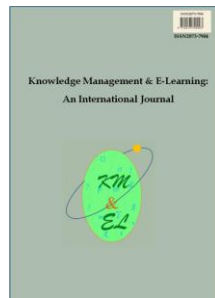# Knowledge Management & E-Learning

The effect of educational attainment levels on use of non-traditional health information resources: Findings from the Canadian survey of experiences with primary health care

Sean Hardiman
Kendall Ho (FRCPC)
University of British Columbia, Canada

The effect of educational attainment levels on use of non-traditional health information resources: Findings from the Canadian survey of experiences with primary health care

Sean Hardiman*

School of Population and Public Health
University of British Columbia, Canada
E-mail: sean.hardiman@alumni.ubc.ca

Kendall Ho, FRCPC

Department of Emergency Medicine
Faculty of Medicine
University of British Columbia, Canada
E-mail: kendall.ho@ubc.ca

*Corresponding author

Abstract: Canadian provincial governments have made significant investments in nurse advice telephone lines and Internet resources as non-traditional options to reduce emergency department visits and improve access to health care for the population. However, little is known about the characteristics of users of these services, and who chooses to use them first, before accessing other sources of health advice. Additionally, individuals with lower levels of education tend to be late adopters of technology and have inconsistent utilization of health services. The purpose of the study is to examine the effect of educational attainment levels on the use of non-traditional health information sources first, before other more conventional sources of health information. The study utilized Canadian Survey of Experiences with Primary Health Care (CSE-PHC), 2007-2008 survey data. Logistic regression models were constructed to examine the relationship between use of non-traditional health information sources first, and educational attainment, adjusted for confounders. Relative to someone with less than secondary education, individuals with secondary education (OR = 4.30, 95% CI: 2.44 – 7.59), and individuals with post-secondary education (OR 4.91, 95% CI: 2.78 – 8.67), had significantly greater odds of using non-traditional health information sources first. These findings suggest that educational attainment has a significant effect on the use of non-traditional health information sources first. Future providers of non-traditional health information sources, especially in the design of future eHealth tools and consideration of eHealth literacy, should consider these results in development and implementation of their communications strategies to maximize the reach of their services.

Keywords: Education; e-Health; Internet; Regression; Telehealth; Canada

Biographical notes: Sean Hardiman, MHA, is with the School of Population and Public Health at the University of British Columbia, where he is a doctoral student. He works for Cardiac Services BC, based in Vancouver, BC. As the Provincial Clinical Director for the Coronary Revascularization and Acute Heart Failure Programs, he is responsible for the planning, funding and

evaluation of cardiac surgery, interventional cardiology, and acute heart failure services for the province. His major research interests are in the areas of access to, and outcomes from, high-intensity cardiac services.

Kendall Ho, MD, FRCP(C) is a Professor in the Department of Emergency Medicine, in the Faculty of Medicine, at the University of British Columbia. A practicing emergency medicine specialist, he is also the founding Director of the eHealth Strategy Office at UBC and served from 2008 to 2015. His research is in technology enabled knowledge translation – the use of information technologies to accelerate the use of health evidence into routine practice – and includes work in telehealth, mhealth, wearables, and sensors research in primary and emergency medicine.

1. Introduction

Access to primary health care services is a major factor in the health and well being of a population (Starfield, Shi, & Macinko, 2005). The availability of strong primary care services has been demonstrated to improve population health (Kringos, Boerma, van der Zee, & Groenewegen, 2013) and is economically viable in the Canadian context (Browne et al., 1999). Research suggests, however, that in 2010, as many as 4.4 Million Canadians, aged 12 and over, did not have access to a primary care physician (Statistics Canada, 2013a). The literature has identified numerous barriers to accessing health care services in western countries, including language (Flores, 2005), transportation or geographical barriers (Arcury, Preisser, Gesler, & Powers, 2005), and mobility (Brown & Flood, 2013), as well as financial barriers (Rahimi, Spertus, Reid, Bernheim, & Krumholz, 2007). Education level is also a barrier to health services that warrants further examination, as research has shown that a high-school diploma is associated with inconsistent utilization of health care services, compared to higher levels of education attainment (Steele, Dewa, Lin, & Lee, 2007).

Recent years have seen an explosion in the utilization of non-traditional sources of health information, with the Internet in general (Baker, Wagner, Singer, & Bundorf, 2003), and the Google search engine in particular, taking on a key role in the lives of 80% of Internet users (Fox, 2013). In addition, nursing advice telephone lines have been launched throughout the United States and Canada, often as an innovative means of preventing the use of emergency departments for primary care purposes (Bearden, Brown, Kirksey, Dansby, & Hilliard, 2008; Dent, 2010). These non-traditional approaches to accessing health information stand in contrast to traditional, in-person visits with a health care professional. However, little evidence is available about how barriers to health care influence utilization of these types of non-traditional sources of health information, nor is there evidence that sheds light on the correlation of individuals' eHealth literacy to their eHealth access and use.

The use of non-traditional health information sources, specifically using the Internet or contacting a telephone advice line for health information, has increased markedly in recent years. However, there is little descriptive evidence of who accesses health information using alternative sources, outside of Fox's (2011) work at the Pew Internet Project in the United States and Underhill and McKeown's (2008) work at Statistics Canada. In both cases, their work is limited to use of the Internet. Fox (2011) found that Americans who look online for health information most often are adults, who have recently provided unpaid care to a parent, child, friend or other loved one; were

white adults between the ages of 18-49; were female; and were more likely to have some college education. Underhill and McKeown (2008) found similar Canadian results, indicating that women were more likely to be seekers of health information online than men, and had a higher level of education, and were more likely to report a higher household income. While there is research indicating the variable quality of health information available on the Internet (Benigeri & Pluye, 2003), and the appropriateness of telephone triage decisions by phone (Blank et al., 2012), descriptive data of who turns first to these services when they have health information needs is lacking.

Ostensibly, non-traditional health information sources are intended to provide value to patients in managing their health, augment the primary care system, and in the case of services sponsored by health services organizations and, in Canada, governments, divert patients to lower cost options than emergency departments. The level of educational attainment of the population is known to have a significant effect on individual and community health status. It is also known that there is a relationship between education and technology adoption, and that lower educational attainment is associated with lower use of technology (Riddell & Song, 2011), an important consideration in the domain of eHealth literacy. Given these factors, it is important to understand what relationship, if any, there is between an individual's level of educational attainment and their use of non-traditional health information sources as a first choice resource.

The present study seeks to address a gap in the identified literature by utilizing the Canadian Survey of Experiences with Primary Health Care (CSE-PHC), 2007-2008, inclusive of all Canadian provinces, to establish the presence of a relationship between levels of education and the utilization of non-traditional health information sources, specifically the Internet and telephone triage systems. The CSE-PHC data set is the most recent Canadian data for which primary care experiences information is available. With this information, it is hoped that those who develop and implement non-traditional systems of health information will be able to ensure resources are tailored to the educational characteristics of target populations. To the best of our knowledge, this study is the first to compare the utilization of non-traditional health information sources by levels of educational attainment in the Canadian population.

2. Methods

Data for this study originated from the Canadian Survey of Experiences with Primary Health Care (CSE-PHC), 2007-2008 survey, a nationally and provincially representative sample of 16,482 individuals who had previously completed the Canadian Community Health Survey (CCHS) Cycle 4.1 between July and December, 2007. The survey included individuals aged 18 years and older (response rate = 70.8%) as of April 14, 2008. The CSE-PHC was conducted by Statistics Canada from April to June 2008 and was designed to collect data on matters relating to Canadians' experience with the health care system, and to generate provincial and national estimates on various aspects of patient experience. The main objective of the CSE-PHC was to create a picture of access and utilization of primary health care services, while also providing specific data describing the experiences of Canadians who live with chronic health conditions. A detailed description of the method of selection for interviews is reported elsewhere (Statistics Canada, 2010). The target population for the CSE-PHC consisted of persons living in private dwellings in the ten Canadian provinces. Persons living on First Nations reserves or Crown lands, individuals residing in institutions, members of the Canadian Forces, and

residents of certain remote regions were excluded from the survey. A multi-stage, stratified cluster design was used to ensure that the sample gave relatively equal importance to health regions and to provinces, thus ensuring regional, provincial, and national representativeness. Data collection was conducted using computer-assisted telephone interviewing software, with the interview team supervised by senior interviewers responsible for ensuring all were familiar with the concepts and procedures of the survey.

In the current study, we tested the hypothesis that the use of non-traditional health information sources as a first resource of health advice is related to an individual's level of education. The outcome variable for this study is the use of non-traditional health information sources as a first resource within the last twelve months. The explanatory variable is the level of education of the participants in the study. Participants were included in the study if they responded to the CSE-PHC questions regarding where a participant sought health information in the last twelve months, and required health information in the last twelve months; this represents a sub-sample of the full CSE-PHC survey group. The sample also included those participants who stated their level of education. Only valid responses to where a subject sought health information were included. Subjects were excluded from the study sample if they did not require health information in the last twelve months. Participants were also excluded if they did not state their level of education.

The use of non-traditional health information by participants in the study, the outcome variable, was assessed with the following question: "Thinking about the last time you required health information or advice, where did you get that information or advice?" Those participants who answered affirmatively that they used a 'telephone help line" or the "Internet" were considered to have used non-traditional health information sources as their first resource. Those participants who did not answer affirmatively to those two criteria were considered to have not used non-traditional health information sources as their first resource. Other sources included primary care providers, walk-in clinics, community health centers, emergency departments, specialist clinics, or another source not specified by the participant.

The education level of participants in the study, the explanatory variable, was assessed with the following question: "What is the highest grade or level of education you have ever reached?" Respondents could indicate less than secondary, completed secondary, or completed post-secondary levels of education, as well as decline to state their level of education. Those individuals who did not respond to this question were excluded from analysis.

Several factors were identified as potential confounding variables through the development of a directed acyclic graph, using published methodology (Shrier & Platt, 2008). The model included demographic variables, specifically age, sex, province of residence; health status (excellent, very good, good, fair, poor); employment status (employed full-time, employed part-time, unable to work due to illness or disability, retired, other); and whether or not a respondent had a regular family doctor (yes, no).

A logistic regression analysis was performed to investigate the relationship between education and the use of non-traditional health information sources, controlling for confounding variables. A significance value of was established for all statistical tests. A power calculation was also performed to establish a sample size necessary to minimize Type II error; this was set at 0.8. The minimum sample size to detect a 10% difference between groups was 199 subjects. This minimum was achieved given the analytic sample

of 4,475. Sampling design was accounted for in all analyses using probability weighting provided by Statistics Canada.

First, descriptive analyses were performed for the outcome and explanatory variables. Second, a Chi-Square statistic was calculated as an indicator of the association between the use of non-traditional health information sources, educational achievement, and identified confounders. Third, bivariable and multivariable logistic regression analysis examined the relationship between the use of non-traditional health information and educational achievement. Participants were excluded from analysis if their measures on variables included in the analysis were found invalid or missing from the data set. SAS software, version 9.3, (SAS Institute, Cary, North Carolina), was used to conduct all statistical analyses.

3. Results

Based on inclusion criteria, this study included 4,459 respondents to the CSE-PHC who had accessed a source of health information in the preceding twelve months and had valid responses for the variables under study. Subjects in the study were 61.7% female and 38.3% male, with 31.8% between the ages of 24 and 44, and 38.8% between the ages of 45 and 64 (Table 1). A total of 91.4% of subjects had a regular family physician. For the primary explanatory variable, level of education, 17.3% had less than a secondary education, 38.6% had completed secondary education, and 44.1% had completed post-secondary education. Visible differences were observed between individuals that accessed non-traditional health information sources first, versus individuals who used another source first. Amongst people who used non-traditional health information first, there were more females than males, and more respondents aged 25 – 44 years than older or younger groups. People who used non-traditional health information sources first also had a lower rate of having a regular family physician versus those who used other sources of health information.

Results from the bivariable analysis showed statistically significant relationships between the use of non-traditional health information sources and education levels, at all levels of higher education (Table 2). Relative to someone who had not completed secondary education, the odds of a person using a source of non-traditional health information first was 4.59 times greater for someone who had completed secondary education (95% CI: 2.64 – 7.99), and 4.74 times greater for someone who had completed post-secondary education (95% CI: 2.75-8.18).

In the multivariable analysis, adjusted for age, sex, family physician, province, and employment status, relative to someone with less than secondary education, individuals with secondary education continued to have a high odds of accessing non-traditional health information sources first (OR=4.30, 95% CI: 2.44 – 7.59). Relative to someone with less than secondary education, and controlling for the same variables, individuals with post-secondary education also continued to have a higher odds of accessing non-traditional health information sources first compared with a person with less than secondary education (OR=4.91, 95% CI: 2.78 – 8.67).

A sensitivity analyses (not shown) was conducted to examine the impact of geography on our results. We wanted to see if categorizing provinces into regions changed the effect of education on use of non-traditional health information sources. Provinces were grouped into four regions (Maritimes, Central, Prairies, and Pacific) and the model was re-run. Relative to the Maritime Region, participants from each of the

Central, Prairie, and Pacific Regions were all statistically more likely to access non-traditional health information sources first than use other sources. This compares with no statistically significant differences observed when provinces were individually considered in the model.

Table 1
Frequencies and proportions of characteristics for respondents to the CSE-PHC (2007-08) who required health information in the preceding 12 months by method of access to health information (n=4,459)

Variables	Used NTHI Sources First (<12 Months) (n = 428)		Other Sources of Health Information First (<12 Months) (n= 4031)		Totals Analytic Sample (n=4,459)	
	n	%	n	%	n	%
Level of Education						
- Less Than Secondary	23	5.4	749	18.6	772	17.3
- Completed Secondary	168	39.3	1553	38.5	1721	38.6
- Completed Post-Secondary	237	55.4	1729	42.9	1966	44.1
Sex						
- Male	126	29.4	1589	39.3	1715	38.3
- Female	303	70.6	2457	60.7	2760	61.7
Age (Years)						
- 18-24	42	9.8	261	6.4	303	6.8
- 25-44	219	51.0	1203	29.7	1422	31.8
- 45-64	132	30.8	1603	39.6	1735	38.8
- 65+	36	8.4	979	24.2	1015	22.7
Health Status						
- Excellent	76	17.7	576	14.3	652	14.6
- Very Good	178	41.5	1506	37.3	1684	37.7
- Good	118	27.5	1238	30.6	1356	30.3
- Fair	39	9.1	515	12.7	554	12.4
- Poor	18	4.2	206	5.1	224	5.0
Family Doctor						
- Yes	67	15.6	317	7.8	384	8.6
- No	362	84.4	3726	92.2	4088	91.4
Province						
- Newfoundland & Labrador	11	2.6	221	4.5	232	5.2
- Prince Edward Island	9	2.1	158	3.9	167	3.7
- Nova Scotia	12	2.8	372	9.2	384	8.6
- New Brunswick	21	4.9	274	6.8	295	6.6
- Quebec	64	14.9	459	11.3	523	11.7
- Ontario	75	17.3	632	15.6	707	15.8
- Manitoba	53	12.4	377	9.3	430	9.6
- Saskatchewan	42	9.8	423	10.5	465	10.4
- Alberta	91	21.2	629	15.6	720	16.1
- British Columbia	52	12.1	501	12.4	553	12.4
Employment Status						
- Employed Full-Time	224	53.3	1853	50.5	2077	50.8
- Employed Part-Time	44	10.5	408	11.1	452	11.0
- Unable to Work	28	6.7	229	6.2	257	6.3
- Retired	49	11.7	781	21.3	830	20.3
- Other	75	17.8	401	10.9	476	11.6

Table 2
Unadjusted and adjusted odds ratios (OR) and 95% confidence intervals (CI) for individuals who required health information in the preceding twelve months and used non-traditional health information sources first compared with those who used other sources from the CSE-PHC (2007-08)

Characteristic	Used NTHI Sources (Yes versus No) Unadjusted		Used NTHI Sources (Yes versus No) Adjusted	
	OR	95% CI	OR	95% CI
Level of Education				
- Less Than Secondary	1.00		1.00	
- Completed Secondary	*4.59	*2.64 – 7.99	*4.30	*2.44 – 7.59
- Completed Post-Secondary	*4.74	*2.75 – 8.18	*4.91	*2.78 – 8.67
Sex				
- Male	1.00		1.00	
- Female	0.98	0.80 – 1.19	0.92	0.75 – 1.14
Age (Years)				
- 18-24	1.00		1.00	
- 25-44	1.16	0.80 – 1.69	1.07	0.72 – 1.58
- 44-64	0.35	0.24 – 0.52	0.36	0.24 – 0.53
- 65+	0.30	0.18 – 0.51	0.31	0.18 – 0.53
Health Status				
- Excellent	1.00		1.00	
- Very Good	*1.47	*1.04 – 2.06	*1.58	*1.12 – 2.25
- Good	*2.25	*1.60 – 3.16	*2.66	*1.95 – 3.92
- Fair	1.02	0.63 – 1.67	*1.78	*1.08 – 2.95
- Poor	*4.24	*2.72 – 6.61	*7.16	*4.42 – 11.60
Family Doctor				
- Yes	1.00		1.00	
- No	*1.86	*1.40 – 2.46	*1.61	*1.18 – 2.19
Province				
- Newfoundland	1.00		1.00	
- Prince Edward Island	0.77	0.05 – 13.73	0.62	0.03 – 11.49
- Nova Scotia	0.55	0.11 – 2.75	0.56	0.11 – 2.86
- New Brunswick	1.70	0.41 – 6.99	1.69	0.34 – 7.19
- Quebec	1.74	0.51 – 5.92	1.50	0.43 – 5.26
- Ontario	2.32	0.69 – 7.79	1.99	0.58 – 6.84
- Manitoba	2.54	0.69 – 9.33	2.63	0.70 – 9.96
- Saskatchewan	2.52	0.67 – 9.46	2.33	0.60 – 9.02
- Alberta	3.41	1.00 – 11.65	3.06	0.88 – 10.76
- British Columbia	2.70	0.79 – 9.19	2.64	0.76 – 9.23
Employment Status				
- Employed Full-Time	1.00		1.00	
- Employed Part-Time	*1.72	*1.28 – 2.30	1.46	*1.05 – 2.04
- Unable to Work	0.72	0.45 – 1.17	0.51	0.29 – 0.92
- Retired	0.56	0.38 – 0.82	1.09	0.06 – 1.80
- Other	*2.30	*1.74 – 3.06	*2.21	*1.61 – 3.04

* Statistically significant findings

4. Discussion

In this study, we examined the relationship between the use of alternative sources of health information first and the level of educational attainment. We found that, relative to a person with less than secondary education and controlling for age, sex, geography, employment, and health status, the odds of a person using a source of alternative of health information first was more than four times greater for those with secondary education, and almost five times greater for a person with post-secondary education. Our results suggest that as education levels increase, the odds of using alternative education sources also increases.

This study, to the best of our knowledge, is the first to examine the relationship between education and the specific use of non-traditional health information sources. As a result, the literature does not indicate the extent to which non-traditional health information sources are first used relative to other sources of health information. However, it is known that education is a key variable associated with numerous health-related behaviors and outcomes, including health literacy (Paasche-Orlow & Wolf, 2007). Research has also established that individuals with lower levels of education are less likely to seek out health information through any means, relative to those individuals who with higher levels of educational attainment (Richardson, Allen, Xiao, & Vallone, 2012). Thus, our findings are consistent with the findings from similar research questions investigated in similar contexts.

There are a number of possible explanations for our findings. First, individuals who have lower levels of education may be less familiar with non-traditional sources of health information. The operators of government-sponsored nurse advice services and Internet resources promote their services, but such promotion is limited and those with lower levels of education may not receive these messages as a function of where and how the service promotion messages are delivered. Second, individuals with secondary or post-secondary education may be more likely to use computers in their daily work, versus those with less than post-secondary education. The CSE-PHC did not capture data on the nature of employment; this information would be able to account for any confounding as a result of this variable. A third possible explanation is that individuals with lower educational attainment do not have ready access to particular types of alternative health sources, specifically a computer at home with Internet access. A recent survey found that 83% of Canadians have a landline telephone at home (Primus Telecommunications Canada Inc., 2012). In 2012, Statistics Canada reported that 83% of Canadians had home Internet service (Statistics Canada, 2013b), but that only 58% of individuals with an income of less than $30,000 had home Internet service. Given that our study used 2007-08 data, it is conceivable that fewer individuals had home access to the Internet at that time.

There are a number of limitations to the current study that merit reporting. First, this study relied on data from 2007/08, as it was the most recent data available on the use of alternative sources of health information. Our study considers use of technology, and the use of the Internet has increased dramatically in recent years. Therefore, it is unclear if our findings are representative of the current environment. With the continued expansion of digital technologies into our daily lives, and the advent of smartphones and tablets that function like powerful portable computers, this data, and our findings may no longer be applicable to today's Canadian population and it is possible that more people are using non-traditional health information sources now than when this study was conducted. This suggests that additional research is necessary to update our findings and determine if the relationship observed here continues.

A second limitation is the way in which the CSE-PHC categorizes levels of educational attainment as less than secondary education, secondary education, and post-secondary education. A substantial range of possibilities exists for both less than secondary education levels, and post-secondary levels. For example, a person with Grade 11 education would be categorized alongside someone with a Grade 8 education; conversely, a person with a graduate degree could be categorized alongside someone with a one-year diploma. The CSE-PHC does not provide more detailed data; future surveys should seek to better categorize educational attainment, to provide for more detailed analysis of differences among educational groups.

A third limitation is the highly gendered response rate. Females made up 62% of individuals who required health information in the preceding twelve months, with the remaining 38% were male. The CSE-PHC does not provide data on whether or not individuals sought health information for themselves, or for others. Given that females tend to provide more direct care to children and elders than males, females may have greater need for health information, and thus more inclined to use non-traditional health information sources when they have education sufficient to support such access. Additional research in this area may be indicated.

A fourth limitation can be found in the study's efforts to control for geographic effect. Efforts to control for geography resulted in unstable estimates, due to small cell sizes at the level of individual provinces. Thus, the results of the sensitivity analysis may be more relevant to consideration of geographic effect than at the level of individual provinces.

A fifth limitation to this study is that it only examines the relationship between the use of non-traditional health information sources first and level of education, and does not examine whether non-traditional health information sources are used as a second or third source of health information. It is possible that people with lower levels of education use non-traditional health information sources as a second or third source; this study does not examine this possibility due to data limitations.

A number of avenues are possible for future research. First, there are more routes to obtain health information than ever before, including further established 811 services, continuous Internet connections via mobile technology, and social media. Establishing whether or not the relationships found here hold in today's environment are warranted. Second, understanding the context in which individuals seek health information may influence their choices. For example, a non-emergency situation may result in a choice to seek non-traditional health information sources first, while an emergency situation may result in a choice to directly contact an in-person health service. Third, it would be useful to understand how many "layers" of health information a person accesses before seeking an in-person visit. While this study examines those who access non-traditional sources of health information first, we know little about those who speak to a friend, use social media, ask a family member, or speak to an acquaintance who is a health professional. Understanding where and why people seek out health information would be useful in designing services to support patients who wish to learn more about their health.

In summary, this study provides the first examination of the effect of education on the use of non-traditional health information services first, specifically Internet health information sources and nurse advice phone line services. This study demonstrates that individuals with secondary or greater levels of education have greater odds of using alternative health services first, compared with those with less than secondary education. Provincial governments in Canada have invested substantial amounts of money in nurse advice line services and Internet health sites; it is clear from these results that those

individuals with less education are not benefitting from these investments. Thus, governments need to investigate the value of these services and determine how best to ensure that all individuals, regardless of educational status, have access to, and benefit from, the information provided.

References

Arcury, T. A., Preisser, J. S., Gesler, W. M., & Powers, J. M. (2005). Access to transportation and health care utilization in a rural region. *The Journal of Rural Health, 21*(1), 31–38.

Baker, L., Wagner, T. H., Singer, S., & Bundorf, M. K. (2003). Use of the Internet and e-mail for health care information: Results from a national survey. *JAMA: the Journal of the American Medical Association, 289*(18), 2400–2406.

Bearden, M. B., Brown, T., Kirksey, K. M., Dansby, M., & Hilliard, M. (2008). Easing the chaos in emergency departments: Implementation of the "ask your nurse" teletriage program. *Journal of Emergency Nursing, 34*(3), 221–224.

Benigeri, M., & Pluye, P. (2003). Shortcomings of health information on the Internet. *Health Promotion International, 18*(4), 381–386.

Blank, L., Coster, J., O'Cathain, A., Knowles, E., Tosh, J., Turner, J., & Nicholl, J. (2012). The appropriateness of, and compliance with, telephone triage decisions: A systematic review and narrative synthesis. *Journal of Advanced Nursing, 68*(12), 2610–2621.

Brown, C. J., & Flood, K. L. (2013). Mobility limitation in the older patient: A clinical review. *JAMA, 310*(11), 1168–1177.

Browne, G., Roberts, J., Gafni, A., Byrne, C., Weir, R., Majumdar, B., & Watt, S. (1999). Economic evaluations of community-based care: Lessons from twelve studies in Ontario. *Journal of Evaluation in Clinical Practice, 5*(4), 367–385.

Dent, R. L. (2010). The effect of telephone nurse triage on the appropriate use of the emergency department. *The Nursing Clinics of North America, 45*(1), 65–69.

Flores, G. (2005). The impact of medical interpreter services on the quality of health care: A systematic review. *Medical Care Research and Review, 62*(3), 255–299.

Fox, S. (2013). After Dr Google: Peer-to-peer health care. *Pediatrics, 131*(Suppl 4), S224–S225.

Fox, S. (2011, February 1). *80% of internet users look for health information online*. Retrieved from http://www.pewinternet.org/Reports/2011/HealthTopics.aspx

Kringos, D. S., Boerma, W., van der Zee, J., & Groenewegen, P. (2013). Europe's strong primary care systems are linked to better population health but also to higher health spending. *Health Affairs (Project Hope), 3*2(4), 686–694.

Paasche-Orlow, M. K., & Wolf, M. S. (2007). The causal pathways linking health literacy to health outcomes. *American Journal of Health Behavior, 31*(Suppl 1), S19–S26.

Primus Telecommunications Canada Inc. (2012, July 31). *Home sweet phone*. Toronto, ON, Canada.

Rahimi, A. R., Spertus, J. A., Reid, K. J., Bernheim, S. M., & Krumholz, H. M. (2007). Financial barriers to health care and outcomes after acute myocardial infarction. *JAMA, 297*(10), 1063–1072.

Richardson, A., Allen, J. A., Xiao, H., & Vallone, D. (2012). Effects of race/ethnicity and socioeconomic status on health information-seeking, confidence, and trust. *Journal of Health Care for the Poor and Underserved, 23*(4), 1477–1493.

Riddell, W. C., & Song, X. (2011). *The role of education in technology use and adoption: Evidence from the Canadian workplace and employee survey* (Working Paper No. 83).

Canadian Labour Market and Skills Researcher Network.

Shrier, I., & Platt, R. W. (2008). Reducing bias through directed acyclic graphs. *BMC Medical Research Methodology, 8*: 70.

Starfield, B., Shi, L., & Macinko, J. (2005). Contribution of primary care to health systems and health. *The Milbank Quarterly, 83*(3), 457–502.

Statistics Canada. (2010). *Microdata user guide - The Canadian survey of experiences with primary health care, 2007 - 2008* (pp. 1–53). Ottawa, ON: Statistics Canada.

Statistics Canada. (2013a, July 3). *Access to a regular medical doctor, 2010*. Retrieved from http://www.statcan.gc.ca/pub/82-625-x/2011001/article/11456-eng.htm

Statistics Canada. (2013b, November 26). *Canadian internet use survey, 2012*. Retrieved from http://www.statcan.gc.ca/daily-quotidien/131126/dq131126d-eng.pdf

Steele, L. S., Dewa, C. S., Lin, E., & Lee, K. L. K. (2007). Education level, income level and mental health services use in Canada: Associations and policy implications. *Healthcare Policy /Politiques De Sante, 3*(1), 96–106.

Underhill, C., & McKeown, L. (2008). Getting a second opinion: Health information and the Internet. *Health Reports, 19*(1), 65–69.