for interpersonal sources of health information among Asian and

Chinese individuals have been observed (Kakai et al., 2003; Pang, Jordan-Marsh, Silverstein, & Cody, 2003). Non-Japanese Asians adopted a more experience-inductive approach to seeking cancer information compared to a fact-inductive approach adopted by many European/American patients; non-Japanese Asians were more likely to draw conclusions from the subjective experiences of people in their social group (Kakai et al., 2003). Chinese elders reported a path to health care that began with the self, moved to family and friends, and came to health care professionals only as a last resort (Pang et al., 2003). Older Chinese ESL immigrant women favoured information from sources they knew. With strong interpersonal values held by these immigrant women and the desire for cancer information delivered by trustworthy persons in an interactive environment, it may be advisable to consider programs that involve the development of trusted relationships with health care professionals and include greater interactive discussion with peers and family in a community setting. Such an approach has been successful for an innovative campaign designed to increase colon cancer screening among low-aculturated Chinese Americans by using a health educator in a primary care setting (Neuhauser & Kreps, 2008).

Web-based resources have the promise to address limitations of traditional health information sources due to interactivity, personalization, convenience and lower cost (Neuhauser & Kreps, 2008). Internet use was second only to physicians as the preferred source of health information in the general U.S. population (Hesse et al., 2005). Although web-based health information may be an excellent strategy for the general population, it may not be as useful for immigrant groups. Few women in our study indicated that they used the Internet for cancer information despite having lived in Canada for, on average, 26 years. Woodall and colleagues also reported low Internet use among Chinese immigrants in the Pacific Northwest (Woodall et al, 2009). The reasons for low reliance on the Internet for

cancer information are likely multifaceted (Statistics Canada, 2008). However, given the emphasis on person-to-person contact for information sharing, Chinese immigrant women may not view the Internet as a reliable information source. Future research will explore this potential association. The majority of authoritative Canadian prevention web sites are in English (or French) and many wanted the cancer information in Chinese; hence, women may be deterred from using online cancer information sources.

### **5.5.1 Limitations**

This study adds to the literature detailing the cancer information seeking preferences and experiences of immigrants and ethnic/racial minorities. There are, however, limitations and caveats to be noted. First, our results focus primarily on the method dimension of information seeking and do not examine the characteristics of the information sought (the information dimension). Second, we used a convenience sample and care should be taken in generalizing the results. Our sample was made up primarily of women who had immigrated to Canada more than 10 years ago and their experiences would not reflect those of more recent immigrants. In addition, the women had to be able to read English; thus, our findings may not reflect the experiences of women without any English language proficiency. Nevertheless, because a number of women reported limited English proficiency in the low literacy group, our results are also applicable to those with basic literacy skills. Thirdly, given that recruitment took place at an older adult centre, women who participated may be more health conscious than women who do not attend such centres. Finally, the measure of health literacy, S-TOFHLA, is not available in Chinese and performance in English could reflect language abilities rather than health literacy skills. An individual could have high health

literacy in her first language, but inferior English language proficiency, resulting in a poor score on S-TOFHLA. Furthermore, the S-TOFHLA is a health literacy instrument developed for U.S. audiences and many terms are unfamiliar to Canadians.

### **5.5.2 Implications for Cancer Education**

Cancer educators often rely on printed information, such as pamphlets, to promote cancer prevention. Our findings suggest that ESL older Chinese immigrant women have preferred and trusted sources for cancer information. The women wanted interpersonal sources and emphasized the importance of cancer information presented in an interactive and comfortable manner through seminars and meetings at community centers. Alternate channels for delivery of cancer prevention information to Chinese language immigrants may need to be considered within the context of cultural norms, language preferences, and other values specific to cultural identities.

## **CHAPTER 6: GENERAL DISCUSSION**

### **6.1 Key Findings**

Figure 3 describes the key findings of the three studies presented in this thesis. Language, culture, health literacy, and role of the physician emerged as important variables across all three studies.

#### **6.1.1 Language**

Language emerged as an important factor across all three studies presented in this thesis. In Study #1 English language proficiency predicted current mammography screening. In Study #2 women who completed the cloze test in their first language performed better than women who completed the test in English. In addition, English language proficiency predicted performance on the S-TOFHLA. Lastly, in Study #3 women categorized as having high or low healthy literacy (by S-TOFHLA scores), discussed how language affected their ability to access and understand cancer information, especially medical terminology.

These findings are consistent with research that shows individuals with limited English proficiency struggle within the healthcare system and have significantly poorer health outcomes (e.g., Jacobs et al., 2005; Wilson et al., 2005; Sentell et al., 2007). Not only can limited English language proficiency reduce a woman's ability to communicate with her physician and understand the need for regular screening, but it may also affect her exposure to cancer information in general (such as use of information pamphlets or websites). For example, using data from the 2005 Health Information National Trends Survey (HINTS)

Vanderpool, Kornfeld, Rutten and Squiers (2009) compared the cancer information seeking experiences of non-Hispanics, English-speaking Hispanics, and Spanish-speaking Hispanics. They found that significantly more Spanish-speaking Hispanics reported that they never looked for cancer information (80%); and, they expressed higher levels of frustration and effort when attempting to find cancer information than non-Hispanics and English-speaking Hispanics. Together, these findings highlight the significant role language plays in contributing to disparities in cancer information access and potential use.

### **6.1.2 Culture**

Across all three studies presented in this thesis culture and acculturation emerged as important variables. In Study #1 the acculturation scale used did not predict screening behaviours. However, years in Canada, a commonly used proxy measure for acculturation, predicted colon cancer screening by ESL Chinese immigrant women. The results of Study #1 also hint at the importance of other cultural factors such as modesty and reverence for authority figures: physician gender and physician recommendation emerged as significant predictors of screening behaviours, especially for mammography. In Study #2 acculturation predicted performance on the S-TOFHLA and the English language cloze test. Lastly, the discussion with women in Study #3 revealed cancer information seeking preferences that were grounded in interpersonally oriented cultural values.

The strong role of culture across these three studies is not surprising. Culture influences how individuals conceptualize health and illness and make decisions regarding health behaviours, such as preventive screening. Woo, Brotto and Gorzalka (2009) examined the role of culture-linked discomfort with sexuality and use of Pap testing in Euro-Canadian

and Chinese university students. They found that Chinese students were more likely to cite embarrassment as a barrier to Pap testing and were also less likely to have completed a Pap test than Euro-Canadian students. The results of Study #1 in the current research project indicated that having a female physician was a significant predictor of mammography use but not colon cancer screening. These results support the perspective of culture-linked discomfort with sexuality, which may play a role in older Chinese immigrant women's use of cancer screening. This warrants further investigation.

The role of culture may be more pronounced in the Chinese immigrant community given the contrast between traditional eastern views of health and western biomedical (allopathic) orientation (Kwok et al., 2006). For example, Confucianism and Taoist philosophy teaches that while one is healthy, there is no reason to worry about getting sick (Kwok et al., 2006). Therefore, the act of screening for cancer when one feels fine may be contradictory to this belief. In addition, Chinese Americans tend to emphasize primary disease prevention (e.g., consumption of a diet rich in fruits and vegetables, fresh air) over secondary disease prevention (e.g., FOBT screening or mammography) (Liang, Yuan, Mandelblatt, & Pasick, 2004). Again, these beliefs may be connected to a deeply ingrained cultural model of health, such as Chinese beliefs of physical, emotional and social harmony for protecting one's health (Kwok et al, 2006). The implication is that unique cultural beliefs about health and cancer found among Chinese immigrants need to be acknowledged when designing interventions to increase use of cancer prevention services.

### **6.1.3 Health Literacy**

Low levels of general health literacy, as measured by the S-TOFHLA, and poor comprehension of colon cancer information (even when presented in one's first language) were found in Study #2. This inadequate comprehension of both general and disease specific health information is worrisome as there are a number of established links between low health literacy and poor health outcomes (Paasche-Orlow & Wolf, 2007). Indeed, Study #1 indicated an association between low health literacy and non-compliance with cancer screening recommendations. This is consistent with previous research showing that patients with limited health literacy are less likely to be knowledgeable about colorectal cancer screening and report more barriers to completing FOBT and colonoscopy (Miller et al., 2007; Peterson et al., 2007).

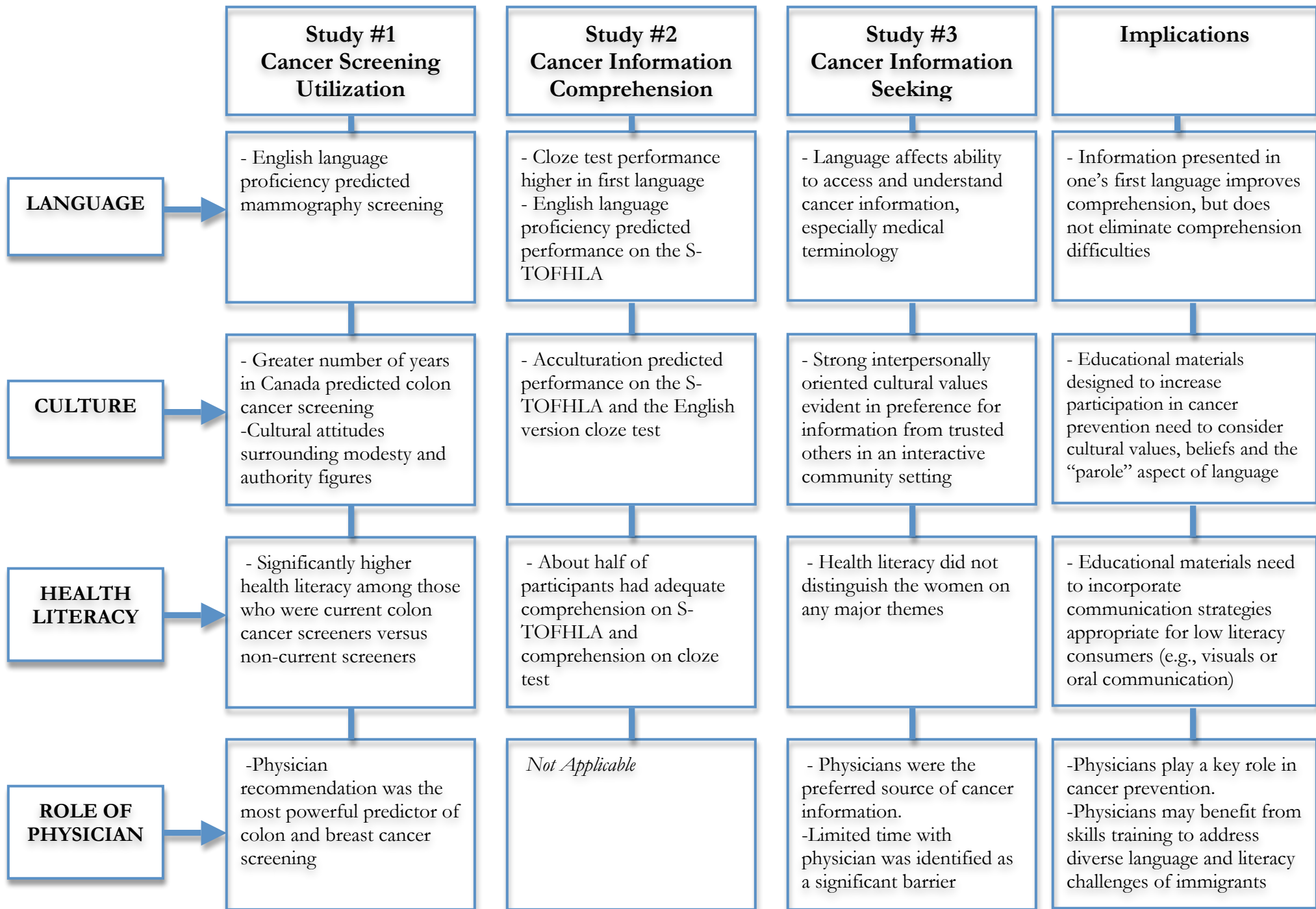
A number of important variables were found to predict low health literacy including acculturation, age, English language proficiency and education. However, overall these variables only explained a small amount of the variability in health literacy scores. This indicates that there are additional factors that may predict the health literacy skills of ESL immigrants. For instance, the direct role of self-efficacy, prior knowledge, and motivation were not examined in this research but may be important considerations. Indeed, self-efficacy concerns an individual's degree of confidence in his or her ability to perform a specific behaviour and research indicates an association between self-efficacy and health literacy (Torres & Marks, 2009).



#### **6.1.4 Role of the Physician**

The role of the health care provider emerged as an important variable in Studies #1 and #3. Women who received a recommendation from their physician were more likely to obtain breast and colon cancer screening. In addition, women reported physicians as their preferred source of cancer information. The importance of physician recommendation has been identified in the general population (Gilbert & Kanarek, 2005; Hanson, Montgomery, Bakker, & Conlon, 2009) and in immigrant populations, including Asian Americans (Sung et al., 2008; Taylor et al., 2004). Physician recommendation may be especially important for older Chinese immigrant women as there is a high instrumental value placed on authority in Chinese culture (Lee, 1998).

Figure 2. Research Study Key Findings



## **6.2 Implications for Public Health and Cancer Educators**

### **6.2.1 Health Communication Strategies**

Considerable resources are devoted to the translation of patient education materials (e.g., Canadian Cancer Society, Cancer Care Ontario). The results from Study #2 suggest that while information presented in one's first language improves comprehension, it does not eliminate comprehension difficulties for ESL Chinese immigrant women. Therefore, while these findings support the allocation of resources in Canada into multi-language cancer education materials they also emphasize the need to look beyond translation alone and consider alternative methods to improve receipt and understanding of printed cancer education materials for diverse audiences. The translation of materials into other languages should be viewed as only a first step in addressing low health literacy among immigrants.

When language barriers are viewed simply as langue (e.g., words and grammar) the assumption is that translating words from one language into equivalent words in another language will solve the problem (Greg & Saha, 2007). However, it is important to consider the social, cultural, and historical context that give words and phrases meaning (i.e., parole). As suggested in this research, cultural values, beliefs and norms play in a key role in guiding information seeking behaviours, comprehension of materials and ultimately cancer screening behaviours. Cancer communication strategies could be targeted to these unique cultural beliefs and attitudes by creating culturally tailored messages (Andrulis & Brach, 2007; Kreps, 2006). For example, a colon cancer prevention pamphlet might include dietary recommendations specific to foods common in the Chinese diet that have proven cancer prevention properties (e.g., soy and rhubarb are two foods found commonly in the Chinese

diet that evidence suggest may protect against cancer (Huang, Lu, Shen, Chung, & Ong, 1997; Wu, Yu, Tseng & Pike, 1998)). Simpson (2003) found that beliefs about diet and traditional Chinese medical approaches are an essential component of breast cancer disease management by Chinese women tested in “Western” Hong Kong cancer centers. Thus, avoiding a one-size-fits-all approach to patient education materials will help to ensure cultural concepts and language nuances are appropriate for the target audience.

In addition to developing materials with content uniquely tailored to the audience’s cultural values, the channels by which the information is disseminated must also be considered when designing public health communication campaigns. The results of Study #3 indicated some unique cancer seeking behaviours among older ESL Chinese immigrants including a preference for information from trusted others in an interactive community setting. The use of familiar, engaging, and trustworthy communication channels have been found by others to be effective in reaching diverse audiences (Tu et al., 2006; Viswanath & Finnegan, 2002). Information dissemination and knowledge exchange that involves community groups and interactive discussion with peers and family should be considered together with more traditional media channels such as Internet and pamphlets. Given the low health literacy levels reported among seniors and immigrants in Canada, the inclusion of alternative and supplementary approaches are important to consider when targeting vulnerable (and marginalized) populations.

### **6.2.2 Patient-Provider Interactions**

The results presented in this thesis clearly demonstrate the key role of the physician in promoting cancer screening among ESL Chinese immigrant women. Women expressed a

strong preference for cancer information from their physician but described difficulty in obtaining this information because of perceived time constraints and discomfort asking questions. These results stress the importance of effective patient-provider interactions and the need for physicians who are well equipped to deal the challenges associated with diverse patients including health literacy, culture, and language. Awareness by physicians that some members of ethnic and ethnic minority groups have experienced discrimination or marginalization in the past and may try to hide or mask their limited English proficiency or literacy out of embarrassment is a cornerstone of better patient-provider communication (Andrulis & Brach, 2007). Physicians also need follow the tenets of clear communication by using clear, simplified language and avoiding medical jargon when counseling patients with poor English language proficiency and low health literacy.

Education and training initiatives to help physicians acquire these essential skills are required and evidence suggests that such programs can have a positive effect on patient outcomes and satisfaction (Beach et al., 2005). An example of such an initiative in Ontario is the launch of the New Immigrant Support Network at the Hospital for Sick Children in Toronto. This is a federal government funded program that launched in 2009 and provides, in addition to the translation of health education articles into multiple languages, cultural competency training for health-care professionals (SickKids News Room, 2009). Physicians play a key role in cancer prevention practices and an ensuring effective patient-provider interaction has the potential to increase screening utilization among immigrant groups in Canada.

### 6.2.3 Other Considerations

The results also highlight the heterogeneity of the older Chinese immigrant population in terms of English-language proficiency, acculturation, and health literacy. This is a key consideration for organizations that work within this community. Less-acculturated, less-educated, and older immigrant women may be particularly vulnerable to non-compliance with preventive cancer screening and have poor comprehension of health and cancer information. Interventions should focus on these vulnerable sub-groups of the Chinese immigrant population. For example, the development of a unique colon cancer screening promotion program designed specifically for less-acculturated Chinese immigrant women.

Another important consideration that is suggested by this study is the role of self-efficacy. Study #1 results indicated that self-efficacy was a significant predictor of colon cancer screening. However, low self-efficacy was implied in Studies #2 and #3 as women reported feeling “stupid” asking their physician questions and 16 women refused to complete the English cloze test despite self-reported adequate English language proficiency. These findings are consistent with previous research that identifies a link between self-efficacy and preventive health behaviors (Carpenter & Colwell, 1995; Hogenmiller et al., 2007). Low self-efficacy for cancer prevention among Thai and Korean ESL immigrant women has been documented (Jirojwong & MacLennan, 2003; Sohng, Sohng, & Yeom, 2002). To increase participation in cancer prevention services it is important to address low self-efficacy perceptions among immigrants by providing knowledge, cues to action, and building on skills. For example, Ahmad, Cameron and Stewart (2005) developed a culturally tailored, language-specific written health education intervention to promote breast cancer screening among South Asian immigrant women. They targeted key components of the

Health Belief Model including perceived barriers, knowledge, and self-efficacy, and found that their intervention increased self-efficacy to discuss and undergo clinical breast examination and mammography.

In addition to self-efficacy other components of the Health Belief Model warrant consideration when developing health communication campaigns for ESL Chinese immigrants. The HBM postulates that people will perform health related actions if they perceive that they are susceptible and if they believe the action will produce a positive result (Rosenstock, 1974). Unfortunately evidence suggests that Asian American women have low perceived risk of getting breast and colon cancer (Kim et al., 2008). Indeed the results of Study #1 indicated that women who ever had a mammogram but were not current screeners were more likely to report that they never or rarely worried about cancer. Kwok et al. (2006) found that older Chinese-Australian women reported a belief that breast cancer was a 'Western disease' and that Caucasian women were more prone to breast cancer as a result of having larger breasts. Education campaigns need to target this low perceived susceptibility and provide clear information regarding cancer risk for Chinese immigrant women. Indeed, the women themselves in Study #3 expressed a desire for cancer risk information that is specific to Chinese or Asian women (see Appendix K). Using the key theoretical constructs from the Health Belief Model, such as self-efficacy and perceived susceptibility, cancer prevention campaigns may be more successful in reaching the Chinese immigrant population.

### 6.3 Limitations

There are limitations to the research findings presented in this thesis, some of which have been presented in Chapters 3, 4 and 5. There are additional caveats that should be considered such as study recruitment, randomization, measurement tools, and potential confounding variables that were not controlled for in this study.

As discussed in the previous chapters, a convenience sample was recruited and this is not representative of the larger Chinese-Canadian immigrant population. While the sample enrolled was generally highly educated and had been in Canada for a long period of time, additional factors may affect the generalizability of the results. First, the majority of participants were recruited from a community that consisted primarily of Cantonese speaking immigrants from Hong Kong. The centre members are not representative of the newer wave of immigrants since 2000 that have arrived from mainland China and Taiwan and who now make up the majority of new immigrants (Statistics Canada, 2008). Second, the study sample represents older women and therefore cannot be generalized to younger immigrants. Lastly, given that the sample was restricted to women these results cannot be generalized to the male Chinese immigrant population. Distinct differences may exist between male and female Chinese immigrants in terms of use of preventative cancer screening, health literacy and proficiency with English.

Another limitation of study recruitment involved the inclusion criterion that required participants to be able to read English. There was no standardized test of English ability prior to admission into the study; rather, women were enrolled based on their self-reporting of English language skills. Women who participated in the study may not have had adequate understanding of study questions due to insufficient English language proficiency. Their



comprehension of study measures, such as the acculturation scale and demographic questions, were also not assessed. The fact that women's English abilities were not measured prior to participation may have also contributed to the inability to randomize sixteen women in Study #2.

The failure to randomize all study participants in Study #2 is a limitation of this research. Sixteen women refused assignment to the English language cloze group due to discomfort and embarrassment completing the test in English. To account for this potential problem, analyses were carried out with and without the 16 women. The reluctance of these sixteen women to complete the English cloze test may reflect low self-efficacy, a potentially important variable not measured in this research. While self-efficacy to complete colon cancer screening was assessed there was no general measure of self-efficacy used. Prior to enrollment in the study women were told that part of the inclusion criterion was the ability to read English and 67% of participants reported either moderate or high English language reading abilities on the demographic questionnaire. This suggests that when presented with a challenging comprehension task many women lacked the self-confidence to complete the test, perhaps due to fear or stigmatization.

The Chinese Cultural Views of Health and Cancer Scale (Liang et al., 2008), although administered and scored, was not included in study analyses. When scores for the measure were tabulated there was virtually no variability in the scores among participants. Hence, upon consultation with statisticians (E. Harvey, personal communication, April 2010) this measure was discarded from the study analyses. A potential explanation for this lack of variation among participants may be that this scale has only recently been developed (Liang et al., 2008) and has not been used extensively in the literature (a review of the literature yielded only 4 published reports using this instrument- all from the developers). Also, the

reliability coefficients of the individual subscales were quite low for the two subscales used in the present research (0.39 for Western Medicine and 0.42 for Medical Examination).

Previous research has demonstrated a link between cultural health beliefs and use of cancer screening (Liang et al., 2008; Wu, West, Chen, & Hergert, 2006) and, potentially, the exclusion of this variable from analyses is a further limitation of the research. In addition to predicting use of cancer screening, a woman's inclination towards more Eastern or Western views of health and cancer may influence comprehension of cancer information. An individual with more Eastern views of disease and cancer may not attend to written cancer information to the same extent as someone with Western health beliefs. Therefore, the women with the Eastern health beliefs could retain less information. Future research is needed to develop a more reliable and valid measure of health and cancer beliefs among Chinese immigrants.

The acculturation scale used was the Suinn-Lew Asian Self-Identify Scale (SL-ASIA). Despite being widely applied in research with Asian Americans and adopting a multidimensional view of acculturation (cognitive, attitudinal, and behavioural components of acculturation), it too has limitations. The instrument was not designed specifically for first-generation immigrants but rather individuals of Asian ancestry. Therefore, participants in this study were automatically assigned a score of "1" (denoting low acculturation) for a number of scale items (e.g., ethnic origin of friends up until the age of 6 and 18; contact with Asia and country where raised). As a result most women scored on the lower end of the scale indicative of lower acculturation. This floor effect may have limited the ability of the instrument to identify those who are more or less acculturated among a first-generation immigrant population. A scale that is designed to specifically measure acculturation among a first-generation Chinese immigrant population to Canada would have been more useful and

provided a more reliable picture of the acculturation levels of the women. However, no such acculturation instrument is available in the literature.

The limitations of the comprehension measures used in this research have been described in previous chapters. That the S-TOFHLA and the cloze test have not been validated in an ESL population is a significant limitation that warrants further consideration. There is a possibility that these measures do not reflect health literacy skills but rather language abilities. For instance, participants may read and understand the information in English but lack the written language skills to complete the cloze test. This may be especially true for Chinese immigrants who often encounter difficulty acquiring written English language skills given the contrast between the Chinese ideographic and the Western alphabetic systems (Muljani et al., 1998).

An additional limitation associated with the cloze test was the inability to delete identical words from the two language versions in order to ensure absolute equivalency in difficulty. Given that a Chinese character can represent a concept or multiple words rather than a single word and the absence of syntax words, it was not possible to delete identical words in each version. Instead every 6<sup>th</sup> word or character from the two versions was systematically deleted. Not only is there the potential that one version involved the deletion of more or less difficult words but it is also important to consider the difficulty for Chinese speakers when faced with the challenge of filling in English syntax words. For example, in English one would say “I listen to the radio”, but the equivalent in Chinese is, “I listen radio”. Many participants encountered great difficulty completing the missing syntax words for the English cloze test. This difficulty with syntax or the English article system has been identified in other research of Chinese learners of English (Robertson, 2000). Again, this

The findings presented also emphasize the need for the development of reliable measures of health information comprehension by ESL populations. Since commonly used health literacy measures, such as S-TOFHLA, are not available in Chinese it is difficult to dissociate language barriers from health literacy barriers. Teasing out health literacy in one's second language differs from health literacy in one's first language remains a challenge for researchers. The development and validation of a Chinese language version of the S-TOFHLA could be a first step in addressing this issue. In addition, alternative methods to evaluate health literacy may be considered. Relying solely on written evaluations of health literacy does not allow for an accurate assessment of an individual's health literacy skill. Researchers should consider combining oral measures of health literacy, such as a 'teach back' technique, with traditional written tests of health literacy.

As the results from this study indicated, translation alone was not sufficient in reducing comprehension difficulties among ESL Chinese immigrant women. Indeed, the predictor variables in the models developed in this research accounted for a small proportion of the variability in comprehension scores among the women. Additional variables, such as self-efficacy and prior exposure to health information, may be important future considerations.

Researchers could also focus on whether how and the extent to which culturally tailored materials affect comprehension. It would be useful to compare written health information that has been developed for English populations and then translated word-by-word to a new language to documents that have been culturally tailored (i.e., the language vs. parole aspects). This would help to quantify the impact of cultural tailoring on comprehension. This empirical evidence could then be used to justify the allocation of

increasingly scarce financial resources to developing multi-language and culturally tailored materials within Canadian public health organizations and hospitals.

## **6.5 Concluding Comment**

ESL immigrants are among the most vulnerable members in Canadian society in terms of facing barriers to cancer prevention services. A crucial component for reducing (and eliminating) these barriers will be the provision of culturally relevant and action-oriented information and skills to empower positive decisions regarding their health care. While language concordant educational materials may improve understanding of cancer information, it is important to look beyond simple language (and its translation) and to address the important cultural issues that play a role in the access, use, and understanding of information.

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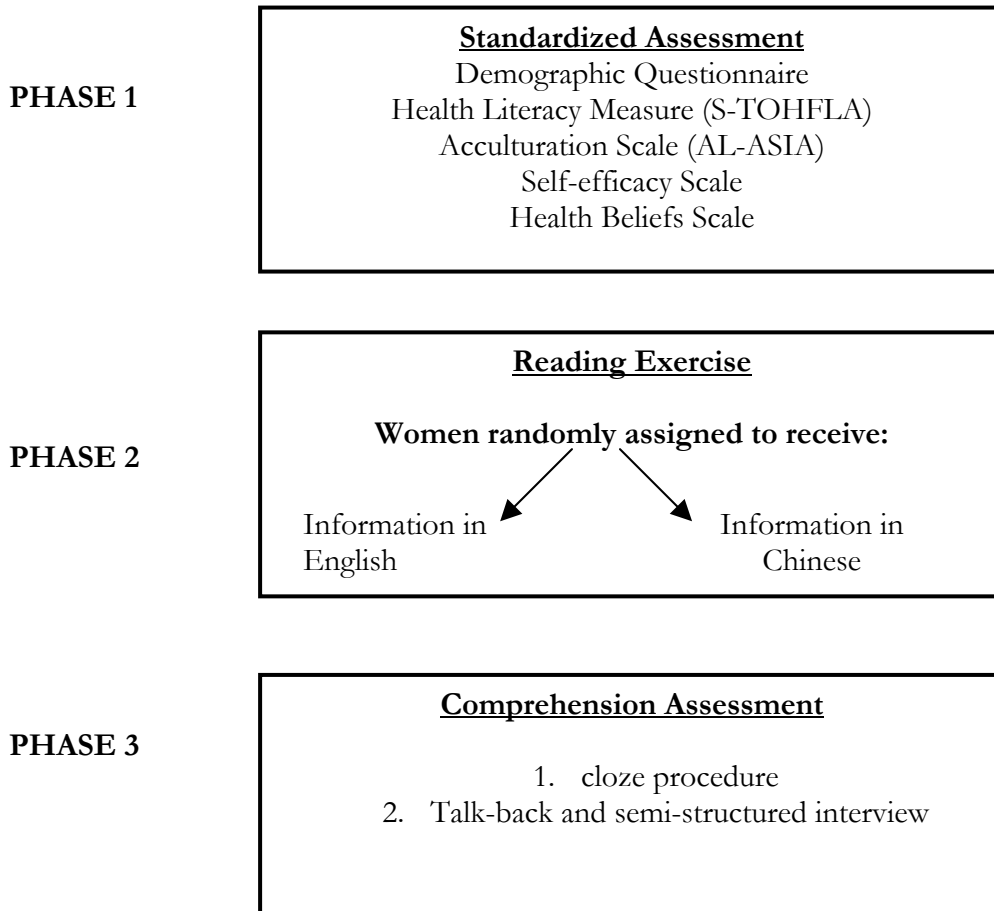
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## **Appendix A: Additional details about research methods**

## **Study Design**

The current study utilized mixed methods to explore the role of language, culture, and literacy in comprehension of cancer prevention materials by Chinese Canadian seniors. The first phase of the study involved the assessment of participant's health literacy, acculturation, health beliefs and self-efficacy using standardized measures. In phase two, participants were randomly assigned to receive a short colon cancer prevention document in English or Chinese. Immediately after reading the information participants' understanding of the document was assessed using a cloze comprehension task. The final phase of the study involved an interview that consisted of two aspects: a talk-back procedure to allow each woman to further explain what she understood about colon cancer prevention and screening information from the printed document as well as a semi-structured interview to explore each woman's perceptions about the actual printed document with respect to readability, structure or format, and cultural sensitivity. Figure 4 outlines the phases of the current study.

**Figure 4. Study Design**



### **Participants**

A convenience sample of 110 women was recruited for this study. To be included in the study women were required to be 50 years of age or older, have immigrated to Canada (first generation Canadian), have as their first language Mandarin or Cantonese, and have English as their second language (English as Second Language-ESL). Women were excluded from

enrolling in the study if 1) they self-reported that they could not read at all in English and 2) if they or their immediate family (spouse, children, parents, sibs) have had cancer.

### **Participant Recruitment**

Primary recruitment took place in Mississauga at the Square One Older Adult Centre, where 89 participants were recruited. Secondary recruitment took place in the Waterloo Region at a Chinese senior group where the remaining 21 participants were recruited. Recruitment was done in collaboration with a trilingual (English, Mandarin, Cantonese).

*Recruitment in Mississauga:* Recruitment took place at the Square One Older Adult Centre (SOOAC) in Mississauga. This non-profit centre is operated for community dwelling seniors 50 years and older and has 1,500+ members. This includes several ethnocultural seniors clubs including the Chinese Golden Age Seniors Club.

Recruitment posters were placed on bulletin boards at the centre and an information table was set up during peak times for members of the centre to get information about the study. Posters were presented in both English and Chinese. However, the majority of recruitment was done through word of mouth as participants informed friends and family of the study.

*Recruitment in Waterloo:* Recruitment in Waterloo took place at a community church offering a once-a-week recreation program for Chinese seniors. Recruitment was facilitated by a member of the Chinese senior group and meetings were arranged with interested seniors.



## **Procedure**

Eligible participants were invited to attend a 90-minute testing session. Prior to the commencement of the session, consent and permission to be audiotaped was obtained from all participants. Information letters and consent forms were available in both English and Chinese. Also prior to the commencement of the study, participants were randomly assigned to receive the colon cancer prevention and screening information in English or Chinese.

Participants completed the battery of questionnaires in the following order: demographics, acculturation scale, self-efficacy questionnaire, and the health literacy instrument of S-TOHFLA. Following completion of these questionnaires the women were given a short (2-page) information sheet from Cancer Care Ontario in either English or Chinese. Women who obtained a score of 3 or less on the S-TOHFLA and were assigned to the English group were given the information sheet in Chinese. Immediately after reading the information sheet the participants completed the written comprehension test (cloze test). The testing session concluded with a short interview in order to probe deeper into issues with comprehension, reactions to the document, and experiences seeking health information. The women received a \$30 honorarium in appreciation of their time.

## **Measures & Materials (not described elsewhere)**

**Chinese Cultural Views of Health and Cancer** (Liang et al., 2009): This 30-item questionnaire is designed to measure Chinese cultural views about health and cancer. Responses to each item are assessed on a 5-point Likert scale. The summed score is standardized to a scale of 1 to 100, where a higher value indicates a more traditional Chinese cultural view. The scale consists of seven factors: fatalism, self-care, hot-cold balance, use of

herbs, western medicine, medical checkup and lifestyle. Cronbach's alpha (reliability) for the summed 30-items is 0.80.

**Appendix B: English and Chinese Advertisement Posters, Study Information, and  
Consent Forms**

# Department of Health Studies and Gerontology University of Waterloo

**WOMEN WHOSE FIRST LANGUAGE IS CHINESE AND WHO ARE  
IMMIGRANTS TO CANADA**

**NEEDED FOR RESEARCH STUDY ON UNDERSTANDING HEALTH  
INFORMATION**

We are looking for women, 50 years and older, to take part in a study of how Chinese language affects understanding of health information.

As a participant in this study, you would be asked to attend one 90 minute meeting at the Square One Older Adult Centre. You will be asked to complete questionnaires, read some health information, and take part in a short interview.

To thank you for your time, you will receive \$30.

For more information about this study, or to volunteer for this study, please contact:

*Laura Todd*  
*Health Studies and Gerontology*  
at  
647-339-5709  
Email: [letodd@uwaterloo.ca](mailto:letodd@uwaterloo.ca)

**This study has been reviewed by, and received ethics clearance through, the Office of Research Ethics, University of Waterloo.**

Dear Madam,

I am writing this letter to invite you to take part in a study I am doing as part of my Masters' degree in the Department of Health Studies and Gerontology at the University of Waterloo under the supervision of Dr. Laurie Hoffman-Goetz. I would like to give you some more information about this project and what you would be asked to do if you decide to take part.

The purpose of this study is to find out how Chinese language affects understanding of printed cancer prevention information. You will be asked to fill out a series of questionnaires. In these questionnaires you will be asked about your use of cancer screening, your beliefs about cancer, and your cultural background. You will also be asked to read some health information talking about colon cancer prevention. These pages will be written in English or Chinese. You will be then be asked to talk about these pages and describe what you liked or did not like about them. From this study we hope to learn how information about cancer prevention can be improved for Chinese Canadians.

The study will involve one meeting lasting about 90 minutes. This meeting will be held at the Square One Older Adult Centre. In appreciation of your time you will receive \$30 at the end of the meeting. You may decide not to answer any of the questionnaire or interview questions if you so wish. You may decide to withdraw from this study at any time by advising the researcher, and may do so without any penalty.

If you agree, the interview portion of our meeting will be audio-recorded to help with collection of information, and later typed into a computer for further study. All information you give us is private. Your name will not be included or in any other way associated, with the data collected in the study. Your name will not appear in any thesis or report resulting from this study. However, with your permission anonymous quotations may be used. All data gathered during this study (questionnaires, audio recording of interviews, electronic files of the audio recorded interviews) will be kept for two years in a locked cabinet in Dr. Hoffman-Goetz's office and then confidentially destroyed. There are no known harms or likely risks to you as a participant in this study.

If you have any questions about this study, or would like more information to help you decide if you want to take part, please contact me (Laura Todd) at (647) 339-5709 or by email at [letodd@uwaterloo.ca](mailto:letodd@uwaterloo.ca). You can also contact Dr. Laurie Hoffman-Goetz at (519) 888-4567 ext. 33098 or email her at: [lhgoetz@healthy.uwaterloo.ca](mailto:lhgoetz@healthy.uwaterloo.ca).

I would like to assure you that this study has been reviewed and received ethics clearance through the Office of Research Ethics at the University of Waterloo. The choice to take part in this study is yours. If you have any comments or concerns that result from your taking part in this study, please contact Dr. Susan Sykes at this office at (519) 888-4567 Ext. 36005 or [ssykes@uwaterloo.ca](mailto:ssykes@uwaterloo.ca)

Thank you very much for considering participating in this study. I look forward to speaking with you and thank you in advance for your help with this project.

Yours sincerely,

Laura Todd  
MSc Candidate

**(Chinese language version of information letter)**

尊敬的女士：

您好！我是滑铁卢大学健康与老人学专业的硕士研究生，现正在Laurie Hoffman-

Goetz教授的指导下开展我的硕士学位研究项目。我在此诚意地邀请您参与这项研究。以下我将简单介绍本研究的内容，并描述一下若您选择参与该研究，您所需要完成的任务。

该研究的目的是探寻中文如何影响加拿大华人理解与癌症预防相关的印刷版宣传信息。在参与的过程中，您将需要填写一系列的调查问卷。这些问卷将会涉及您对癌症常规检查的使用，您对癌症的看法以及您的文化背景。另外，您还将阅读一些关于预防结肠癌的资料。我们有英文和中文两种版本的预防结肠癌相关资料供您选择。阅读完毕之后，您将需要讨论一下您对这些资料的理解，并描述其中您喜欢或不喜欢的内容。我们希望通过此研究，了解到如何改进由卫生局发布的预防癌症相关资料，以更利于加拿大华人从中获取防癌信息。

这个研究包括一个持续约90分钟的会谈。该会谈将在Square

One

Older

Adult

Centre进行。为感谢您的参与，会谈结束后，您将会获得\$30加元作为报酬。在参与的过程中，您可根据个人意愿，选择不回答问卷或访谈中的任何问题。您也可以在任何时候向研究人员要求退出。这将不会有任何不良后果。

此外，我们将会征求您的同意，对访谈进行录音。录音的目的是方便收集信息，并可将其转移到电脑中进行后期数据处理。我们将对您提供的所有信息保密。我们收集的所有信息将会是匿名的。您的名字也将不会作为研究结果出现在任何的报告或论文中。当然，我们也会征求您的同意，匿名引用您提供的信息。本研究收集到的所有信息，包括调查问卷、访谈录音以及录音的电子文件，将在Hoffman-Goetz教授办公室的带锁储物柜内保存至两年后秘密销毁。作为本研究的参与者，您不会受到任何已知的不良影响，也不需承担任何可能的风险。

如果您对该研究有任何疑问，或希望了解更多信息以便决定是否参与，请联系：



Laura Todd

电话：(647) 339-5709

电子邮箱：[letodd@uwaterloo.ca](mailto:letodd@uwaterloo.ca)

Laurie Hoffman-Goetz教授

电话：(519) 888-4567转33098

电子邮箱：[lhgoetz@healthy.uwaterloo.ca](mailto:lhgoetz@healthy.uwaterloo.ca)

我向您保证该研究已通过学校科学伦理委员会的审查和批准。

您可以根据个人意愿决定是否参加。如果您在参与的过程中有任何意见，您可联系Susan Sykes教授。她的办公电话是：(519) 888-4567转36005，电子邮箱：[ssykes@uwaterloo.ca](mailto:ssykes@uwaterloo.ca).

在此，感谢您对该研究的兴趣。 非常期待您的参与。

诚挚地，

硕士研究生

Laura Todd

## **Consent Form to Participate**

I agree to take part in a study being carried out by Dr. Laurie Hoffman-Goetz and Laura Todd from the University of Waterloo's Department of Health Studies and Gerontology. The work is funded by the Government of Canada (Social Sciences and Humanities Research Council of Canada).

I have made the choice to participate in this study based on the information given in the information letter. I have had the chance to ask questions and ask for any further details that I wanted about this study. I know that I will be asked to attend a 90 minute meeting and fill out a series of questionnaires, take part in a reading activity and a brief interview. I know that I may choose not to answer any questions that I do not want to answer. I know that I can withdraw from the study at any time. I know that in appreciation of my time at the end of the session I will be given \$30.

I am also aware that I have the choice to allow my interview to be audio-recorded for accuracy. All information that I give will be held in private, and I will not be named in any report that comes from this study. I was told that I may withdraw my consent at any time by informing the researcher.

I know that this project has been reviewed by, and received ethics clearance through, the Office of Research Ethics at the University of Waterloo and that I may contact Dr. Susan Sykes at (519) 888-4567 ext. 36005 if I have any concerns or comments as a result of taking part in the study.

I agree to take part in this study.

YES                      NO                      (Please circle your choice)

I agree to have my interview audio recorded.

YES                      NO                      (Please circle your choice)

I agree to the use of anonymous quotations in any thesis or publication that comes of this research.

YES

NO

(Please circle your choice)

Participant Name: \_\_\_\_\_ (Please print)

Participant Signature: \_\_\_\_\_

Witness Name: \_\_\_\_\_

Witness Signature: \_\_\_\_\_

Date: \_\_\_\_\_

(Chinese language version of consent form)

## 参 与 志 愿 书

本人同意参与由滑铁卢大学健康与老人学专业Laurie Hoffman-Goetz 教授和 Laura Todd 主持的研究。本研究项目由加拿大政府社会科学及人文科学研究学会资助。

通过阅读研究简介，我决定参与该研究。我曾有机会就本研究提出任何问题或要求了解更多详情。我知道我将参加一个90分钟的访谈并回答一系列的问卷，参加一个阅读任务和短暂的会谈。我了解我可以选择不回答任何我不愿回答的问题，或在研究过程中的任何时间要求退出。我清楚在参加研究後我将会获得\$30加元作为报酬。

我也知道我有权决定是否允许我的会谈内容被录音。我提供的所有信息都会保密。我的名字不会出现在本研究相关的任何报告中。我被告知我可以在任何时间向研究人员提出撤回我的准许。



## Appendix C: Demographic Questionnaire

## Demographic Questions

The following items were from Health Information National Trends Survey (HINTS 2007).  
Available at: <http://hints.cancer.gov/>

Items:

1-12, 14, 16-18, 21-33

The following items were developed for the purposes of this study:

13, 15, 19, 20

To answer a question simply check the box that best represents your answer or write in the space provided.

### 1. What is your age?

\_\_\_\_\_ years old

### 2. What is your marital status?

- Married
- Divorced or Separated
- Widowed
- Single, never been married

### 3. Language

Please indicate your **skill** level in English and Chinese as high, moderate, or low.

| Language       | Speak  | Read   | Write  |
|----------------|--|--|--|
| <u>English</u> | <input type="checkbox"/> High<br><input type="checkbox"/> Moderate<br><input type="checkbox"/> Low | <input type="checkbox"/> High<br><input type="checkbox"/> Moderate<br><input type="checkbox"/> Low | <input type="checkbox"/> High<br><input type="checkbox"/> Moderate<br><input type="checkbox"/> Low |
| <u>Chinese</u> | <input type="checkbox"/> High<br><input type="checkbox"/> Moderate<br><input type="checkbox"/> Low | <input type="checkbox"/> High<br><input type="checkbox"/> Moderate<br><input type="checkbox"/> Low | <input type="checkbox"/> High<br><input type="checkbox"/> Moderate<br><input type="checkbox"/> Low |

4. Please indicate your **comfort** level in English and Chinese as high, moderate, or low.

| Language       | Speak  | Read   | Write  |
|----------------|--|--|--|
| <u>English</u> | <input type="checkbox"/> High<br><input type="checkbox"/> Moderate<br><input type="checkbox"/> Low | <input type="checkbox"/> High<br><input type="checkbox"/> Moderate<br><input type="checkbox"/> Low | <input type="checkbox"/> High<br><input type="checkbox"/> Moderate<br><input type="checkbox"/> Low |
| <u>Chinese</u> | <input type="checkbox"/> High<br><input type="checkbox"/> Moderate<br><input type="checkbox"/> Low | <input type="checkbox"/> High<br><input type="checkbox"/> Moderate<br><input type="checkbox"/> Low | <input type="checkbox"/> High<br><input type="checkbox"/> Moderate<br><input type="checkbox"/> Low |

**5. What is your current occupational status?**

- Employed
- Unemployed
- Homemaker
- Retired
- Other (please specify)

**6. What is the highest grade or level of schooling in CANADA you have completed?**

- Less than 8 years
- 8 through 11 years
- 12 years or completed high school
- Post-high school training other than college (vocational or technical)
- Some college or university
- College or university graduate
- Postgraduate

**7. What is the highest grade or level of schooling in CHINA you have completed?**

- Less than 8 years
- 8 through 11 years
- 12 years or completed high school
- Post-high school training other than college (vocational or technical)
- Some college or university
- College or university graduate
- Postgraduate



**8. In what country where you born?**

Country: \_\_\_\_\_

**9. In what year did you come to live in Canada?**

Year: \_\_\_\_\_

**10. In total how many years have you lived in Canada?**

\_\_\_\_\_ years

**11. What is your total yearly income from all sources? (All sources include employment income, pension income, savings income, old age security).**

- Less than \$10,000
- \$10,000 - \$20,000
- \$20,000 - \$30,000
- \$30,000 - \$40,000
- \$40,000 - \$50,000
- More than \$50,000

**12. Have you ever looked for information about health or medical topics from any source?**

- YES
- NO

**13. The most recent time you looked for information about health or medical topics, where did you go first for this information?**

MARK ONLY ONE.

- Books
- Brochures and pamphlets
- Cancer Organization
- Family member
- Friend/co-worker
- Doctor or health care provider

- Internet
- Library
- Magazines
- Newspapers
- Telephone information number
- Traditional Chinese practitioner (for example, herbalist, acupuncturist)
- Other (please specify)

**14. The most recent time you looked for information about health or medical topics, in what language did you get this information?**

- English
- Chinese
- Other

**15. Based on the results from your most recent search for information about health or medical topics, how much do you agree or disagree with each of the following statements?**

|  | Strongly<br>Agree        | Somewhat<br>Agree        | Somewhat<br>Disagree     | Strongly<br>Disagree     |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| It took a lot of effort to get the information you needed  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| You felt frustrated during your search for the information | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| You were concerned about the quality of the information.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| The information you found was hard to understand           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**16. I prefer to get printed health and medical information in...**

- English
- Chinese
- Either language
- Other

**17. How likely do you think it is that you will develop cancer in the future?**

- Very low
- Somewhat low
- Moderate
- Somewhat high
- Very high

**18. How often do you worry about getting cancer?**

- Rarely or never
- Sometimes
- Often
- All the time

**19. In general would you say your health is**

- Excellent
- Very good
- Good
- Fair
- Poor

**20. What language do you use when talking with your doctor?**

- English
- Chinese (Mandarin or Cantonese)
- Other

**21. Is your doctor**

- Male
- Female

**22. How much knowledge does your doctor have of traditional Chinese medicine?**

- No knowledge of Chinese medicine
- Some knowledge of Chinese medicine
- A lot of knowledge of Chinese medicine

**23. Think about the last time a doctor, nurse, or other health care professional told you that you should get a test to check for breast cancer (a mammogram). When did this discussion take place?**

- A year ago or less
- More than 1 year ago but not more than 2 years ago
- More than 2 years ago but not more than 5 years ago
- Over 5 years ago
- I do not remember
- No health care professional has told me I should get this test

**24. Have you ever had a mammogram (breast cancer test) done?**

- YES
- NO
- DO NOT KNOW

**25. If YES, when was the last time you had a mammogram test done?**

- A year ago or less
- More than 1 year ago but not more than 2 years ago
- More than 2 years ago but not more than 5 years ago
- Over 5 years ago
- Do not know or remember
- No health care professional has told me I should get this test

**26. Think about the last time a doctor, nurse, or other health care professional told you that you should get a test to check for cervical cancer (a PAP test). When did this discussion take place?**

- A year ago or less
- More than 1 year ago but not more than 2 years ago
- More than 2 years ago but not more than 5 years ago
- Over 5 years ago
- Do not know or remember

No health care professional has told me I should get this test

**27. Have you ever had a PAP test (cervical cancer test) done?**

- YES
- NO
- DO NOT KNOW

**28. If YES, when was the last time you had a PAP test done?**

- A year ago or less
- More than 1 year ago but not more than 2 years ago
- More than 2 years ago but not more than 5 years ago
- Over 5 years ago
- Do not know or remember
- No health care professional has told me I should get this test

**29. Think about the last time a doctor, nurse, or other health care professional told you that you should get a test to check for colon cancer. When did this discussion take place?**

- A year ago or less
- More than 1 year ago but not more than 2 years ago
- More than 2 years ago but not more than 5 years ago
- Over 5 years ago
- Do not know or remember
- No health care professional has told me I should get this test

A **stool or fecal occult blood test (FOBT)** is done at home to check for colon cancer. You send your stool sample to the doctor's office or lab for testing. This does not include drugstore or pharmacy test kits.

A **colonoscopy** and a **sigmoidoscopy** are both tests that examine the bowel by inserting a tube in the rectum.

- During a **colonoscopy**, you may feel sleepy and need someone to drive you home.

- During a **sigmoidoscopy**, you are awake and can drive yourself home after the test.

**30. Have you ever done a stool blood test, also known as a fecal occult blood test (FOBT)?**

- YES
- NO
- DO NOT KNOW

**31. If yes, when did you do your most recent stool blood test/fecal occult blood test?**

- A year ago or less
- More than 1 year ago but not more than 2 years ago
- More than 2 years ago but not more than 5 years ago
- Over 5 years ago
- Do not know or remember

**32. Have you ever had a colonoscopy?**

- YES
- NO
- DO NOT KNOW

**33. If yes, when did you have your most recent colonoscopy?**

- A year ago or less
- More than 1 year ago but not more than 5 years ago
- More than 5 years ago but not more than 10 years ago
- Over 10 years ago
- Do not know or remember

**34. Have you ever had a sigmoidoscopy?**

- YES
- NO
- DO NOT KNOW

**35. If yes, when did you have your most recent sigmoidoscopy?**

- A year ago or less

- More than 1 but not more than 5 years ago
- More than 5 but not more than 10 years ago
- Over 10 years ago
- Do not know or remember

**Appendix D: Acculturation Measure (Suinn-Lew Acculturation Scale)**



SUINN-LEW ASIAN SELF-IDENTITY ACCULTURATION SCALE  
(SL-ASIA)

The questions that follow are for the purpose of collecting information about your historical background as well as more recent behaviours that may be related to your cultural identity. Please check the box that best represents your answer.

**1. What language can you speak?**

- Chinese only (Mandarin, Cantonese.)
- Mostly Chinese, some English
- Chinese and English about equally well (bilingual)
- Mostly English, some Chinese
- Only English

**2. What language do you prefer to speak?**

- Chinese only
- Mostly Chinese, some English
- Chinese and English about equally well (bilingual)
- Mostly English, some Chinese
- Only English

**3. How do you identify yourself?**

- Oriental
- Asian
- Asian-Canadian
- Chinese-Canadian
- Canadian

**4. Which identification does (did) your mother use?**

- Oriental
- Asian
- Asian-Canadian
- Chinese-Canadian

- Canadian

**5. Which identification does (did) your father use?**

- Oriental
- Asian
- Asian-Canadian
- Chinese-Canadian.
- Canadian

**6. What was the ethnic origin of the friends and peers you had as a child up to age 6?**

- Almost exclusively Asians, Asian-Canadians, Orientals, Chinese-Canadians
- Mostly Asians, Asian-Canadians, Orientals, Chinese-Canadians
- About equally Asian groups and non-Asian groups
- Mostly non-Asian ethnic groups
- Almost exclusively non-Asian groups

**7. What was the ethnic origin of the friends and peers you had, as a child from 6 to 18?**

- Almost exclusively Asians, Asian-Canadians, Orientals, Chinese-Canadians
- Mostly Asians, Asian-Canadians, Orientals, Chinese-Canadians
- About equally Asian groups and non-Asian groups
- Mostly non-Asian groups
- Almost exclusively non-Asian groups

**8. Whom do you now associate with in the community?**

- Almost exclusively Asians, Asian-Canadians, Orientals, Chinese-Canadians
- Mostly Asians, Asian-Canadians, Orientals, Chinese-Canadians
- About equally Asian groups and non-Asian ethnic groups
- Mostly non-Asian groups
- Almost exclusively non-Asian groups

**9. If you could pick, whom would you prefer to associate with in the community?**

- Almost exclusively Asians, Asian-Canadians, Orientals, Chinese-Canadians
- Mostly Asians, Asian-Canadians, Orientals, Chinese Canadians
- About equally Asian groups and non-Asian groups
- Mostly non-Asian groups
- Almost exclusively non-Asian groups

**10. What is your music preference?**

- Only Chinese music
- Mostly Chinese music
- Equally Chinese and English music
- Mostly English music
- English only music

**11. What is your movie preference?**

- Chinese-language movies only
- Chinese-language movies mostly
- Equally Chinese/English English-language movies
- Mostly English-language movies only
- English-language movies only

**12. Where were you raised?**

- In China (Mainland or Taiwan) only
- Mostly in China, some in Canada
- Equally in China and Canada
- Mostly in Canada, some in China
- In Canada only

**13. What contact have you had with China?**

- Raised one year or more in China
- Lived for less than one year in China
- Occasional visits to China

- Occasional communications (letters, phone calls, etc.) with people in China
- No exposure or communications with people in China

**14. What is your food preference at home?**

- Exclusively Chinese food
- Mostly Chinese food, some North American (Canadian) food
- About equally Chinese and North American (Canadian) food
- Mostly North American (Canadian) food
- Exclusively North American (Canadian) food

**15. What is your food preference in restaurants?**

1. Exclusively Chinese food
2. Mostly Chinese food, some North American (Canadian) food
3. About equally Chinese and North American (Canadian) food
4. Mostly North American (Canadian) food
5. Exclusively North American (Canadian) food

**16. Do you**

- Read only in Chinese?
- Read Chinese better than read in English?
- Read both Chinese and English equally well?
- Read English better than read in Chinese?
- Read only English?

**17. Do you**

- Write only in Chinese?
- Write Chinese better than English?
- Write both Chinese and English equally well?
- Write English better than write in Chinese?
- Write only English?

**18. If you consider yourself a member of the Asian group (Oriental, Asian, Asian-Canadian, Chinese-Canadian, etc., whatever term you prefer), how much pride do you have in this group?**

- Extremely proud
- Moderately proud
- Little pride
- No pride but do not feel negative toward group
- No pride but do feel negative toward group

**19. How would you rate yourself?**

- Very Chinese
- Mostly Chinese
- Bicultural
- Mostly Westernized
- Very Westernized

**20. Do you participate in Chinese occasions, holidays, traditions, etc.?**

- Nearly all
- Most of them
- Some of them
- A few of them
- None at all

## **Appendix E: Self-Efficacy Scale**

### Self-efficacy Scale

This set of questions asks about how confident you are about certain aspects of colorectal cancer testing. For each statement simply circle the number that best represents your answer.

(4= very confident, 3= confident, 2= not very confident, 1= not at all confident)

**How confident are you that you can make a decision about whether or not to get colorectal cancer testing?**

|                |           |                    |                      |
|----------------|-----------|--------------------|----------------------|
| <b>4</b>       | <b>3</b>  | <b>2</b>           | <b>1</b>             |
| very confident | confident | not very confident | not at all confident |

**How confident are you that you can complete the colorectal cancer testing?**

|                |           |                    |                      |
|----------------|-----------|--------------------|----------------------|
| <b>4</b>       | <b>3</b>  | <b>2</b>           | <b>1</b>             |
| very confident | confident | not very confident | not at all confident |

**How confident are you that you can complete colorectal cancer testing even if you are embarrassed about it?**

|                |           |                    |                      |
|----------------|-----------|--------------------|----------------------|
| <b>4</b>       | <b>3</b>  | <b>2</b>           | <b>1</b>             |
| very confident | confident | not very confident | not at all confident |

**How confident are you that you can find the time to complete colorectal cancer screening?**

|                |           |                    |                      |
|----------------|-----------|--------------------|----------------------|
| <b>4</b>       | <b>3</b>  | <b>2</b>           | <b>1</b>             |
| very confident | confident | not very confident | not at all confident |

**How confident are you that you can talk to your doctor about getting colorectal cancer testing?**

|                |           |                    |                      |
|----------------|-----------|--------------------|----------------------|
| <b>4</b>       | <b>3</b>  | <b>2</b>           | <b>1</b>             |
| very confident | confident | not very confident | not at all confident |

**How confident are you that you can carry out any necessary preparation for colorectal cancer testing?**

|                |           |                    |                      |
|----------------|-----------|--------------------|----------------------|
| <b>4</b>       | <b>3</b>  | <b>2</b>           | <b>1</b>             |
| very confident | confident | not very confident | not at all confident |

**How confident are you that you can get support from family or friends to help you complete colorectal cancer testing?**

|                |           |                    |                      |
|----------------|-----------|--------------------|----------------------|
| <b>4</b>       | <b>3</b>  | <b>2</b>           | <b>1</b>             |
| very confident | confident | not very confident | not at all confident |



## **Appendix F: Chinese Cultural View of Health and Cancer Scale**

### Chinese Cultural Views of Health and Cancer Scale

For each statement simply circle the number that best represents your answer.

(5 = strongly agree, 4= agree, 3= neutral, 2= disagree, 1= strongly disagree)

**If I am meant to get cancer, I will get it.**

|                |          |          |          |                   |
|----------------|----------|----------|----------|-------------------|
| <b>5</b>       | <b>4</b> | <b>3</b> | <b>2</b> | <b>1</b>          |
| strongly agree | agree    | neutral  | disagree | strongly disagree |

**If we get cancer, the best way to deal with it is to accept it, just like the old saying “Listen to heaven and follow fate”.**

|                |          |          |          |                   |
|----------------|----------|----------|----------|-------------------|
| <b>5</b>       | <b>4</b> | <b>3</b> | <b>2</b> | <b>1</b>          |
| strongly agree | agree    | neutral  | disagree | strongly disagree |

**Health or illness is a matter of fate. Some people are always healthy; others get sick very often.**

|                |          |          |          |                   |
|----------------|----------|----------|----------|-------------------|
| <b>5</b>       | <b>4</b> | <b>3</b> | <b>2</b> | <b>1</b>          |
| strongly agree | agree    | neutral  | disagree | strongly disagree |

**I cannot control my destiny.**

|                |          |          |          |                   |
|----------------|----------|----------|----------|-------------------|
| <b>5</b>       | <b>4</b> | <b>3</b> | <b>2</b> | <b>1</b>          |
| strongly agree | agree    | neutral  | disagree | strongly disagree |

**Avoiding cancer is a matter of personal luck.**

|                |          |          |          |                   |
|----------------|----------|----------|----------|-------------------|
| <b>5</b>       | <b>4</b> | <b>3</b> | <b>2</b> | <b>1</b>          |
| strongly agree | agree    | neutral  | disagree | strongly disagree |

**No matter what I do, if I am going to get cancer, I will get it.**

|                |          |          |          |                   |
|----------------|----------|----------|----------|-------------------|
| <b>5</b>       | <b>4</b> | <b>3</b> | <b>2</b> | <b>1</b>          |
| strongly agree | agree    | neutral  | disagree | strongly disagree |

**It is hard to prevent cancer.**

|                |          |          |          |                   |
|----------------|----------|----------|----------|-------------------|
| <b>5</b>       | <b>4</b> | <b>3</b> | <b>2</b> | <b>1</b>          |
| strongly agree | agree    | neutral  | disagree | strongly disagree |

**Getting cancer is like being sentenced to death.**

|                |          |          |          |                   |
|----------------|----------|----------|----------|-------------------|
| <b>5</b>       | <b>4</b> | <b>3</b> | <b>2</b> | <b>1</b>          |
| strongly agree | agree    | neutral  | disagree | strongly disagree |

**It is best not to think about cancer. If we think about it too much, we probably will get cancer.**

|                |          |          |          |                   |
|----------------|----------|----------|----------|-------------------|
| <b>5</b>       | <b>4</b> | <b>3</b> | <b>2</b> | <b>1</b>          |
| strongly agree | agree    | neutral  | disagree | strongly disagree |

**As long as I can take good care of myself and keep myself healthy, I don't need to see a doctor.**

|                |          |          |          |                   |
|----------------|----------|----------|----------|-------------------|
| <b>5</b>       | <b>4</b> | <b>3</b> | <b>2</b> | <b>1</b>          |
| strongly agree | agree    | neutral  | disagree | strongly disagree |

**I don't visit the doctors if I'm not feeling sick.**

|                |          |          |          |                   |
|----------------|----------|----------|----------|-------------------|
| <b>5</b>       | <b>4</b> | <b>3</b> | <b>2</b> | <b>1</b>          |
| strongly agree | agree    | neutral  | disagree | strongly disagree |

**Herbs are a better choice for preventing diseases than Western medicine.**

|                |          |          |          |                   |
|----------------|----------|----------|----------|-------------------|
| <b>5</b>       | <b>4</b> | <b>3</b> | <b>2</b> | <b>1</b>          |
| strongly agree | agree    | neutral  | disagree | strongly disagree |

**Herbs are more effective in harmonizing a person's ying-yang than Western medicine.**

|                |          |          |          |                   |
|----------------|----------|----------|----------|-------------------|
| <b>5</b>       | <b>4</b> | <b>3</b> | <b>2</b> | <b>1</b>          |
| strongly agree | agree    | neutral  | disagree | strongly disagree |

**Herbs are better remedy for illness than Western medicine.**

|                |          |          |          |                   |
|----------------|----------|----------|----------|-------------------|
| <b>5</b>       | <b>4</b> | <b>3</b> | <b>2</b> | <b>1</b>          |
| strongly agree | agree    | neutral  | disagree | strongly disagree |

**Regularity in meals and daily schedules can make us healthy**

|                |          |          |          |                   |
|----------------|----------|----------|----------|-------------------|
| <b>5</b>       | <b>4</b> | <b>3</b> | <b>2</b> | <b>1</b>          |
| strongly agree | agree    | neutral  | disagree | strongly disagree |

**Keeping my mind happy, doing my hobbies, and not competing with others can lead to better health.**

|                |          |          |          |                   |
|----------------|----------|----------|----------|-------------------|
| <b>5</b>       | <b>4</b> | <b>3</b> | <b>2</b> | <b>1</b>          |
| strongly agree | agree    | neutral  | disagree | strongly disagree |

**Regular outdoor walking is essential to achieve good health.**

|                |          |          |          |                   |
|----------------|----------|----------|----------|-------------------|
| <b>5</b>       | <b>4</b> | <b>3</b> | <b>2</b> | <b>1</b>          |
| strongly agree | agree    | neutral  | disagree | strongly disagree |

**Certain food is not good for me because it will disturb the hot-cold balance in my body.**

|                |          |          |          |                   |
|----------------|----------|----------|----------|-------------------|
| <b>5</b>       | <b>4</b> | <b>3</b> | <b>2</b> | <b>1</b>          |
| strongly agree | agree    | neutral  | disagree | strongly disagree |

**Most diseases, excluding external wounds, are caused by the imbalance between hot and cold in a person's body.**

|                |          |          |          |                   |
|----------------|----------|----------|----------|-------------------|
| <b>5</b>       | <b>4</b> | <b>3</b> | <b>2</b> | <b>1</b>          |
| strongly agree | agree    | neutral  | disagree | strongly disagree |

**Eating "cold" food in the summer and "hot" food in the winter will help strengthen my body.**

|                |          |          |          |                   |
|----------------|----------|----------|----------|-------------------|
| <b>5</b>       | <b>4</b> | <b>3</b> | <b>2</b> | <b>1</b>          |
| strongly agree | agree    | neutral  | disagree | strongly disagree |

**I will be embarrassed if a doctor or nurse check my private parts.**

|                |          |          |          |                   |
|----------------|----------|----------|----------|-------------------|
| <b>5</b>       | <b>4</b> | <b>3</b> | <b>2</b> | <b>1</b>          |
| strongly agree | agree    | neutral  | disagree | strongly disagree |

**A lot of medical tests are too intrusive and make me uncomfortable.**

|                |          |          |          |                   |
|----------------|----------|----------|----------|-------------------|
| <b>5</b>       | <b>4</b> | <b>3</b> | <b>2</b> | <b>1</b>          |
| strongly agree | agree    | neutral  | disagree | strongly disagree |

**Medical doctors usually do unnecessary tests.**

|                |          |          |          |                   |
|----------------|----------|----------|----------|-------------------|
| <b>5</b>       | <b>4</b> | <b>3</b> | <b>2</b> | <b>1</b>          |
| strongly agree | agree    | neutral  | disagree | strongly disagree |

**We should not take “Western” medicine too often, because its chemical ingredients will hurt our bodies.**

|                |          |          |          |                   |
|----------------|----------|----------|----------|-------------------|
| <b>5</b>       | <b>4</b> | <b>3</b> | <b>2</b> | <b>1</b>          |
| strongly agree | agree    | neutral  | disagree | strongly disagree |

**Western medicine is good for killing germs rather than preventing disease.**

|                |          |          |          |                   |
|----------------|----------|----------|----------|-------------------|
| <b>5</b>       | <b>4</b> | <b>3</b> | <b>2</b> | <b>1</b>          |
| strongly agree | agree    | neutral  | disagree | strongly disagree |

**Eating food prepared by myself is a key to good health.**

|                |          |          |          |                   |
|----------------|----------|----------|----------|-------------------|
| <b>5</b>       | <b>4</b> | <b>3</b> | <b>2</b> | <b>1</b>          |
| strongly agree | agree    | neutral  | disagree | strongly disagree |

**I know my body better than anyone else.**

|                |          |          |          |                   |
|----------------|----------|----------|----------|-------------------|
| <b>5</b>       | <b>4</b> | <b>3</b> | <b>2</b> | <b>1</b>          |
| strongly agree | agree    | neutral  | disagree | strongly disagree |

**Bodily constitution is different for every person; therefore, some kinds of people are more likely to get cancer than others do.**

|                |          |          |          |                   |
|----------------|----------|----------|----------|-------------------|
| <b>5</b>       | <b>4</b> | <b>3</b> | <b>2</b> | <b>1</b>          |
| strongly agree | agree    | neutral  | disagree | strongly disagree |

**Going to clinics or hospitals too often will cause me to catch diseases or get bad luck.**

|                |          |          |          |                   |
|----------------|----------|----------|----------|-------------------|
| <b>5</b>       | <b>4</b> | <b>3</b> | <b>2</b> | <b>1</b>          |
| strongly agree | agree    | neutral  | disagree | strongly disagree |

**Chi-Kung or Tai-Chi can help regulate the chi in the body, which can increase one's stamina and prevent diseases.**

|                |          |          |          |                   |
|----------------|----------|----------|----------|-------------------|
| <b>5</b>       | <b>4</b> | <b>3</b> | <b>2</b> | <b>1</b>          |
| strongly agree | agree    | neutral  | disagree | strongly disagree |

## **Appendix G: Shortened Test of Functional Health Literacy in Adults (S-TOFHLA)**



Source: Baker DW, Williams MV, Parker RM, Gazmararian JA, Nurss J. Development of a brief test to measure functional health literacy. *Patient Education and Counseling*. 1999; 38(1):33-42.

**Sample items:**

Reading Comprehension Items:

1. Your doctor has sent you to have a \_\_\_\_\_ x-ray.  
Choices (stomach, diabetes, stitches, germs)
  
2. You must have an \_\_\_\_\_ stomach when you come for \_\_\_\_\_.  
Choices (asthma, empty, incest, anemia), and, (is, am, if, it)
  
3. The X-ray will \_\_\_ from 1 to 3 \_\_\_\_\_ to do.  
Choices (take, view, talk, look), and, (beds, brains, hours, diets)
  
4. THE DAY BEFORE THE X-RAY  
For supper have only a \_\_\_ snack of fruit, \_\_\_ and jelly, with coffee or tea.  
Choices (little, broth, attack, nausea), and, (toes, throat, toast, thigh)

**Appendix H: Cancer Care Ontario ColonCheck Fact Sheet**

# Colon Cancer Check

---

## **What is colon cancer?**

Colon cancer develops in the large intestine. It generally develops from tiny growths inside the colon called polyps. Over time, some polyps can become cancerous. Colon cancer is cancer of the large intestine (colon), the lower part of your digestive system.

## **How common is colon cancer?**

Colon cancer is the second deadliest cancer in Canada, and Ontario has one of the highest rates of colon cancer in the world. In 2007, an estimated 3,250 died from the disease and 7,800 Ontarians were newly diagnosed with colorectal cancer.

## **What causes colon cancer?**

The exact cause is hard to pinpoint. However, it is known that tiny growths called polyps sometimes form on the inner surface of your colon or rectum. Polyps are not cancerous to start with and some may never become cancer. But over time, the slow growing polyps can become a cancerous tumour.

## **What are the signs and symptoms I should watch for?**

Colon cancer often doesn't give us any clues of its presence inside us. During the early stages of the disease there are no symptoms. Regular screening is the best way to detect colon cancer early. As colon cancer progresses the following symptoms may occur:

- A change in your bowel movements
- Blood (either bright red or very dark) in your stool (feces)

- Diarrhea, constipation or feeling that your bowel does not empty completely
- Stools that are narrower than usual
- Stomach discomfort
- Unexplained weight loss
- Fatigue
- Vomiting

If you have one or more of the above symptoms it may not be colon cancer, but you need to check it out without delay by speaking to your health care provider.

### **What are the screening methods?**

There are various methods of screening for colon cancer. The screening methods that are part of the ColonCancerCheck program are:

- Fecal Occult Blood Test (FOBT) a simple, self-administered test that can be done in the privacy of your own home. It can detect the presence of trace amounts of blood in your stool. A positive test result doesn't necessarily mean that you have colon cancer but does require follow-up to find out if you do have colon cancer. Approximately 10% of people with a positive FOBT are found to have cancer during a follow-up colonoscopy. It is recommended that everyone 50 years and older should be screened with an FOBT every two years.

- Colonoscopy is an examination of the lining of your rectum and colon using a long flexible tube with a camera on the end. It is recommended for individuals at increased risk, such as those who have one or more close relatives (parent, sibling or child) who had colon cancer and those with a positive FOBT result.

### **Will taking the Fecal Occult Blood Test cost me anything?**

No, there is no cost to take the test.

### **How do I protect myself from getting colon cancer?**

You will reduce your risk of getting colon cancer, as well as many other diseases, if you lead a healthy lifestyle, including a diet filled with lots of fruits, vegetables and whole grains. It will also help if you watch your weight, don't smoke, and don't drink alcohol excessively. It is also very important to be screened regularly for colon cancer.

### **When should I start screening for colon cancer?**

It's recommended that if you are 50 years of age or older, without a family history of colon cancer, you should be screened for the disease using an easy-to-use Fecal Occult Blood Test (FOBT) every two years.

### **What do I do if I have a family history of colon cancer?**

You have an increased risk of developing colon cancer if you have a family history of the disease in a first degree family member (parent, sibling, child). It is recommended that you get screened using colonoscopy at age 50 or 10 years earlier than the age of the diagnosis of your parent or sibling.

### **What difference will regular FOBT screening make?**

Studies show that screening with an FOBT every two years reduced death from colon cancer by 16 per cent over a decade. When caught early through regular screening, there is a 90 per cent chance that colon cancer can be cured.

## Appendix I: English and Chinese Cloze Tests

# Colon Cancer Check

---

## What is colon cancer?

Colon cancer develops in the \_\_\_\_\_ intestine. It generally develops from \_\_\_\_\_ growths inside the colon called \_\_\_\_\_. Over time, some polyps can \_\_\_\_\_ cancerous. Colon cancer is cancer \_\_\_\_\_ the large intestine (colon), the \_\_\_\_\_ part of your digestive system.

## What are the signs and symptoms I should watch for?

Colon cancer often doesn't give \_\_\_\_\_ any clues of its presence \_\_\_\_\_ us. During the early stages \_\_\_\_\_ the disease there are no \_\_\_\_\_. Regular screening is the best \_\_\_\_\_ to detect colon cancer early. \_\_\_\_\_ colon cancer progresses the following \_\_\_\_\_ may occur:

- A change in \_\_\_\_\_ bowel movements
- Blood (either bright \_\_\_\_\_ or very dark) in your \_\_\_\_\_ (feces)
- Diarrhea, constipation or feeling that \_\_\_\_\_ bowel does not empty completely
- \_\_\_\_\_ that are narrower than usual
- \_\_\_\_\_ discomfort
- Unexplained weight loss
- Fatigue
- \_\_\_\_\_

If you have one or more of the above symptoms it may not be colon cancer, but you need to check it out without delay by speaking to your health care provider.

### **What are the screening methods?**

\_\_\_\_\_ Occult Blood Test (FOBT) a simple, \_\_\_\_\_ test that can be done \_\_\_\_\_ the privacy of your own \_\_\_\_\_. It can detect the presence \_\_\_\_\_ trace amounts of blood in \_\_\_\_\_ stool. A positive test result \_\_\_\_\_ necessarily mean that you have \_\_\_\_\_ cancer but does require follow-up \_\_\_\_\_ find out if you do \_\_\_\_\_ colon cancer. Approximately 10% of \_\_\_\_\_ with a positive FOBT are \_\_\_\_\_ to have cancer during a \_\_\_\_\_ colonoscopy. It is recommended that \_\_\_\_\_ 50 years and older should \_\_\_\_\_ screened with an FOBT every \_\_\_\_\_ years.

Colonoscopy is an examination \_\_\_\_\_ the lining of your rectum \_\_\_\_\_ colon using a long flexible \_\_\_\_\_ with a camera on the \_\_\_\_\_. It is recommended for individuals \_\_\_\_\_ increased risk, such as those \_\_\_\_\_ have one or more close \_\_\_\_\_ (parent, sibling or child) who \_\_\_\_\_ colon cancer and those with \_\_\_\_\_ positive FOBT result.

### **How do I protect myself from getting colon cancer?**

You will reduce your risk of getting colon \_\_\_\_\_, as well as many other \_\_\_\_\_, if you lead a healthy \_\_\_\_\_, including a diet filled with \_\_\_\_\_ of fruits, vegetables and whole \_\_\_\_\_. It will



also help if \_\_\_\_\_ watch your weight, don't smoke, \_\_\_\_\_  
don't drink alcohol excessively. It \_\_\_\_\_ also very important to be  
\_\_\_\_\_ regularly for colon cancer.

**Answers (54):** Large, tiny, polyps, become, of, lower, Us, inside, of,  
symptoms, way, as, symptoms, your, red, stool, your, Stools, stomach,  
vomiting, Fecal, self-administered, in, home, of, your, doesn't, colon,  
to, have, people, found, follow-up, everyone, be, two, of, and, tube,  
end, at, who, relatives, had, a, cancer, diseases, lifestyle, lots, grains,  
you, don't, is, screened

## Chinese Cloze Test (simplified)

### 什么是结肠癌？

结肠癌一般出现\_\_\_\_\_大肠内部。通常其\_\_\_\_\_初形态是结肠内的一种叫做息肉的微小生长体。\_\_\_\_\_着时间的推移，部分息肉会\_\_\_\_\_变。结肠癌是大\_\_\_\_\_（结肠）癌症，而\_\_\_\_\_肠处于消化系统的\_\_\_\_\_部。

### 个人应该注意哪些征兆和症状？

人体内的结肠\_\_\_\_\_通常不会有什么明显的征兆。结\_\_\_\_\_癌的早期也不\_\_\_\_\_有任何症状。要尽早发现结肠癌，\_\_\_\_\_好的办法是定\_\_\_\_\_进行检查。随着\_\_\_\_\_情的持续恶化，\_\_\_\_\_能会出现以下\_\_\_\_\_状：

- 大便异常
- 粪便中含有\_\_\_\_\_块（大红色或\_\_\_\_\_色）
- 出现腹泻、便\_\_\_\_\_或感觉排便\_\_\_\_\_尽
- 粪便与以前相比较窄小
- 胃部不适
- 莫名的体重\_\_\_\_\_降
- 疲劳

- 呕吐

如果您出现上述的一项或几项症状，并不能确定已患有结肠癌，但是您需要告知您的医护服务人员并立刻进行检查。

## 通过何种方式进行检查？

检查结肠癌的方法有很多种。\_\_\_\_\_肠癌检查计划中所包含的方法为：

- 粪便隐血试\_\_\_\_\_ (FOBT)

可以在家里\_\_\_\_\_下进行的一\_\_\_\_\_简单、自行掌\_\_\_\_\_的试验。该方\_\_\_\_\_可以检测出\_\_\_\_\_便中血液的\_\_\_\_\_量。试验结果呈阳性并不能\_\_\_\_\_全证明您患有\_\_\_\_\_肠癌，但是您需要进一步检查以便确\_\_\_\_\_。大约10%的FOBT试验结果呈阳性的\_\_\_\_\_试者在下一步的结肠镜检\_\_\_\_\_中会被查出患有结肠癌。建\_\_\_\_\_所有50岁以\_\_\_\_\_的人每两年\_\_\_\_\_一次FOBT 检查。

- 

结肠镜检查采用一根前端带有一个摄像\_\_\_\_\_的柔软长管，检查人的直肠\_\_\_\_\_结肠内层。建议有较高患病\_\_\_\_\_险的个人采用此方法，例如有一个\_\_\_\_\_多

个亲属患有此\_\_\_\_\_症的人或者FOBT检查结果呈\_\_\_\_\_性的测试者。

### 如何保护自己避免患上结肠癌？

主要您保持\_\_\_\_\_康的生活方\_\_\_\_\_，例如多吃水\_\_\_\_\_、蔬菜和粗粮，那么您完全可\_\_\_\_\_降低结肠癌以及其他多种疾病的患病风\_\_\_\_\_。同样，不抽烟、\_\_\_\_\_酗酒、关注体\_\_\_\_\_变化也有助于避免患病。此外，定期进行结\_\_\_\_\_癌检查也十分重要。

Answers:

在 in, 最 initial, 随 over(time),, 癌 cancer, 肠 intestine, 大 large, 下 lower, 癌 cancer, 肠 intestine, 会 will, 最 best, 期 regular, 病 disease, 可 can, 症 symptom, 血 bloody (red), 深 dark, 秘 constipation, 未 not, 下 loss, 结 colon, 验 test, 私 private, 种 a, 握 deal with, 法 method, 粪 faces, 痕 micro, 完 completely, 结 colon, 认 confirm, 测 test, 查 screen, 议 recommend, 上 above, 做 take, 头 camera, 和 and, 风 risk, 或 or, 癌 cancer, 阳 positive, 健 health, 式 (life)style, 果 fruits, 以 can, 险 risk, 不 not, 重 weight, 肠 intestine

## Appendix J: Interview Guide

## INTERVIEW SCRIPT

### **(1) Introduction**

The goal of this study is to find out how Chinese language affects understanding of printed cancer prevention information. The purpose of this interview is to ask you some more questions about the information sheet you read on colon cancer prevention. I am also interested in your thoughts and opinions on the usefulness of the colon cancer information you read.

Before we begin I want to ask you if I can audio-record the interview. This will be done so that I don't miss any important parts of our discussion. Your opinions and comments will remain confidential and your name will not be used in any reports. The recordings will be destroyed after the study is completed.

### **(2) Ice-breaker questions were introduced**

### **(3) Questions to Probe for Comprehension**

**Let's begin by discussing the information you read on the sheet about colon cancer.**

1. From the information you read on the sheet, can you tell me what causes colon cancer?
2. Can you tell me what are two symptoms that can be related to colon cancer?  
A symptom is something that describes how you feel (for example, a headache) or something that you notice that may be different from your normal situation (for example, you have to go to the bathroom more often).
3. Can you name the two tests that are used to screen for colon cancer?
4. How old should you be when you start having a screening test for colon cancer?
5. Should men and women be of different ages when they start having a screening test for colon cancer?
6. How often should you be screened for colon cancer using an FOBT test?

#### **(4) Questions to Probe for Opinions about the Content of the Cancer Information Page**

I am very interested in your thoughts and opinions about the information you just read. I want to let you know that there are no right or wrong answers. I am interested in what you think was helpful or not helpful about how the information was presented. With your help I want to find ways to improve the printed information so that Chinese-Canadians find it useful for them.

1. What did you think about how this cancer information was presented? (Probes: what did/did not like about it?)
2. What do you think about the content of the article? Is the information useful to you?
3. Are there any specific features of the article that you found were hard to read or understand?
4. Thinking about people who are new to Canada and may not speak English very well, what do you think we can do to make this information better for them?
5. Where do you go to get information about health?
6. In what language do you prefer to get this information?

#### **(5) Questions about screening behaviors.**

**Having read this information about colon cancer and prevention, can we talk a little more about your thoughts about colon cancer screening?**

1. Before today was this something you had heard of? Have you heard anything about the tests used to look for colon cancer? (Probes: FOBT, colonoscopy)
2. Have you ever had a test for colon cancer? (If yes, why did you have this test? If no, are there any reasons why you have not had the test?)
3. After reading this information today do you think this would be something you would do? (Probes: Why or why not?)
4. Thinking about yourself, your family, and friends, what do you think could be done to encourage people to go for a colon cancer test?

#### **(6) Wrap-up**

Thank you very much for meeting with me today. Your feedback is very important in understanding how we can improve the information we give to people about colon cancer.

1. Are there any other stories or thoughts you would like to share with me about colon cancer, cancer screening in general, or how to best give information to people to help them make a decision about cancer screening?



**Appendix K: HINTS information seeking behaviour items and reaction to colon cancer document (Study 3)**

**Due to space restrictions for the publication of study 3 (A Qualitative Study of Cancer Information Seeking among English-as-a-Second Language Older Chinese Immigrant Women to Canada: Sources, Barriers, and Strategies) the following results were excluded from the final manuscript.**

### *1. Information Seeking Experiences*

Health information seeking experiences were assessed using four items from the National Cancer Institute's Health Information National Trends Survey (HINTS, 2006). Participants were asked to respond to the following four statements based on the results from their most recent search for health or medical information: (1) "It took a lot of effort to get the information you needed", (2) "You felt frustrated during your search for the information", (3) "You were concerned about the quality of the information", (4) "The information you found was too hard to understand". Women rated their responses on a four point Likert scale as strongly agree, somewhat agree, somewhat disagree, or strongly disagree. Participants were also asked to indicate their preferred language for printed health information (English, Chinese, either language).

### *Findings*

#### *Information Seeking Experiences*

Table 2 shows the responses to the four HINTS items regarding information seeking experiences. There was no significant difference between the two groups of women based on health literacy scores on their responses to these items. However, more than half of the total sample (61%) reported that it took a lot of effort to get the information they needed, 49% felt frustrated during their search for the information and 43% reported that they found health information difficult to understand. A large proportion of the sample (75%) reported that they were concerned with the quality of the information that they obtained.

**Table 8. Experience during most recent search for health information by health literacy group**

| Items <sup>a</sup>   | % of sample that somewhat or strongly agreed |                     |              |
|--|--|---------------------|--------------|
|  | High HL <sup>b</sup>                         | Low HL <sup>c</sup> | Total Sample |
| <b>“It took a lot of effort to get the information you needed”</b> | 13 (54%)                                     | 14 (70%)            | 27 (61%)     |
| <b>“You felt frustrated during your search for information”</b>    | 11 (48%)                                     | 10 (50%)            | 21 (49%)     |
| <b>“You were concerned about the quality of the information”</b>   | 21 (87.5%)                                   | 12 (60%)            | 33 (75%)     |
| <b>“The information you found was hard to understand”</b>          | 12 (50%)                                     | 7 (35%)             | 19 (43%)     |

<sup>a</sup> Items are from HINTS (2006)

<sup>b</sup> High HL = high health literacy group

<sup>c</sup> Low HL = low health literacy group

## *2. Reaction to colon cancer document*

Using a semi-structured interview guide we asked the women about: (a) their reaction to the printed colon cancer prevention material including perceptions of its content, clarity, difficulty and usefulness.

### *Findings*

#### *Reaction to colon cancer information sheet*

Women in both health literacy groups responded positively to the colon cancer prevention information sheet provided. Most women reported that they found the information was useful, easy to understand, and informative (n=41).

It’s very easy to understand. It tells everything, yeah the information is very easy to understand and very complete. (#31, high health literacy)

I think it’s very good, you know. .... very good .... I think if nobody, if they don’t know any about colon cancer, after they read that they would pay attention to it. I think it’s very good. (#54, low health literacy)

A number of women (n=17) identified areas they felt could be improved upon to help them understand and make use of the document. Women in the high health literacy group wanted more details on symptoms, specifically how to differentiate symptoms that are related to colon cancer versus other illnesses (n=5). Second, women in both groups discussed the desire for information unique and culturally relevant to Chinese women in terms of diet recommendations and their risk of developing colon cancer (n=8). Finally, women in both groups identified how the use of pictures or other visuals would help them to understand and make use of the document (n=6).

*a) More detail on symptoms*

“Is so confusing because so many, so many diseases have this kind of symptom, especially girls, you know.” (#33, high health literacy)

“Mhmm, yeah. Because some of the symptom, maybe all of the symptoms are quite common to other illness.” (#43, high health literacy)

*b) Information tailored for Chinese women*

“How about percentage of colon cancer to Asian woman, what is the percentage?” (#39, high health literacy)

“But usually you know our diet is different with Canadian food. So, what they talking about doesn’t relate to our everyday food we are eating.” (#5, low health literacy)

*c) Pictures or other visuals*

“But if you have some photos on it, to um, draw your attention or, make you, how do you say, not that nervous. Yeah. And, would it be possible to make it color photo.” (#33, high health literacy)

“Well they can use some picture to show them, you know, and talk to them about their family member and in the case of, you know, this is very important knowledge, they should know that.” (#71, low health literacy)

**Appendix L: Representative statistical output from SPSS data analysis**

**Study #1:** Fisher's exact tests for mammography screening drop outs (physician recommendation and gender)

**DropoffMamm \* DocRec**

**Crosstab**

Count

|             |             | DocRec |     | Total |
|-------------|-------------|--------|-----|-------|
|             |             | no     | yes |       |
| DropoffMamm | not current | 8      | 6   | 14    |
|             | current     | 13     | 68  | 81    |
| Total       |             | 21     | 74  | 95    |

**Chi-Square Tests**

|                                    | Value               | df | Asymp. Sig. (2-sided) | Exact Sig. (2-sided) | Exact Sig. (1-sided) |
|------------------------------------|---------------------|----|-----------------------|----------------------|----------------------|
| Pearson Chi-Square                 | 11.707 <sup>a</sup> | 1  | .001                  |                      |                      |
| Continuity Correction <sup>b</sup> | 9.442               | 1  | .002                  |                      |                      |
| Likelihood Ratio                   | 9.885               | 1  | .002                  |                      |                      |
| Fisher's Exact Test                |                     |    |                       | .002                 | .002                 |
| Linear-by-Linear Association       | 11.583              | 1  | .001                  |                      |                      |
| N of Valid Cases                   | 95                  |    |                       |                      |                      |

a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 3.09.

b. Computed only for a 2x2 table

**DropoffMamm \* DocGencat**

**Crosstab**

Count

|             |             | DocGencat |        | Total |
|-------------|-------------|-----------|--------|-------|
|             |             | male      | female |       |
| DropoffMamm | not current | 11        | 2      | 13    |
|             | current     | 41        | 40     | 81    |

**Crosstab**

Count

|             |             | DocGencat |        | Total |
|-------------|-------------|-----------|--------|-------|
|             |             | male      | female |       |
| DropoffMamm | not current | 11        | 2      | 13    |
|             | current     | 41        | 40     | 81    |
| Total       |             | 52        | 42     | 94    |

**Chi-Square Tests**

|                                    | Value              | df | Asymp. Sig. (2-sided) | Exact Sig. (2-sided) | Exact Sig. (1-sided) |
|------------------------------------|--------------------|----|-----------------------|----------------------|----------------------|
| Pearson Chi-Square                 | 5.239 <sup>a</sup> | 1  | .022                  |                      |                      |
| Continuity Correction <sup>b</sup> | 3.953              | 1  | .047                  |                      |                      |
| Likelihood Ratio                   | 5.806              | 1  | .016                  |                      |                      |
| Fisher's Exact Test                |                    |    |                       | .033                 | .020                 |
| Linear-by-Linear Association       | 5.183              | 1  | .023                  |                      |                      |
| N of Valid Cases                   | 94                 |    |                       |                      |                      |

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.81.

b. Computed only for a 2x2 table

## Study #2: Regression model for S-TOFHLA

### Regression

[DataSet1] J:\CURRENT SPREADSHEET MAY27.sav

#### Variables Entered/Removed<sup>b</sup>

| Model | Variables Entered                            | Variables Removed | Method |
|-------|--|-------------------|--------|
| 1     | Education level by 2 categories <sup>a</sup> |                   | Enter  |

- a. All requested variables entered.  
b. Dependent Variable: Cloze traditional

#### Model Summary

| Model | R                 | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|-------------------|----------|-------------------|----------------------------|
| 1     | .351 <sup>a</sup> | .123     | .105              | 16.84089                   |

- a. Predictors: (Constant), Education level by 2 categories

#### ANOVA<sup>b</sup>

| Model |            | Sum of Squares | df | Mean Square | F     | Sig.              |
|-------|------------|----------------|----|-------------|-------|-------------------|
| 1     | Regression | 1950.832       | 1  | 1950.832    | 6.878 | .012 <sup>a</sup> |
|       | Residual   | 13897.168      | 49 | 283.616     |       |                   |
|       | Total      | 15848.000      | 50 |             |       |                   |

- a. Predictors: (Constant), Education level by 2 categories  
b. Dependent Variable: Cloze traditional

#### Coefficients<sup>a</sup>

| Model |                                 | Unstandardized Coefficients |            | Standardized Coefficients | t      | Sig. |
|-------|---------------------------------|-----------------------------|------------|---------------------------|--------|------|
|       |                                 | B                           | Std. Error | Beta                      |        |      |
| 1     | (Constant)                      | 56.300                      | 3.766      |                           | 14.951 | .000 |
|       | Education level by 2 categories | 12.668                      | 4.830      | .351                      | 2.623  | .012 |

- a. Dependent Variable: Cloze traditional

#### Coefficients<sup>a</sup>

| Model |                                 | 95.0% Confidence Interval for B |             |
|-------|---------------------------------|---------------------------------|-------------|
|       |                                 | Lower Bound                     | Upper Bound |
| 1     | (Constant)                      | 48.732                          | 63.868      |
|       | Education level by 2 categories | 2.961                           | 22.374      |

- a. Dependent Variable: Cloze traditional



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