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A Comparison of Health Information Seeking Behaviors and Attitudes of Immigrant US Residents and Native Born US Residents: Adults with Personal or Familial Experience with Cancer.

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Abstract

Background: There is insufficient research about the health information seeking, access, and usage among immigrants to the United States, who, face health disparities associated with their immigrant status. Health-information seeking behaviors and attitudes, unique to immigrants, need to be considered as one set of factors contributing to health disparities.

Objective: This thesis focused on identifying differences in information seeking behaviors and attitudes between natal and immigrant US residents and the subset who had either themselves had been diagnosed with cancer or who had a family member diagnosed with cancer.

Methods/Analyses: Nationally representative Health Information National Trends Survey (HINTS) data (HINTS4Cycle 3), collected from a sample of respondents (N=3185) by mail between September and December 2013, was used for these analyses. Sample weights were applied during SAS data analysis to account for the complex survey design. Analyses assessed the frequencies of health information seeking behaviors and attitudes of natal versus immigrant US residents.

Results: Both natal and immigrant US residents indicated that the Internet was the most popular choice for seeking health or medical information (69.9% and 69.8%, respectively), with the next highest being doctor, healthcare provider, or cancer organization combined (14.3% and 17.1%, respectively). These differences in use of information sources were not significant. Both natal and immigrant US residents “strongly agreed” or “agreed” that they were frustrated (68.1% and 65.8%, respectively) and were concerned about the quality of the information (52.9% and 54.8%, respectively) during the last time they searched for health information. Again, these differences in attitudes toward information were not significant.

On the other hand, compared to natal US residents, immigrant US residents were more likely to state that their most recent search took a lot of effort (35.2% and 46.1%, respectively, $p=.01$). There were also moderate and significant differences between natal and immigrant respondents’ trust toward information from government health agencies (69.3% and 81.3%, respectively, $p<.01$), charities (45.6% & 53.1%, respectively, $p=0.01$), and religious organizations (30.9% & 44.1%, respectively, $p<.01$). Compared to natal US residents, higher percentages of immigrant US residents trusted health or medical information from national television (60.6% and 43.2%, $p<.01$), local television (48.8% and 39.0%, $p=.02$), and radio (39.1% and 24.8%, $p<.01$).

About one-third (30.2%) of immigrant US residents reported that they spoke English “not well” or “not well at all.” Among the immigrant US residents, the Internet was the source most commonly chosen by both groups (Speak English “very well,” or “well” and speak English “not well” or “not at all”) as the source they went to first during their most recent search for health or medical information (78.1% and 45.8%, respectively, $p<.01$). Among the immigrant US residents, both those in the less fluent group and those who stated that they were fluent in speaking English, the Internet was reported as the fourth most trusted source for health and medical information (16.6% and 15.7%, $p=0.9$). The top three most trusted sources were the

same for both groups “doctor (66.4% and 52.2%, $p=0.8$),” “government health agency (37.9 and 29.5, $p=0.4$),” and “medical magazines and newsletters (27.0% and 22.3%, $p= 0.6$). Although stated as the second most common choice for both groups, healthcare provider or cancer organization was approximately three times as common among those who spoke less English (32.9% and 12.1%, $p<.01$) compared to those who were more fluent in speaking English.

Conclusions: There are important differences between Internet-related health information seeking behaviors and attitudes of natal US residents and immigrant US residents.

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1 INTRODUCTION

1.1 Background

Chronic diseases, now a leading health concern in the United States, affect people of all ages, and are more prevalent and costly than any other health issue (Centers for Disease Control and Prevention [CDC], 2009). Evidence suggests that a comprehensive approach is needed to address chronic diseases in the US (CDC, 2009). This type of approach is recommended in the World Health Organization’s Integrated Chronic Disease Prevention and Control Program (ICP) and in the public health approach of the CDC. These programs include, among others, strategies to raise community awareness, implement community-based programs, and encourage the dissemination of knowledge, experiences, and best practices (WHO, 2015; CDC, 2013).

A key tenet of the Principles of the Ethical Practice of Public Health states, “Public health should advocate and work for the empowerment of disenfranchised community members, aiming to ensure that the basic resources and conditions necessary for health are accessible to all” (Public Health Leadership Society, 2002, p. 4). Public health practitioners should consider its tacit work to identify specific disenfranchised groups, and seek to understand and address, at the most fundamental level, the factors that contribute to disparities. To understand some aspects of disenfranchisement, some practitioners have focused on health information-seeking behavior (HISB)—how individuals acquire health-related information (Lambert & Loiselle, 2007). HISB has been important in studying coping mechanisms, health decision making, changing health-related behaviors, and behavior prevention (Lambert & Loiselle, 2007). The

goal of understanding HISB is to optimize the design and effectiveness of health intervention programs.

Information sources (channels) used by individuals is one domain highlighted within the HISB literature. Over time, an increasing number of people have been seeking health information by way of the Internet (Cline & Haynes, 2001). The Internet provides the benefits of convenience, anonymity, and interactivity, and is generally accepted as a source offering access to, and a medium for sharing, a wide variety of health-related information. Furthermore, prior research has shown a positive correlation between the use of the Internet for health information and change in health-related behaviors of chronically ill persons (e.g. Ayers & Kronenfeld, 2007). Also, compared to younger adults, there is higher than expected use of the Internet among older adult; this level of Internet usage is attributed to the need for information, due to the prevalence of chronic disease among older adults (Roblin, Houston, Allison, Joski, & Becker, 2009).

This increasing importance of the Internet in health information seeking is a topic that should be of great significance to public health practitioners dealing with chronic disease. Understanding the details of who uses the Internet, under what conditions, why, and how this and other information sources are used, provides insight that can inform the design of interventions and health promotion programs. Despite the increased use of the Internet, however, some population groups, because of their demographic makeup, remain disadvantaged in terms of access to, and usage of, information and communication technologies (Lorence, Park, & Fox, 2006). This phenomenon—the Digital Divide—affects marginalized groups, even within the United States (Wyatt, 2005). The groups most affected by

the Digital Divide include people within the lower socio-economic strata, unemployed, women, the elderly, ethnic minorities, persons with limited formal education, and immigrants (Changrani & Gany, 2005; Kreps, 2005; Watt, Henwood, Hart, & Smith, 2005). This inequity is addressed in the health communication and health information technology goal of *Healthy People 2020* as: to “use health communication strategies and health information technologies (IT) to improve population health outcomes and health care quality, and to achieve health equity” (US Department of Health and Human Services, 2015). Some objectives that have been set toward achieving this goal include (a) “increasing internet and mobile access,” (b) “providing new opportunities to connect with culturally diverse and hard to reach populations,” and (c) “delivering accurate, accessible, and actionable health information that is targeted or tailored” (US Department of Health and Human Services, 2015).

1.2. This study

In general, there is insufficient evidence about health information access and usage within disenfranchised groups (Kreps, 2005). These groups are usually characterized by low income, less education, and being a member of ethnic minorities (Kreps, 2005). This thesis focuses on one group affected by disparities associated with the Digital Divide—immigrant US residents. In 2013, immigrants constituted 13% of the total US population, up from 6% in 1980. (Migration Policy Institute [MPI] / U. S. Census Bureau, 2012, 2011, 2010 / American Community Survey [ACS] 1970, 1990, 2000 Decennial Census Data). This increase underscores the importance of focusing on immigrants to help address relevant health disparities. Although their health tends to be better than that of their US counterparts when they immigrate here, this initially favorable health difference changes significantly and worsens as their length of stay

in the US increases (Fennelly, 2006). Further, their health declines to the point of being poorer than those with whom they compared favorably when they first arrived in the US. This is, in part, because they seem to be more likely to develop chronic diseases such as cancer (Kreps & Sparks, 2008). One way to help reduce this disparity is to provide access to culturally relevant health-related information via the Internet for immigrant US residents. However, there is also a Digital Divide—a scarcity of culturally relevant content on the Internet (Changrani & Gany, 2005). This Digital Divide can be addressed by ascertaining which groups are using the Internet (compared to other sources of health-information), the usage patterns, and possible barriers to Internet use. A better understanding of the Digital Divide between immigrants and native-born residents can provide valuable information that can allow public health practitioners to produce health information that is meaningful to immigrant sub-groups.

A search for work in this area was conducted via Medline, Pubmed, and PsycInfo using the search words “health information seeking” AND “immigrants” AND “Internet.” This search yielded five studies, three of which were specific to Hispanic/Latino immigrants. This study is designed to fill the gap of a lack of research on health information seeking behaviors of immigrants in the United States. Data for this thesis was obtained from the Health Information National Trends Survey (HINTS), a nationally representative data set about the use of cancer-related information in the US. The survey provides data to compare immigrants (immigrant US residents) and US born residents in terms of cancer diagnosis and use of the Internet and other sources of health-related information. Given the growth in the immigrant population in the US, the higher likelihood that, compared to natal residents, immigrant residents live with chronic illness (Kreps & Sparks, 2008), and the role of the Internet in the dissemination and acquisition

of health-related information, it is crucial for public health practitioners to garner information that helps in understanding the HISB of immigrants.

In this thesis, I review the literature on: (a) Immigrant US population; (b) Acculturation and immigrant health; (c) Health information seeking behaviors (HISB); (d) Internet – benefits and barriers to use; (e) Digital Divide, health, and Internet use; (f) Implications for policy and practice. Following the literature review, is a description of the methodology, including the design of the HINTS from which data were drawn for this study, and the data analyses used to facilitate comparisons, between natal and immigrant US residents and, with other relevant studies within extant literature. The results and discussion are then presented.

Information from a comparison of health information behaviors and attitudes between immigrant and natal US residents can be used for improving health policy and practice management. One use is to inform channel decisions to maximize "reach". Reach is a marketing term used to quantify the number of people exposed to the messages sent by the marketer (Assael, 2004). Reach, therefore, ultimately affects the dissemination of health information. Another use is to promote access to, and understanding of health-related information from, and about, immigrants. Having a better understanding of how the Internet and other sources are used, and the experiences and challenges immigrants face in relation to health information seeking can help in the design and placement of more relevant health messages. These two factors have obvious implications for (a) the effectiveness and efficiency of health programs designed to address chronic illness, (b) costs associated with healthcare delivery, (c) morbidity, mortality, and long-term quality of life for immigrants to the US, and (d) indirect economic

effects on the communities in which immigrants reside, and, to a lesser extent, the general economy of the United states.

2. LITERATURE REVIEW

2.1 Immigrant US population

There has been consistent growth in the number of immigrant residents within the US in the last three decades. In 1980, there were approximately 14 million immigrants resident in the US, but by 2013, there were approximately 40 million (MPI / U. S. Census Bureau, 2012, 2011, 2010/ ACS 1970, 1990, 2000 Decennial Census Data). One immigrant (net) is added to the US population every 33 seconds (US Census Bureau, 2015). Projections indicate that the number of immigrant residents will increase by 26% within the next decade (by 2025), and more than 67% by 2050 (US Census Bureau, 2014).

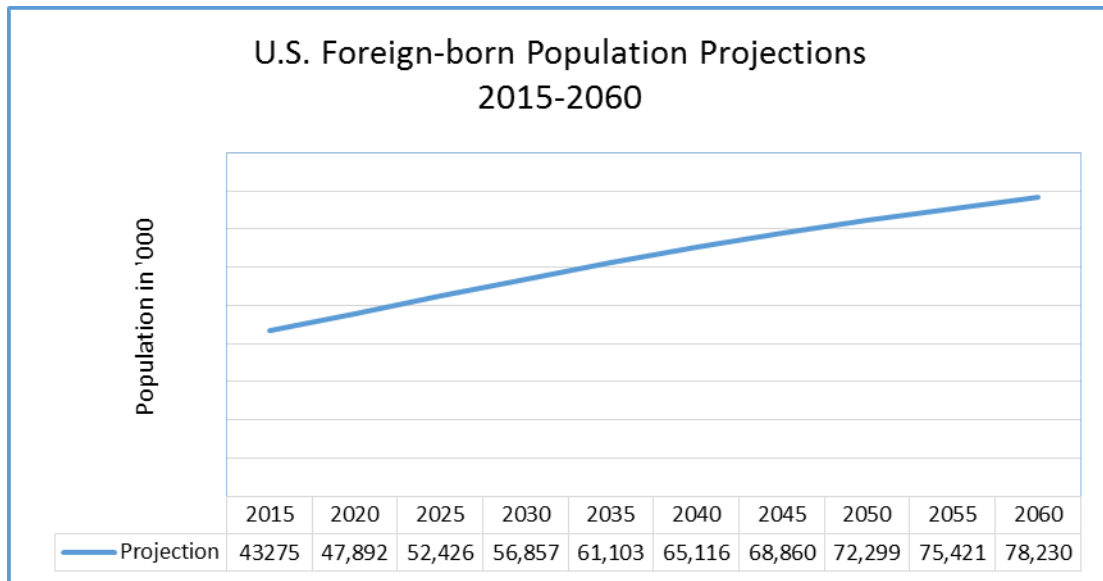


Figure 2-1 Projections of Foreign-Born Population for the United States: 2015 to 2060;
Source: US Census Bureau, Population Division, 2014.

The current immigrant segment of the population is significant, not only in terms of size, but it also compares unfavorably with natal US residents on characteristics that are important to public health. In 2010, members of the immigrant group were less likely to have health insurance coverage and to have graduated from high school; they were also more likely to live

in poverty, to have given birth in the previous 12 months, and to live in larger multigenerational households with more children under 18 (Grieco et al., 2012). Many of these characteristics are directly or indirectly attributable to acculturation.

2.2 Acculturation and immigrant health

Acculturation is the process by which cultural behaviors change because of consistent interaction between groups of people from different cultures; this is usually found in minority/ethnic groups, which adopt beliefs, language, and behaviors of the host group (Redfield, Linton, & Herskovits, 1936; Satia-Abouta, Patterson, Neuhouser, & Elder, 2002). Understanding acculturation is important because it provides explanations of how and why the health of immigrant US residents tends to deteriorate over time, despite evidence that when they arrive in the host country they tend to be in better health than their natal US counterparts in that country. This phenomenon—the healthy migrant phenomenon—refers to the finding that the individuals who immigrate are usually those that are in good health (Fennelly, 2006). They are usually found to fare initially better than their US-born counterparts on measures of chronic health, mortality, and health risk factors (Fennelly, 2006). Afterwards, however, factors intervene to create a gap between immigrant and natal residents.

A number of factors may help to explain a decline in immigrants' health. These include higher educational attainment (they are likely to be among the more highly educated in their country of origin), employment outside the home, language fluency, disparities in access to health care, and health-risks associated with poverty (Fennelly, 2006; Satia-Abouta et al., 2002). High education, employment outside the home, and language fluency result in greater exposure to the local culture and can facilitate ready learning about the culture. Language

fluency also enables immigrants to interact with other residents and thus to be assimilated into the culture and environment more easily than others who may have a language barrier.

Immigrants gain increased exposure to the host culture via friends, acquaintances, and the media. Invariably, immigrants work outside the home, thus gaining additional exposure to the local culture via interaction with natal and other US residents. Working outside the home also reduces the amount of time for preparing food at home and maintaining an active lifestyle. Access to fast foods and other convenient food alternatives contribute to increased health risks.

Greater acculturation has been associated with chronic illness in the US. For example, in their systematic review of acculturation literature, Delevari, Sonderlund, Swinburn, Mellor, and Renzaho (2013) found that greater acculturation was often associated with higher than lower body mass index (BMI). Specifically, the association with prevalence of obesity starts after 10 years of living in the US, and begins to approach the levels of natal residents (Goel, McCarthy, Phillips, & Wee, 2004) This was attributed to diminished “Healthy Immigrant Effect” caused by unhealthy nutritional changes resulting from being exposed more and more to promotions in the host country (Delevari et al., 2013). Higher BMI is of importance because obesity has been found to be associated with increased risk of various chronic diseases and cancers, such as esophageal, pancreatic, colorectal, breast, kidney, thyroid, and gallbladder (National Cancer Institute [NCI], 2012).

Duration of stay in the US also affects the prevalence of cancers in general among immigrants. Studies that utilized data from Surveillance, Epidemiology, and End Results (SEER), and cancer registries from the US and other countries between 1975 and 2003 have been consistent in cancer incidence conclusions that were drawn. These studies report that the

incidence patterns of cancer among first generation immigrants were very similar to those of their country of origin but for subsequent generations these patterns were similar to those in the host country. This was particularly so for cancers related to hormones and diet, such as breast and colorectal malignancies (SEER, 2003). There is also an association between BMI and cancer (National Cancer Institute (NCI), 2012). Other factors, such as perceived medical discrimination, have also been associated with screening behaviors, which, in turn are associated with cancer incidence and mortality rates (Crawley, Ahn, & Ainkleby, 2008).

These adverse health-related associations with acculturation and immigrant status underscore the importance of understanding health information seeking behaviors and attitudes of immigrant US residents. Doing so can help strategize channel decisions for dissemination and retrieval of health-related information thus, potentially ameliorating the acculturation-related natural progression toward poorer health status.

2.3 Health Information seeking behaviors (HISB)

Health information seeking behavior can be classified according to why seekers are motivated to find health information. These reasons include interest in behavior change and prevention, medical decision making involvement, and coping (Lambert & Loiselle, 2007). The study of health information seeking has been applied mostly to the concept of coping with illness but is applied to many other areas of health (Lambert & Louiselle, 2007).

The Internet is often used for seeking health information, and may be used to improve health-related decision-making (Warren, Kvansey, Hecht, Ahluwalia, & Okuyemi, 2010). Health-related information accessed through the Internet can also bridge language and financial barriers as a source of information for self-diagnosis and treatment and service options (Kim &

Yoon, 2011). For example, the internet can provide (a) information in the natal language of immigrants, (b) translation help, and (c) recommendations for finding health service providers who speak the desired language (Kim & Yoon, 2012). Pursuing knowledge about health information seeking behaviors, including the sources of choice, enhance one's understanding of these behaviors (Lambert & Loiselle, 2007).

2.4 The Internet – benefits and barriers to use

Television and other media sources play important roles in the dissemination of health information but the Internet offers an alternative to these other sources (Cotten & Gupta, 2004). Advent of the Internet and subsequent advances in technology have significantly impacted the way the average person communicates. Health information can be accessed online via websites, email, listservs, instant messaging (IM), online support groups, and chat rooms (Cotton & Gupta, 2004). Focusing on the Internet as a channel of communication is important to public health professionals because of the implications associated with the multiplicity of users and usages (Cline & Haynes, 2001). A 2013 Pew study indicated that 59% of US adults had looked online for information in the past year (Pew Research Center, 2015).

Internet Advantages. There are many advantages to communicating through Internet connectivity, now commonly referred to as computer-mediated communication (CMC). Many of these advantages differentiate the Internet from other sources, such as television, radio, and newspapers (Cotton & Gupta, 2004). Some of the advantages provided by this mode of communication include anonymity (not having to disclose one's identity when seeking sensitive health related information), convenience (being able to access information at any time and anywhere), and flexibility— in terms of audience size, immediate and delayed activity,

synchronous and asynchronous communication, and physical space from the other party, when desired. In addition to these advantages, communication can also be tailored to the cultural preferences of a user by adapting text, sound, color, movement, diagrams, etc. (Pearson, 2010).

Some of these and other advantageous CMC features, such as interactivity and aiding widespread access to information, form the bases for recommendations for public health practitioners to use the Internet. The Internet can be used to provide information to members of the public, to access information from the public, and for administering interventions. The interactivity feature of the Internet enhances the potential for tailoring messages (Cline & Haynes, 2001). Furthermore, because the Internet can be used for interpersonal interaction it can be helpful in encouraging behavior change (Cline & Haynes, 2001). Seeking information from Internet users and then using that information for programming customized audiovisual responses is a means of replicating interpersonal communication, thus facilitating persuasion through these customized messages (Cassell, Jackson, & Chevront, 1998).

Many of the attributes of Internet-facilitated communication are advantageous for managing health-related interventions. Some reasons that have been noted for use of the Internet in intervention delivery include convenience for users, cost, timeliness in disseminating information, stigma reduction (attributable to the anonymity feature), better control of interventions, providing access to hard-to-reach groups, and immediacy of feedback (Cassell et al., 1998; Griffith et al., 2006). Convenience-related benefits include effort-reduction on the part of users and reduction of transportation-related time and costs (Griffith, 2006). Groups may be hard-to-reach, not just because of geographic reasons, but also because of other circumstances, which may or may not be health related – for example, mobility problems or

lack of access to child care, which can make it difficult for caregivers or mothers to attend in-person intervention sessions (Griffiths, Lindenmeyer, Powell, Lowe, & Thorogood, 2006).

The Internet is a viable option for preserving anonymity and is a quick source of information when time is of the essence (Griffith et al., 2006). The anonymity that accompanies Internet usage enables stigmatized individuals to search for information without having face-to-face contact with others by whom they feel they may be judged (Cline & Haynes, 2001), provides confidentiality, and permits users to ask sensitive questions without fear of scrutiny (Cotton & Gupta, 2004). These advantages position the Internet as an attractive health information channel for both the general public—seeking support and health information—and for health professionals—gathering information (e.g. from postings) and intervention delivery.

Barriers to Internet use. The Internet is important in providing information and encouragement to help individuals take an active role in their own health care. For this reason, it is important that public health practitioners be aware of, not just the advantages of Internet use, but also the barriers that may preclude access to helpful health-related resources. These barriers should be taken into consideration when making decisions regarding the design of health message (Clayman, Manganello, Viswanath, Hesse, & Arora, 2010). Despite the advantages associated with privacy, confidentiality, and other features of the Internet, some of these characteristics also present concerns for online health information seekers, in general (Bernhardt, Lariscy, Parrott, Silk, & Felter, 2002). Barriers to accessing health information via the Internet can be attributed to factors that limit access to the Internet or factors that limit the usability of Internet-information. Factors that limit access include socio-economic status and education (Warren et al., 2010). Disproportionate access also exists among members of cultural

minorities, compared to other members of population (Warren et al., 2010). As noted above, compared to the general population, members of minority populations (such as immigrants) are disproportionately affected by factors that lead to poorer health status.

On the other hand, usability is affected by factors such as culture and language fluency (Cline, 2001; Peña-Purcell, 2008). Culture and language issues can lead to other barriers related to previous experience of the source, the relevance of the information, and credibility of the source (Calnan & Williams, 1996; Schneider & Laurion, 1993; Gore & Madhavan, 1993, as per Gray, Klein, Noyce, Sesselberg, & Cantrill, 2005). Culture affects the interpretation and use of information (Peña-Purcell, 2008). Previous studies have also indicated that there is a high level of uncertainty relative to the trustworthiness of health information accessed via the Internet (Bernhardt et al., 2002). As an example, assessments regarding privacy and confidentiality can pose barriers to Internet use when users become concerned that their information may not be secure from hackers or the government (Bernhardt et al., 2002). Even for those who do have access to the Internet, there are disparities related to its use by minority populations (Warren, Kvasny, Burgess, Ahluwalia, & Okuyemi, 2010). For example, culture and socioeconomic status can affect the usefulness of available health information.

Whereas culture can affect attitude toward health information, language fluency affects the ability to read, comprehend, and appropriately use available health information (Cline, 2001). Also, there is an association between socioeconomic status (e.g. education, income) and eHealth literacy—understanding how and where to seek, evaluate, and utilize health information obtained through electronic sources for the purpose of solving health problems;

ultimately, this association limits the use of Internet resources by low eHealth individuals (Neter & Brainin, 2012).

2.5 Digital Divide, health, and Internet use

The Digital Divide—gap in access to digital information due to demographic characteristics or socioeconomic circumstances—is well documented (e.g. Hsu, 2005; Lorence, Park, & Fox, 2006; Wyatt, 2005). The phenomenon persists, despite programs (e.g. the Racial and Ethnic Approaches to Community Health 2010—REACH 2010; The Universal Program) to address the disparities associated with lack of access to digital information (Lorence, Park, & Fox, 2006). The Race and Recession Survey, conducted through the Washington Post/Kaiser/Harvard University Survey Project partnership found that, compared to persons who earned \$40,000 or more annually, fewer persons (74% versus 97%) who earned less than \$40,000 per year had a computer at home. The same study found that 86% of those who earned at least \$40,000 per year and 56% who earned less per year had high-speed Internet connection. Furthermore, 73% of those in the higher income bracket, compared to 45% of those in the lower income bracket (earning less than \$40,000/annum) said they ever used the Internet to access health information (Henry J. Kaiser Family Foundation, 2011).

Demographic characteristics and socioeconomic circumstances of persons adversely affected by the Digital Divide are similar to those of persons adversely affected by other factors associated with health disparities (Kreps, 2005). These characteristics, which include low income, less education, and being a member of ethnic minorities preclude segments of the population from access to, and use of, online health information (Kreps, 2005). This preclusion perpetuates the Digital Divide.

Members of low income, less education, and minority segments of the population are often vulnerable to, among other illnesses, higher rates of cancer incidence and poorer survival rates, due to lack of information and late diagnosis (Haynes & Smedley, 1999). Compared to natal US residents, immigrants globally (and specifically in the US), are more at risk for cancer-related morbidities and mortality (Kreps & Sparks, 2008). In general, immigrants are among the least financially secure and least educated within the population of the United States (Kreps, 2008).

The different age distributions of immigrant and natal US residents have implications for differing rates and types of Internet use. In general, younger adults, compared to older adults, are more likely to use the Internet. Since immigrant populations tend to be younger, this could serve to reduce the current divide. In this regard, there seems to be a diminishing Divide between social media natal and immigrant US residents (Pew Research Center, 2015). Immigrant US residents' level of trust also affects the Digital Divide. Hispanics, the fastest growing minority segment in the US, serves as an example here. This segment represents more than half of the growth in the US population since 2000 (Pew Research Center, 2008). Hispanics indicate fear regarding the quality of health information that is available on the Internet (Pew Research Center, 2008).

In summary, immigrants tend to be younger and therefore more tech savvy, thus conceptually contributing to a reduction in the Digital Divide between immigrant and natal residents. However, research indicates that other factors associated with immigrant populations in general, such as lower, socioeconomic status, and negative assessments of health information obtained from the Internet serve to maintain a Digital Divide. Reducing the

Digital Divide, and ultimately, the disparities regarding access to, and utility of, health information for minorities will require addressing these factors, including the negative assessments such as trust (Peña-Purcell, 2008).

2.6 Implications for policy and practice

Understanding CMC, the Digital Divide, and the effect of acculturation on HISB can inform public health practitioners in the design of differentiated and helpful health-related programs. Acknowledging that target group characteristics differ across contexts and usage patterns can further clarify behaviors and provide information for designing strategic health messaging. This thesis explores behaviors of immigrants to identify how they are different from those of US born residents and discusses the implications of these differences in public health. One of the implications of the lower socioeconomic status is access to health care through the newly implemented Affordable Care Act (ACA). Information related to finding coverage options are available through a website—healthcare.gov. Lower income families without Internet access, or those who, because of their educational levels or other factors, may not be able to understand the information presented are therefore at a disadvantage, despite the new options for coverage among the uninsured (Henry J. Kaiser Family Foundation, 2011).

3. METHODOLOGY

This chapter provides details about the data and analytical methods used for this study. This study is based on the Health Information National Trends Survey (HINTS), developed by the Health Communication and Informatics Research Branch (HCIRB) of the Division of Cancer Control and Population Sciences (DCCPS). HINTS is comprised of data that is nationally representative of the use of cancer related information in the United States. For this thesis, I utilized HINTS, 4 Cycle 3.

3.1 Sampling

Sampling was carried out through a two-stage design, which utilized a sampling frame of residential addresses, from which a stratified sample was selected. Stratification included minority sub-populations. Detailed descriptions of the sampling and data management methods are described elsewhere (HINTS4Cycle3 Methodology Report at <http://hints.cancer.gov/hints4.aspx>).

Data were collected between September 6, 2013 and December 30, 2013. One respondent, pre-determined as the adult with the next upcoming birthday, was selected per household to complete the questionnaire. Spanish-speaking households were over-sampled. Of the 12,010 questionnaires that were mailed out, 3,231 were received, and 3,185 were coded as eligible. Of the 46 ineligible questionnaires, 40 were incomplete and 6 were duplicates.

Each respondent was assigned a full-sample weight—used to calculate population and subpopulation estimates from the HINTS data—and a set of 50 replicate weights—calculated using the delete one jackknife (JK1) method. Implementing the JK1 procedure produces

unbiased estimates of sampling variance. The sampling weight variable and the 50 replicate weight variables were used in analyzing the data for this thesis.

3.2 Data description and measures

The HINTS study provided data on demographic and other variables such as nativity (US and non-US born immigrant status), and level of fluency in speaking English. The survey also provided data on health communication seeking behaviors and attitudes, experiences in searching for health information from various media (e.g., radio, newspaper, Internet), and cancer history.

Health information seeking.

Respondents were given yes/no answer options for the question about whether they had ever looked for health or medical information from a number of sources such as family, friends, coworkers, Internet, newspapers, books, healthcare worker, and cancer organization. Those who responded in the affirmative were asked questions about the last time they sought health information. For example, they were asked to give verbatim responses to indicate where they looked initially on the most recent occasion that they sought information about health or medical topics.

Challenges.

Respondents were also asked to rate the level of challenges they experienced in attempting to get health information. Respondents were asked to rate, on a 4-point Likert scale (from “strongly agree” to “strongly disagree”), statements about effort, frustration, quality concerns, and difficulty in understanding, relative to health information seeking attempts.

Trust

Respondents rated trust in the health and medical information that they received from various sources. A 4-point Likert scale (“a lot” to “not at all”) was also used to capture respondents’ level of trust. Sources included doctor, family, radio, newspapers, Internet, etc.

Cancer Diagnosis

To identify respondents who had been exposed to dealing with cancer, HINTS included two questions about diagnosis history. Respondents were asked whether they had been diagnosed and whether a family member had received a cancer diagnosis. The binary response options to both questions were “yes” and “no.”

Sociodemographic characteristics

Some of the groupings provided by HINTS for sociodemographic characteristics were used as presented, while others were recoded. Those used in this present analyses included: education (up to high school completion, vocational and some college, college graduate or post-grad); household income (US\$0-34,999, 35,000-49,999, 50,000-74,999, 75,000-99,999, 100,000 and above); occupational status (employed, unemployed, homemaker/student/retired, other); age group (18-25, 26-35, 36-45, 46-65, >65); marital status (married/ living as married, divorced/ widowed/ separated, single/never married).

3.3 Data analyses

Sampling and replicate weights were used in all analyses. Missing data were excluded from analyses. A series of frequencies were run to compare natal and immigrant residents. Tables report the actual sample size, while percentages are based on weighted data. Chi square statistics were used to identify any difference between natal and foreign born residents in

terms of (a) demographic characteristics, (b) health information seeking behaviors, (c) health information seeking challenges, (b) trust of various health information sources, and (e) cancer diagnosis for self or family member. Chi square statistics were also used to identify group differences based on English fluency within immigrant residents. Data analyses were done using SAS 9.4 (SAS Institute, Cary, NC) and executed on the W32-7PRO platform.

4. RESULTS

4.1 Sample characteristics

Table 4.0.1 Weighted estimates and sample frequencies for socio-demographic characteristics and nativity

		Natal US Residents		Immigrant US Residents		p-value (based on weighted data)
		Weighted %	Sample N	Weighted %	Sample N	
GENDER	Male	48.4	926	52.5	206	0.31
	Female	51.6	1461	47.5	287	
AGE GROUP	18-25	27.2	348	27.2	78	<0.0001
	26-35	28.1	533	42.6	177	
	36-45	26.0	907	20.4	161	
	46-65	10.0	449	6.2	65	
	Over 65	8.6	318	3.7	42	
EDUCATION	High School or Less	32.9	795	40.2	201	<0.0001
	Vocational/Some College	35.6	811	17.1	120	
	College or Postgrad	31.5	961	42.7	205	
HOUSEHOLD INCOME	\$(0 – 34,999)	33.6	861	39.5	229	0.36
	\$(35,000 – 49,999)	14.3	324	16.8	69	
	\$(50,000 – 74,999)	18.5	383	13.8	61	
	\$(75,000 – 99,999)	14.2	276	10.8	57	
	\$100,000 & above	19.4	410	19.2	57	
OCCUPATION	Employed	80.5	1299	76.3	282	0.40
	Homemaker/Student/ Retired/Disabled	8.4	139	12.4	53	
	Other	4.3	40	0.5	9	
	Unemployed	6.9	124	10.7	57	
MARITAL STATUS	Married/Living as Married	57.6	1280	64.6	313	0.16
	Divorced/Widowed/ Separated	17.6	820	12.8	135	
	Singe/Never Married	24.8	459	22.6	75	
SPEAK ENGLISH	Not Well or Not at All	0.4	14	30.2	163	<0.0001
	Well or very well	99.6	2501	69.8	368	
ANY CANCER (self or family)	Yes	79.9	1873	42.5	227	<0.0001
	No	20.1	482	57.5	210	

Table 4.1 shows the demographic characteristics of natal and immigrant sample subgroups. There were significant differences between the groups in terms of age distribution, education, how well they spoke English, and cancer diagnosis. Whereas the natal sample was

more evenly distributed among the age groups, approximately 43% of the immigrant group was in the 26-35 age group ($p < .01$). For education, approximately 36% of natal residents, compared to approximately 17% (weighted percentage) of immigrant reported that they had completed vocational or some college. However, a higher proportion of immigrant (42.7% versus 31.5%; $p < .01$) reported having completed college or postgraduate school. As expected, almost all natal stated that they spoke English “very well,” or “well,” compared to approximately 70% of immigrant residents ($P < .01$). The remaining 30% of immigrant residents reported that they spoke English “not well” or “not well at all.” Residents were asked whether they had ever been diagnosed as having cancer and whether any family members had been diagnosed with cancer. Approximately 80% of natal US residents indicated in the affirmative to either or both of these questions, compared to approximately 43% of immigrant US residents ($P < .01$).

4.2 Health information seeking

This remaining section of this chapter outlines results related to health-information seeking behaviors, challenges experienced, and trust of information by source. To get a clearer picture of factors that may have influenced the differences between natal and immigrant US residents, data were analyzed among all respondents, and since HINTS focuses on cancer-related information behaviors, among respondents with a cancer diagnosis personally or within their “family”. Within the immigrant group, data were analyzed by fluency in the English language—how well they spoke English. Fluency was recoded to represent two groups: spoke English “very well” or “well” and spoke English “not well” or “not at all.”

4.2.1 Where seek information

Respondents were asked whether they had ever looked for health or medical information and where they went initially the most recent time they looked for such information. There was a moderate and significant difference ($p=.01$) between natal and immigrant residents in terms of whether they had ever looked for health or medical information from any source. Approximately 80% of natal, compared to approximately 68% of immigrant US residents, stated that they had searched for health information.

Table 4.0.2 Where respondents looked initially during most recent search for health or medical information

	All respondents				Respondents with Cancer Experience				p-value (based on weighted data)
	Native US-Residents		Immigrant US-Residents		Native US-Residents		Immigrant US-Residents		
	%	N	%	N	%	N	%	N	
Books, Brochures, Library	8.8	191	8.2	31	8.8	141	9.0	17	0.54 (All) 0.9 (cancer)
Healthcare/ Cancer Org	14.3	327	17.1	76	14.4	243	15.6	34	
Family, Friend, Coworker	4.1	78	4.3	16	3.7	56	3.8	7	
Internet	70.0	1144	69.3	178	73.4	862	71.5	78	

All Respondents. **Table 4.2** displays frequencies of information sources by nativity. There was no difference in the proportions of either group regarding where they first sought health or medical information on the most recent occasioned that they looked. Both groups indicated that the Internet was the most popular choice (70.0% and 69.3%, $p=0.54$), with the next highest being healthcare provider or cancer organization (14.3% & 17.1%, natal and immigrant residents, respectively, $p=0.54$). Additionally, equal proportions of both groups indicated that, during their most recent search for health information, they also searched elsewhere ($p=0.7$).

Respondents with Experience of Cancer. **Table 4.2** displays frequencies of information sources by nativity for the subset of survey respondents who had either themselves or their family received a cancer diagnosis. There was no significant difference between natal and immigrant residents, in terms of where they first looked for health information during their most recent search ($p=0.9$). Among respondents who had a cancer diagnosis in their families), the Internet was reported by most people (both natal and immigrant US residents) as the initial source they utilized for seeking health or medical information during their most recent search (73.4%, 71.5%, natal vs. immigrant US residents, respectively, $p=0.9$).

Table 4.0.3 Where looked for health or medical information by English fluency

	Speak English very well or well		Speak English not well		p-value (based on weighted data)
	Weighted %	Sample N	Weighted %	Sample N	
Books, Brochures, Library	6.1	20	15.0	11	<.01
Healthcare/Cancer Org	12.1	44	32.9	32	
Family, Friend, Coworker	3.7	11	6.4	5	
Internet	78.1	146	45.8	31	

Immigrants' English Fluency. **Table 4.3** displays frequencies of information sources among immigrant US residents, classified by level of English fluency (speak English “very well” or “well” and speak English “not well” or “not at all”). Results were similar to those obtained for all respondents and those with experience of cancer. The Internet was the source both groups of immigrant US residents classified by English fluency went to initially during their most recent search for health or medical information (78.1% and 45.8%, respectively, $p<.01$). Although stated as the second most common choice for both groups, “healthcare provider or cancer organization” was three times as common among those who spoke less English (32.9% and 12.1%, $p=.01$) compared to those who were more fluent in speaking English.

4.2.2 Information search challenges

This section outlines the results of participants’ responses regarding their experience the most recent time they looked for health or medical topics.

Table 4.4 Challenges in seeking health and medical information during most recent search

		All respondents				Respondents with Cancer Experience				p-value (based on weighted data)
		Native US-Residents		Immigrant US-Residents		Native US-Residents		Immigrant US-Residents		
		%	N	%	N	%	N	%	N	
LOT OR EFFORT (to get info needed)	Strongly agree, agree	35.2	710	46.1	177	34.1	526	44.5	76	0.01 (All)
	Somewhat, strongly disagree	64.8	1321	53.9	181	65.9	984	55.5	85	0.1 (Can)
FRUSTRATED (during search)	Strongly agree, agree	31.9	666	34.2	118	32.0	500	34.3	53	0.6 (All)
	Somewhat disagree, dis	68.1	1357	65.8	221	68.0	1009	65.7	99	0.7 (Can)
QUALITY CONCERN	Strongly agree, agree	52.9	1022	54.8	201	51.8	756	56.4	92	0.7 (All)
	Somewhat disagree, dis	47.1	997	45.2	147	48.2	749	43.6	65	0.4 (Can)
HARD TO UNDERSTAND	Strongly agree, agree	25.8	520	34.4	130	25.2	374	37.3	60	0.1 (All)
	Somewhat disagree, dis	72.4	1496	65.6	212	74.8	1127	62.7	92	0.01 (Can)

All Respondents. **Table 4.4** displays frequencies of challenges in seeking information by nativity. There were significant differences between both groups regarding effort needed to get the information and difficulty in understanding the information. Compared to natal US residents, a higher percentage of immigrant US residents (35.2% & 46.1%, respectively, $p=0.01$) “strongly agreed” or “agreed” that the most recent search required a “lot of effort.” Likewise, a greater proportion of immigrant US residents (34.4% versus 25.8%, $p=0.1$) “strongly agreed” or “agreed” that the information was “hard to understand.” Most immigrant and natal US residents “strongly agreed,” or “agreed” that during the most recent search they felt

“frustrated” (68.1% and 65.8%, $p=0.6$) or were concerned with the quality of the information (47.1% & 45.2%, $p=0.7$).

Respondents with Experience of Cancer. **Table 4.4** displays frequencies of challenges in seeking information by nativity for the subset of survey respondents who had either themselves or their family received a cancer diagnosis. As was revealed in the analyses for the general natal and immigrant subgroups, above, there were significant differences between the natal US residents who had experienced a cancer diagnosis for themselves or their family and immigrant US residents who had experienced a cancer diagnosis for themselves or their family. Both of these natal and immigrant groups “strongly agreed” or “agreed” that the most recent search took “a lot of effort” (34.1% and 44.5%, respectively, $p=0.1$), and was “hard to understand” (25.2% and 37.3%, respectively, $p=0.01$). Unlike the results obtained in analyzing data on the general population, however, among those that had dealt with a cancer diagnosis, both the natal and immigrant US residents “strongly agreed” or “agreed” that “quality concern” was their biggest challenge (51.8% and 56.4% respectively, $p=0.04$). “Lot of effort” during search was the second biggest challenge (34.1% and 44.5, US and immigrant US residents, respectively, $p=0.1$).

Table 4.5 Challenges in seeking health or medical information during most recent search by English fluency

		Speak English very well or well		Speak English not well		p-value (based on weighted data)
		Weighted %	Sample N	Weighted %	Sample N	
LOT OR EFFORT (to get info needed)	Strongly agree, agree	44.6	121	50.8	55	0.5
	Somewhat, strongly disagree	55.4	143	49.2	38	
FRUSTRATED (during search)	Strongly agree, agree	33.8	88	35.8	30	0.8
	Somewhat disagree, dis	66.2	170	64.2	50	
QUALITY CONCERN	Strongly agree, agree	55.1	152	54.0	49	0.9
	Somewhat disagree, dis	44.9	113	46.0	33	
HARD TO UNDERSTAND	Strongly agree, agree	33.6	90	36.9	39	0.7
	Somewhat disagree, dis	66.4	169	63.1	43	

Immigrant English Fluency. **Table 4.5** displays frequencies of information sources among immigrant US residents, classified by level of English fluency (speak English “very well” or “well” and speak English “not well” or “not at all”). There were no significant differences between the English fluency groups in terms of their responses to the challenges—level of effort, frustration, quality concern, and difficulty in understanding—associated with the most recent time they looked for health or medical information. However, most of the respondents in both groups “strongly agreed” or “agreed” that “concern for quality” was a challenge (55.1% and 54%, $p=0.9$), followed by “lot of effort to get information needed” (44.6% and 50.8%, $p=0.5$).

4.2.3 Trust of health and medical information sources

Respondents were also asked how much, in general, they trusted health and medical information that they got from various sources.

All Respondents. **Table 4.6** displays frequencies of trust of medical and health information sources by nativity. Although there was little difference between the proportion of each group that trusted the Internet “a lot” or “some” (66.8% & 66.4%, $p=0.9$), there were group differences in terms of trust relative to the various sources. The Internet received the fourth

highest level of support for trust “a lot” or “some” (behind doctor, 92.7%, and government health agency, 81.3%, and health news from special health or medical magazines or newsletters, 75.6%) for immigrant residents, but fifth highest (behind doctor, 95.9%, health news, 74.3%, government, 69.3%, religious organizations, 69.1%) for natal residents. Comparing both groups, there was a small but significant difference in the level of trust (“a lot” or “some”) toward health or medical information from a doctor (92.7% vs. 95.9%, $p=.02$).

Table 4.6 Trust of health and medical information sources

		All Respondents				Respondents with Cancer Experience				p-value (based on weighted data)
		Native US-Residents		Immigrant US-Residents		Native US-Residents		Immigrant US-Residents		
		%	N	%	N	%	N	%	N	
DOCTOR	A lot, some	95.9	2549	92.7	464	96.8	1794	94.0	202	0.02 (All) 0.2 (Ca)
	Little not at all	4.1	109	7.3	49	3.2	65	6.0	18	
FAMILY & FRIENDS	A lot, some	62.3	1510	57.8	276	63.3	1108	46.2	107	0.3 (All) 0.01 (Ca)
	Little, not at all	37.7	1004	42.2	195	36.7	712	52.8	92	
GOVERNMENT HEALTH AGENCIES	A lot, Some	69.3	1739	81.3	367	70.9	1280	81.5	163	<.01 (All) 0.03 (Ca)
	Little, Not at all	30.7	741	18.7	101	29.1	513	18.4	39	
HEALTH NEWS	A lot, some	74.3	1791	75.6	331	75.8	1330	76.2	140	0.7 (All) 0.9 (Ca)
	Little, Not at all	24.7	700	24.4	140	24.3	475	23.8	61	
INTERNET	A lot, Some	66.8	1630	66.4	296	68.6	1222	69.0	128	0.9 (All) 0.9 (Ca)
	Little, not at all	33.2	827	33.6	173	31.4	556	31.0	74	
CHARITIES	A lot, Some	45.6	1147	53.1	239	45.1	841	42.0	102	.01 (All) 0.7(Ca)
	Little, not at all	54.4	1333	46.9	220	54.9	957	58.0	94	
RELIGIOUS GROUPS (and leaders)	A lot, Some	30.9	838	44.1	190	30.6	604	35.5	74	<.01 (All) 0.5 (Ca)
	Little, not at all	69.1	1659	55.9	277	69.4	1202	64.5	125	
RADIO	A lot, some	24.8	663	39.1	174	24.3	490	27.9	65	<.01 (All) 0.5 (Ca)
	Little, Not at all	75.2	1802	60.9	292	75.7	1296	72.1	133	
TRUST LOCAL TV	A lot, Some	39.0	1027	48.8	233	3.8	77	4.3	14	0.02 (All) 0.7 (Ca)
	Little, Not at all	61.0	1458	51.2	244	96.2	1721	95.7	193	
NATIONAL TV (national or cable news)	A lot, Some	43.2	1172	60.6	257	43.5	865	59.9	111	<.01 (All) 0.01 (Ca)
	Little, Not at all	56.8	1312	39.4	211	56.5	932	40.1	92	

There were also moderate and significant differences between natal and immigrant residents' trust toward information from government health agencies (69.3% and 81.3%, respectively, $p < .01$), charities (45.6% & 53.1%, respectively, $p = 0.01$), and religious organizations (30.9% & 44.1%, respectively, $p < .01$). There were even larger differences between the two groups. Compared to natal residents, immigrant residents more frequently trusted health or medical information from national television (60.6% and 43.2%, respectively, $p < .01$), local television (48.8% and 39.0%, respectively, $p = .02$), and radio (39.1% and 24.8%, respectively, $p < .01$).

Respondents with Experience of Cancer. **Table 4.6** displays frequencies of trust of medical and information sources by nativity for the subset of survey respondents who had either themselves or their family received a cancer diagnosis. Among those who had dealt with cancer, there was no significance between the proportion of natal US residents and immigrant US residents who trusted the Internet "a lot" or "some" (68.6% and 69.0%, respectively, $p = 0.9$). The Internet was fourth most-trusted by both groups. Both of these results were consistent with the results obtained for the general population (above). "Doctor" was the number one choice trusted "a lot" or "some," for both groups. There were differences in the next two top choices trusted "a lot" or "some." For natal residents, "health news" was second choice (78.8%), followed by "government health" agency sources (70.9%). For immigrant residents, the second most popular choice for trust "a lot" or "some" was "government health agencies," followed by "health news" from special health or medical magazines or newsletters (76.2%). Compared to the general population there were much fewer trust differences within the group of respondents who had experienced cancer. For his group, 43.5% of natal residents

trusted “national television,” compared to 59.9% of those that were immigrant residents (p=0.01). There were also significant differences between the proportion of natal and immigrant US residents who reported “a lot” or “some” trust in government sources (70.9% and 81.5%, respectively, p=0.03), and family and friends (63.3% and 46.2%, respectively, p=0.01).

Table 4.7 Trust of health and medical information sources by English fluency

		Speak English well or very well		Speak English Not well		p-value (based on weighted data)
		Weighted %	Sample N	Weighted %	Sample N	
DOCTOR	A lot, Some	94.9	335	87.5	127	0.01
	Little not at all	5.1	21	12.5	28	
GOVERNMENT HEALTH AGENCIES	A lot, Some	85.4	276	70.5	91	.004
	Little not at all	14.6	63	29.5	37	
HEALTH NEWS	A lot, Some	81.4	254	60.7	76	.004
	Little not at all	18.6	84	39.3	55	
INTERNET	A lot, Some	71.3	233	52.9	61	0.01
	Little not at all	28.7	107	47.1	66	
NATIONAL TV	A lot, Some	62.0	192	56.7	64	.05
	Little not at all	38.0	148	43.3	62	
FAMILY & FRIENDS	A lot, Some	58.6	210	55.8	65	0.7
	Little not at all	41.4	127	44.2	67	

Immigrants’ English fluency. **Table 4.7** displays frequencies of trust of medical and health information sources among immigrant US residents, classified by English fluency (speak English “very well” or “well” and speak English “not well” or “not at all”). There were several differences between the two fluency groups in terms of the level of trust for health and medical information sources. First, there were significant differences in the trust levels between the respondents of the more fluent and less fluent English-speaking groups with respect to health and medical information from multiple sources. These included: “a doctor” (94.9% and 87.5%, respectively, p=.01), “government health agencies” (85.4% and 70.5%, respectively, p=.004), “special health or medical magazines or newsletters” (81.4% and 60.7%, respectively, p=.004),

the “Internet” (71.3% and 52.9%, respectively, $p=.01$), and “national or cable television news programs” (62.0% and 57.6%, respectively, $p=.05$).

The Internet was reported as the fourth most trusted source (71.3%) for health and medical information for immigrant residents who but sixth most trusted (52.9%) among those who indicated less English fluency ($p=0.01$). The three most trusted sources were the same for both those who reported that they spoke English “very well” or “well” and those who reported less English fluency. They were “doctor” (94.9% and 87.5%, respectively, $p=.001$), “government health agency” (85.4% and 70.5%, respectively, $p=.004$), and “special health or medical news magazine or newsletter” (81.4% and 60.7%, respectively, $p=.004$).

5. DISCUSSION

This thesis focused on the health information seeking behaviors and attitudes of natal US residents and immigrant US residents in terms of sources searched, challenges associated with health information seeking, and trust of various sources. The primary objective was to compare sources of health information by nativity among all respondents and among those with cancer experience (either personal or familial). The first main difference was that a lower percentage (68% vs 80%, $p < .01$) of immigrant residents indicated that they had searched for health information. Another main finding of this thesis was that, for most (70.0% and 69.3%) respondents in both the natal US residents and immigrant US residents groups, the Internet was the initial source of choice during their most recent search for health or medical information.

The second objective was to compare information search challenges by nativity among all respondents and among those with cancer experience (either personal or familial). Among all respondents that had searched for health or medical information, a higher percentage of immigrant residents “strongly agreed” or “agreed” that during their most recent search, a lot of effort was needed to get health info (46.1% vs. 35.2%, $p = .01$) and was hard to understand (34.4% vs. 25.8%, $p = 0.1$). Also, among those who had, themselves, or their family, received a cancer diagnosis, there was a significant difference between the natal group and the immigrant group regarding the degree to which they “strongly agreed” or “agreed” that the information was “hard to understand” (25.2 vs. 37.3%, respectively, $p = .01$).

The third objective was to compare trust for various sources of health and medical information among all respondents and among those who experienced cancer (either personally or through family). The main finding in this respect was that immigrant residents were more trusting of government health agencies (81.3 vs. 69.3, $p < 0.01$), charities (53.1 vs. 45.6, $p = 0.01$) and religious organizations (44.1 vs. 30.9, $p < 0.01$) but less trusting of national and local television and radio. However, immigrant residents that had experienced cancer were more trusting of national television (59.9 vs. 43.5, $p = 0.01$) than natal residents.

A fourth objective of the study was to compare immigrant US residents by level of English fluency in terms of where they initially searched, and the challenges they experienced, during their most recent search for health or medical information, and trust of various sources of health or medical information. Thirty percent (30%) of immigrant US-residents indicated limited fluency in the English language. The internet was the initial source chosen by most respondents of both the group that indicated that they spoke English "very well" or "well" and those who indicated that they spoke English "not well" or "not at all." There was a significant difference between the more English-fluent and less English-fluent groups in terms of where they initially searched for health information (78.1 and 45.8 respectively; $p < 0.01$). There was no difference between the two groups in respect of the challenge regarding "level of effort," "frustration," "quality concern," and "difficulty in understanding." Compared to the less English-fluent immigrant US-residents, the immigrant US-residents who were more fluent in the English language reported greater trust of doctor, government health agencies, special health or medical magazines or newsletters, the Internet, and national or cable television news programs as sources of health information.

There were also other (secondary) findings related to nativity differences and within group differences for the immigrant US population (English-fluency). The Internet was rated fourth highest in terms of trust for the immigrant group, compared to fifth for natal residents, but was trusted by approximately the same proportion of respondents within both nativity groups (66.8% and 66.4%, $p=.09$). For cancer incidence, a much lower percentage of immigrant US residents indicated that they, or anyone in their family, had received a cancer diagnosis. There was also a difference in the age distribution - there was a higher percentage of immigrant residents in the younger age categories, compared to natal residents.

5.1 How findings are consistent with literature

The finding that compared to natal US residents, a lower proportion (67.6% vs. 79.5%) of immigrant US residents had ever looked for health information may be partially explained by factors that are consistent with the concept of a “Digital Divide”. Higher proportions of the immigrant group “strongly agreed” or “agreed” that their most recent health information seeking experience required a lot of effort and the information was hard to understand. Literature indicates that limited fluency, socioeconomic characteristics, such as low income and less education, and membership in minority groups that contribute to the Digital Divide can affect health information seeking (Cline 2001, Kreps, 2005; Warren et al., 2010).

Also, whereas the age distribution of the natal respondents was approximately evenly spread, for the immigrant group, close to half (43%) were between 26 and 35 years old. In fact, the proportion of this group that reported being in the younger age groups 18-25 and 26-35 totaled 69.9%, compared to 55.3% for natal respondents. Older people are usually the ones in

need of more health information because of the prevalence of chronic illness within that age group (Roblin et al., 2009).

Since cancer is related to age, and the immigrant group was younger, this may explain the fact that, compared to natal US respondents, a smaller percentage of immigrant residents (42.5% vs. 79.9%) reported that they, themselves, or a family member had received a cancer diagnosis. Although cancer is not the only reason one may need to seek health information, this difference could affect information seeking behaviors and the level of challenges one may face. For, example, since a cancer diagnosis is such a significant and stressful event in life, seeking information could become more challenging than during other less stressful times and thus, could affect the reported level of challenges in this study. Additionally, previous studies note a paradox between acculturation and immigrant health—despite better initial health status, immigrants' health tend to decline with length of stay in the US (Delevari, 2013). Access to, and use of, helpful health information via the Internet or other sources could offset some of the risk of this decline in health. Furthermore, increasing life expectancy is accompanied by increasing levels of chronic diseases associated with older ages. Thus, as immigrants age, their health-related information needs will increase. Some of the “Digital Divide” between immigrant and natal residents is spurious and may diminish with time as an increase in medical conditions such as cancer motivate health information seeking behavior. This does not mean, however, that challenges related to difficulty, trust, etc., will be resolved. In fact, these challenges could be exacerbated.

According to the Migration Policy Institute, about half of the immigrant population is classified as limited in English proficiency (MPI, 2013). For this current study, more than 30% of

immigrant residents reported that they either did not speak English well, or did not speak the language at all. This factor could affect whether respondents sought information, where they looked, and the search experience. Additionally, there were significant differences between the more fluent and less fluent immigrant subgroups in terms of their reports regarding the initial source they used to find health information during their most recent search. Although the Internet was the number one source of choice for both fluency groups, over 78% of the more fluent English-speaking immigrants (compared to 45.8% of less fluent, $p=.01$) reported that they sought information from the Internet. On the other hand, a higher percentage of the less English-fluent group (32.9% vs. 12.1%) stated that they sought information via healthcare or cancer organizations. Additionally, the Internet was the first source visited during respondents' most recent search for health information. This was also true for all groups—general natal and immigrant US residents, those who had experienced cancer in their lives, and immigrant respondents within both fluency groups. This underscores the importance of understanding HISB related to the Internet.

Concern about the quality of information obtained via the internet was the number one challenge noted by natal US residents and by immigrant US residents both those with high and low English fluency. “Lot of effort” to get information, which was reported as the second most challenging aspect of the most recent search for all three groups (natal US residents and both levels of English-fluency immigrant residents). Considering that the Internet was the number one choice of health information, the concern about the quality of information seems to be consistent with the finding that the Internet was reported as the fourth and fifth most trusted source by both natal and immigrant residents, respectively. Yet, it was the source visited

initially by all groups during their most recent search for health information. Convenient access and cost may be some factors that explain the choice, despite the challenges and trust level for respondents.

5.2 Implications for policy and practice

Immigrants are among those most in need of culturally relevant health information that include, but also, extend beyond just translations from one language to another. Identifying important characteristics of underserved groups, and understanding usage patterns, and user experiences, therefore, provides important bases for designing effective health information messages that will assist immigrant groups manage their health care (Kreps, 2005; Kreps & Sparks, 2008). There are a number of additional reasons for public health practitioners and policy makers to pay special attention to the immigrant US population in general, and the less fluent English-speaking groups in particular. First, based on analyses of the HINTS survey data used in this thesis, 30% of immigrant residents are not fluent in English. Second, the proportion of the immigrant sub-population, compared to the overall population of the US, is rising steadily (US Census Bureau, 2014). Projections suggest that this trend will continue for the next decade or more (US Census Bureau, 2014). Third, due to the effects of acculturation, the health of immigrants is expected to deteriorate over time. In addition, compared to their natal counterparts, they will fare worse in terms of chronic diseases and other health issues (Fennelly, 2006; Satia-About a et al. 2002). Fourth, members of ethnic minorities are disproportionately affected by the Digital Divide because of disparities associated with access to, or use of, online information (Kreps, 2005; Warren et al. 2010). Fifth, compared to the less fluent English-speaking sub-group, a much higher proportion of the more fluent English-

speaking immigrants (78.1% vs. 45.8%) indicated that the Internet was the first place they looked for health information during their most recent search.

Because of its advantages—flexibility, anonymity, interactivity, connectivity, etc.—the Internet is becoming increasingly important to public health professionals (Cassell, et al. 1998; Cline & Haynes, 2001; Pearson, 2010). Additionally, the Internet is being more widely used by government and other institutions to reach the public with health information. The Internet, therefore, provides an avenue for such institutions to reach immigrant populations who, in this study, compared to natal US residents were found to trust government and religious organizations more. Literature suggests that the use of the Internet can bridge language barriers and provide a source of information for the less fluent English speakers who, because of fears associated with their language limitations, may feel more comfortable remaining anonymous while accessing information (Kin & Yoon, 2012). The Internet is, therefore, an important channel for health information dissemination and retrieval. It can also be used as a cost-effective means of interpersonal communication and administering interventions (Cassell et al. 1998).

The Internet is also a source of information on, and access to, coverage under ACA. This is an especially significant factor to consider, given the immigrant minority disparities that have been discussed. To maximize the potential of the Internet, however, practitioners must acknowledge the inherent challenges associated with limited language fluency and other socio-economic factors that put this segment of the population at disproportionate risk. Additionally, given the expected growth in the immigrant population (due to increased immigration) and the extended life expectancy that is forecasted for humanity in general (NIH/national Institute of

Aging, 2015), practitioners must design and implement strategic plans to address the attendant foreseeable challenges to health care infrastructures. Many of the features of the Internet that have been discussed present that channel as a viable resource for addressing these challenges

The findings of this study highlight the importance of understanding HISBs of immigrant US residents and the role of the Internet in access to, and usability of, information. There are policy implications for language considerations. Steps need to be taken to improve language proficiency of immigrants, and to ensure that information is available in multiple languages. For example, all health information provided on the Internet by the government should be available in multiple languages. There are also implications for health service providers who should be mindful of not only the adverse effects of information lack on the health of immigrants but also of how this can affect public health in general. Despite the many advantages of the Internet, however, there are limitations, such as authenticity of available information. It is therefore necessary for the public health practitioners to view the Internet not as “the answer” to all needs regarding the dissemination or retrieval of information, but, instead, to continue or increase use of other media to augment current Internet reach while addressing the current barriers for Immigrant populations.

Understanding the Internet, and other health information seeking behaviors, experiences and challenges also have implications beyond the provision and retrieval of information for public health professionals. Understanding and acknowledging how these behaviors differ across immigrant and other groups within the population facilitate (a) the design of more effective and efficient health programs for chronic illness, (b) management of

costs associated with healthcare delivery, (c) potential reduction in morbidity and mortality rates, and (d) a reduction in the negative economic effects on the families, and communities.

5.3 Limitations

The findings of this study must be considered in respect of its limitations, which include those related to the sample, research design, data collection, and the information collected. First, heterogeneity in the immigrant group (by years in the US, by country of origin, etc.) was not analyzed; data on the total immigrant group were analyzed at the aggregate level. Further studies to explore other within group differences can add further insight to important cultural and other differences. Findings and recommendations must, therefore, be considered in terms of the fact that additional analyses to differentiate within the immigrant subsample may yield different findings. Second, the study utilized a cross-sectional design and, therefore, no conclusions regarding causation can be drawn. Third, there is inherent bias in using self-reported measures in any study therefore, results should be interpreted accordingly. Fourth, the data was collected through mailed questionnaires and so one cannot be definitive regarding who actually filled out questionnaires. Fifth, questions related to where respondents looked for information were limited to the channel type and did not consider any further specifics, such as particular websites, or radio or television stations or programs the respondents utilized. It is conceivable, then, that the responses regarding trust may not be representative of the channel type, per se, but may be linked to the more specific source (such as programming) utilized by respondents. Further studies to drill down to this level of information could also provide information that further enlightens message placement and design strategies.

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