MoBros and MoSistas on Social Media: A Content Analysis of *Twitter* Conversations during the 2013 Movember Canada Campaign

by

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Authors Declaration

This thesis consists of material all of which I authored or co-authored: see Statement of Contributions included in the thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

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

Statement of Contributions

I would like to acknowledge Dr. Laurie Hoffman-Goetz as the co-author who contributed to the research described in Chapters 4 and 5 of this thesis. Dr. Laurie Hoffman-Goetz was involved in the research design, data analysis, and authoring of the research in Chapters 4 and 5.

Abstract

Introduction: Health communication campaigns are an important tool for disseminating health information and influencing the salience of health issues on the public agenda. Social media sites are popular platforms for health information seeking and sharing in the digital age. This thesis uses the 2013 Movember Canada campaign as a case study to examine whether the campaign objective of creating conversations about prostate and testicular cancers aligns with conversations on the *Twitter* social networking site and to discuss what themes were present in Movember-related conversations.

Methods: The *Twitter* search engine (https://Twitter.com/search-home) was used to collect historical data on *Twitter*. Search criteria for this study included tweets with the hashtag '#Movember', published for November 2013 inclusive, and available in English. Geographical location information was collected from the user profile in order to identify Canadian tweets. In study #1, the Movember 2013 website content was collected from an online web archive (*Wayback Machine;* https://archive.org/web/). Content of the Movember Canada 2013 website was categorized by page tabs and topic headings and informed the preliminary codebook. 4222 publically-available Canadian tweets were analyzed using a quantitative content analysis methodology. In study #2, a qualitative content analysis methodology was used to analyze 2400 tweets. Tweets were read and coded for overt and latent themes in an iterative fashion until saturation of themes occurred.

Results: Study #1. There were significantly fewer health-related (n = 673) than non-health-related (n= 3549) tweets ($p < 0.05$). Few tweets (0.6% of all tweets) referenced

prostate or testicular cancers. Community engagement activities as well as moustache and grooming references were the most frequent topics in the health-related (10.49% and 1.97% of 4222 tweets) and non-health-related (32.83% and 32.76% of 4222 tweets) categories, which were significantly different by topic ($p<0.05$). Study #2. The major themes identified in the tweets were: fundraising as priority (34% of 2400 tweets), making a change to men's health (18% of 2400 tweets), the campaign as a moustache contest rather than a charity (26% of 2400 tweets), the use of masculine metaphors/imagery (9% of 2400 tweets), and the role of women as moustache supporters (4% of 2400 tweets).

Conclusion: Health information about prostate and testicular cancers was limited in *Twitter* messages about the 2013 Movember Canada campaign. Findings from this thesis highlight the importance for health campaign coordinators to communicate a philanthropic narrative that explicitly associates campaign activities, such as fundraising and raising awareness, with the dedicated health issue so that the general public will view the health issue as an important issue. Future research that considers methodological approaches such as surveys or interviews will be necessary to collect data about the impact of discussing social media health campaigns and their related health issues on health behaviour change (e.g., health knowledge, attitudes, behaviours).

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Introduction

A communication campaign is a) purposive with the intent to encourage specific changes to human behaviour; b) aimed a large target audience; c) conducted within a specific time frame, and d) an organized set of communication activities (Rogers, & Storey, 1987). Among notable and well-documented mass media health communication campaigns have been the Stanford Heart Disease Prevention Program (Noar, 2006; Wang, Cubbin, Ahn, & Winlkeby, 2008), Breast Cancer Awareness Month (Jacobsen & Jacobsen, 2011; Thackeray, Burton, Giraud-Carrier, Rollins, & Draper, 2013), and ParticipACTION (Craig, Bauman, & Reger-Nash, 2010). The introduction of the Movember campaign offered a unique communication strategy that capitalized on new communication technologies, such as social media sites, and required "embodied participation" (Robert, 2013) in the form of moustache growing and grooming.

In 2003, four Australian friends embraced an opportunity for health education following the success of a moustache growing contest within their social networks (30 young adults); this contest was affectionately termed Movember since it focused on moustache growing in the month of November (Movember, 2013c). Inspired by the women's health movement, the Movember contest was seen as a platform for raising awareness about and research funds for men's health issues (Jeffcott, Cagiannos, & Zorn, 2012). In 2004, the moustache growing contest was paired with raising awareness about men's health generally and prostate cancer specifically (Robert, 2013). Hence, the creators of the Movember campaign devised a novel campaign strategy of pairing body modification (facial hair) with health awareness.

The Movember campaign challenged men to become ambassadors of their own health by growing a moustache and collecting pledges for the maintenance of their facial hair (Movember, 2013b). As the popularity of the campaign grew, so did the number of participating countries. In 2007, the Movember campaign was established in Canada and tied to a specific focus on prostate cancer (Movember, 2015b). This scope was broadened in the 2013 Movember Canada campaign to include efforts towards raising awareness about testicular cancer, the most common cancer among young men aged 15 to 29 years (Canadian Cancer Society, 2014c).

Among the stated goals of the campaign was that as moustaches emerge above men's lips in November, discussions would be triggered about men's health (Movember, 2013b). In March 2014, the Movember team announced that the 2013 campaign stimulated 1.7 billion conversations about men's health worldwide (Movember Canada, 2014). An infographic about the impact of the 2013 Movember campaign can be found in Appendix A. One popular mechanism through which individuals participate in conversations and share various user-generated content, such as news, thoughts, and images, is through social media (Khang, Ki, & Ye, 2012).

Social media refers to a group of Internet-based applications that allow users to create and share content with one another (Kaplan & Haenlein, 2010; Thackeray, Neiger, & Keller, 2012). Categories of applications include content and video sharing, bookmarking, games, and social networking (Thackeray et al., 2012). One increasingly popular social media network site is *Twitter*—a web-based service that allows users to create profiles, make connections with other users, and view content of those with whom they have connected (twitter.com). Popular social network sites such as *Twitter* promote

rapid dissemination of information via the Internet (Eysenbach, 2008). The popularity of social media, and the resulting spread of user-generated content provides an opportunity for the public to play a significant role in information generation, filtering, and amplification (Chew & Eysenbach, 2010). Such public engagement through social media can encompass a variety of movements and concerns including political, social, and health topics. For example, *Twitter* was used to coordinate efforts and share news information regarding a demonstration outside Moldovan government offices in reaction to what some believed were fraudulent results of the 2009 parliamentary election (Mungui-Pippidi & Munteanu, 2009). Similarly, *Twitter* played a pivotal role as a medium for communication and activism regarding the 2009 Iranian presidential elections, even in particular areas where the government routinely censored its citizens (Solow-Niederman, 2010). In the health domain, *Twitter* has facilitated the monitoring and surveillance of disease levels and public concern online during pandemics, such as during the 2009 H1N1 outbreak (Chew & Eysenbach, 2010; Signorini, Segre, & Polgreen, 2011).

Social media has changed the way people, learn, think, and communicate about health information. In many cases, the public does not automatically accept the advice of traditional experts, such as doctors or public health institutions, and instead look to what peers are saying about the health topic (Ratzan, 2011). This is especially the case among well-educated young adults (Percheski & Hargittai, 2011). Consequently, it is timely and important to examine the content of online public conversations through social media channels to identify whether the Movember campaign objectives of creating conversation about prostate and testicular cancers align with Movember-related conversations on

Twitter. Examining conversations on social media such as *Twitter* provide insight into what messages are taken from the campaign by individuals and then disseminated to others on social networking sites. The content of these messages can influence the knowledge, behaviours, or attitudes by the public about men's health and men's reproductive cancers.

Media theory informs how mass media and social marketing campaigns influence health knowledge, opinions and behaviours. One of the first and best validated media theories is that of agenda setting theory, which describes how the public interprets the importance of an issue depending on the emphasis that the mass media places on the issue (McCombs & Shaw, 1972). In 2013, the Movember Canada team set the agenda of men's health, prostate cancer, and testicular cancer on the campaign website. The impact or capacity of a mass media/social marketing campaign such as Movember to set the public agenda can be examined by investigating conversations on social media (*Twitter*). Hence, the agenda that is set by the Movember campaign should be reflected in discussions on *Twitter*. Analyzing *Twitter* conversations can help to determine whether the 2013 Movember campaign successfully achieved the goal of creating conversations about "real issues" (e.g., men's health, prostate cancer, testicular cancer) (Movember Canada, 2015f) rather that un-related or non-health related issues (e.g., moustache growing). Agenda setting theory has also informed research on media coverage about skin cancer (Dixon, Warne, Scully, Dobbinson, & Wakefield, 2014), breast cancer screening (Jones, Denham, & Springston, 2006), and smoking policy (Sato, 2003).

This M.Sc. thesis research investigated conversations on social media, and specifically on *Twitter*, during the 2013 Movember Canada campaign. The specific

elements examined were: 1) the topics of discussion in conversations, 2) the frequency of topics, and 3) the overt and latent themes regarding the Movember campaign, prostate and testicular cancers, and men's health in general. The 2013 Movember Canada campaign was used as a case study to illustrate the impact of a national mass media campaign about facial hair and men's reproductive cancers on social networking responses to that campaign. Improving our understanding of the "official" campaign agenda setting of men's reproductive cancers on social media discussions can help improve the design and messaging of mass media health communication and social marketing campaigns, including those that use body modification as a primary communication strategy.

Chapter 1: Literature Review

This section presents an overview of relevant literature related to the main concepts of this thesis: men's reproductive cancers, the portrayal of men's health in traditional media, the Movember campaign, social media in health communication studies, and agenda-setting theory.

1.1 Men's Reproductive Cancers: Prostate and Testicular Cancer

Prostate cancer has been the main focus for the Movember campaign since its inception in 2007. Prostate cancer is the second most frequently diagnosed cancer in men worldwide (World Health Organization, 2015), with an estimated global incidence of 1.1 million cases in 2012 (Ferlay et al., 2013). This accounts for 15% of all cancers diagnosed in men excluding non-melanoma skin cancer (Ferlay et al., 2013). With an estimated 307, 000 deaths worldwide in 2012 (6.6% of total cancer-related male deaths), prostate cancer is the fifth leading cause of cancer death (Ferlay et al., 2013).

Prostate cancer is the leading cancer in Canadian men (again, excluding non-melanoma skin cancer) and it is estimated that 1 in 8 Canadian males will be diagnosed with prostate cancer in his lifetime (Canadian Cancer Society's Advisory Committee on Cancer Statistics, 2014). Prostate cancer accounts for approximately 24% of new cases of cancer in Canadian men (Canadian Cancer Society's Advisory Committee on Cancer Statistics, 2014). However, prostate cancer does not affect all men equally and the risk increases with age (Canadian Cancer Society, 2014b). Men aged 60-69 represent 40% of

newly diagnosed cases of prostate cancer (Canadian Cancer Society's Advisory Committee on Cancer Statistics, 2014). Prostate cancer is the third most common cause of cancer death in Canadian men (Canadian Cancer Society's Advisory Committee on Cancer Statistics, 2014). Most prostate cancer deaths occur in males aged 80 years and older (Canadian Cancer Society's Advisory Committee on Cancer Statistics, 2014). The high incidence-to-mortality ratio of this disease indicates that a large percentage of men clinically diagnosed with prostate cancer will eventually die of causes other than prostate cancer (Penson, Rossignol, Sartor, Scardino, & Abenhalm, 2008). This has led to the public perception that many men die *with* prostate cancer rather than *because* of prostate cancer.

The prostate-specific antigen (PSA) test for prostate cancer screening is not currently recommended in Canada as a population-based screening program due to the high potential for false-positive results (Bell et al., 2014). Instead, patients are advised to speak to their primary care provider and discuss if the PSA test is right for them. Between 2001 and 2009 the mortality rate declined significantly in Canada from 26.7 per 100,000 to 19.4 per 100,000 (Canadian Cancer Society's Advisory Committee on Cancer Statistics, 2014). The decline is described as a possible reflection of improvement in treatment options (Canadian Cancer Society's Advisory Committee on Cancer Statistics, 2014). Alternatively, Bouchardy et al. (2008) explain the drop in mortality as a result of increased focus and awareness on surveillance (e.g., rectal digital exams) and control of prostate cancer (e.g., watchful waiting monitoring).

Upon a prostate cancer diagnosis, the concern of physicians and patients is life expectancy and quality of life after treatment (Penson et al., 2008). Early detection of

prostate cancer increases the chance of diagnosis and early treatment while the cancer is still a low-risk localized neoplasm. Treatment options for patients with low-risk prostate cancer include radical prostatectomy, radiation therapy, and active surveillance (O'Brien et al., 2011). A delay of even 6 months for radical prostatectomy can significantly worsen the pathological outcomes and lower the chance for bio-chemical recurrence-free survival (the absence of serum PSA of 0.2 ng/mL or greater) (O'Brien et al., 2011). Bio-chemical recurrence is a criterion used to evaluate success of prostate cancer treatment and is an indication of residual prostate cancer or disease progression (Uchio, Aslan, Wells, Calderone, & Concato, 2010). Thus, early detection of prostate cancer is important for increasing the odds of positive treatment outcomes and reducing the probability of death from prostate cancer (Charvat et al., 2013). Though previous studies have shown a diminished quality of life in the areas of sexual, urinary, and bowel function after treatment (Penson et al., 2008), recent studies indicate that for many patients, recovery to near-baseline functional levels following treatment is expected (Corbin, Kunnavakkam, Eggener, & Liauw, 2013).

In 2013, the organizers of the Movember Canada campaign decided to incorporate a second reproductive male cancer into the campaign platform, namely, testicular cancer (Movember, 2015b). Along with non-Hodgkin lymphoma, testicular cancer is the most commonly diagnosed cancer in young men ages 15-29 years (Canadian Cancer Society's Advisory Committee on Cancer Statistics, 2014). Testicular germ cell tumours are classified as seminomas and non-seminomas (Verhoeven et al., 2013). Seminomas grow more slowly than non-seminomas and can sometimes be detected by the presence of human chorionic gonadotropin (a protein commonly associated with pregnancy) in the

blood (American Cancer Society, 2015c). Spermatocytic seminomas, which are more common among men over 40 years, progress slowly and have a better prognosis than non-seminoma tumours (Stang et al., 2013). Non-seminomas, which make up approximately 50% of all germ cell tumours (Canadian Cancer Society, 2015a), occur more frequently in young men aged 15 to 30 years and are classified into four different types of tumours: embryonal carcinoma, yolk sac carcinoma, choriocarcinoma, and teratoma (American Cancer Society, 2015c). For 2012, the global incidence of testicular cancer was estimated to be 55,266 cases with an estimated 10,351 deaths (Ferlay et al., 2013). In Canada, approximately 1000 men will be diagnosed with testicular cancer and 29 will die from the disease in 2014 (Canadian Cancer Society, 2015b).

The mortality rate for testicular cancer is low and the 5-year survival proportion (96%) is the second highest cancer survival among young Canadian adults (De et al., 2011). The low mortality rates and high survival rates are a reflection of the potential for cure if treatment and care before cancer metastasis has been instituted (Verhoeven et al., 2012). Treatment options include orchiectomy (surgical removal of the testicle), radiation therapy, and chemotherapy (Shabbir & Morgan, 2004; Torpy, Lynm, & Glass, 2008). Despite the high survival rate, testicular cancer survivors often deal with long-term morbidity. For example, both testicular cancer and its treatment have been associated with second malignant neoplasms, cardiovascular disease, decreased fertility, and psychosocial disorders (Travis et al., 2010; van den Belt-Dusebout et al., 2007). Moreover, treatments such as radiotherapy and chemotherapy increase the risk of premature death due to second malignant neoplasms and cardiovascular disease in testicular cancer survivors (van den Belt-Dusebout et al., 2007). Testicular cancer is often

painless in its early stages and can be detected early by regular self-examination or physical examination by a physician (Torpy et al., 2008). Although testicular cancer may be rare, if not detected and treated in its early stages, it can progress, metastasize, and eventually lead to premature death in young men (Shanmugalingam, Soultati, Chowdhury, Rudman, & Van Hemelrijck, 2013).

1.2 Coverage of Prostate and Testicular Cancers in Traditional Mass Media

In traditional print media, such as newspapers and magazines, the coverage of prostate and testicular cancer has been far less than that of breast and female reproductive cancers. For example, Clarke (2004) found that there was a significantly smaller number of North American magazine articles published between 1996 and 2001 dedicated to the two male cancers (11 articles on testicular; 19 articles on prostate cancer) than to breast cancer (174 articles). Breast cancer stories also were covered more frequently in an analysis of 2003 ethnic and mainstream newspapers in the United States, despite a lower incidence of breast cancer in comparison to prostate cancer (Stryker, Emmons, & Viswanath, 2007). Indeed, media reporting of breast cancer far exceeds the coverage of other women's cancers with significantly higher mortality (Gerlach, Marino, & Hoffman-Goetz, 1997).

High media coverage of breast cancer may be attributed to campaigns and awareness efforts such as Breast Cancer Awareness Month (BCAM) in October, which have been running in the United States, Canada, and Britain for over two decades. BCAM has been successful at increasing awareness about breast cancer, educating women about risk factors, raising funds for breast cancer research, and promoting early

detection through screening and self-examination (Thackeray et al., 2013). In contrast, prostate and testicular cancer campaigns have not achieved the same success in raising public awareness and research funds as Breast Cancer Awareness Month. For example, a surge of online search activity relating to breast cancer occurred throughout each October compared to other months between 2004 and 2009 (Glynn, Kelly, Coffey, Sweeney, & Kerin, 2011). In contrast, there was no significant difference for online search activity related to prostate cancer between September, prostate cancer awareness month, and other months (Glynn et al., 2011). The Movember campaign may present an opportunity for increasing public awareness and education about prostate and testicular cancers, which would parallel the success of Breast Cancer Awareness month.

The most dominant theme in mass media coverage of prostate and testicular cancer articles between 1996 and 2001 was discussions about medical treatment (Clarke, 2004). Closely related was the theme of early detection. This finding was not surprising since the debate about the benefits and risks of prostate-specific antigen (PSA) testing has been controversial ever since the U.S. Food and Drug Administration approved the test for early detection of prostate cancer in 1994 (MacKenzie, Chapman, Holding, & McGeechan, 2007; Stark, Mucci, Rothman, & Adami, 2009). Indeed, the research literature about the coverage of prostate cancer in the media suggests that the main focus is often with the topic of population wide screening with the PSA test- its cost, benefits and efficacy (Lawrentschuk, Daljeet, Trottier, Crawley, & Fleshner, 2011; MacKenzie, Chapman, Barratt, & Holding, 2007; MacKenzie et al., 2007).

Dominant stereotypes of masculinity are frequently cited in articles about prostate cancer. In North American magazines, between 1996-2011, treatments for prostate cancer

were described using characteristics such as aggression, determination, and dominance (Clarke, 2004). Additionally, the testicles were equated with manhood and masculinity and frequently associated with sexuality and fertility. Treatment and other complications of prostate cancer are often constructed as a threat to sexual function and war metaphors are used to construct the patient as a warrior who has to fight and battle the disease (Miele, & Clarke, 2014). Dominant stereotypes of masculinity were also frequently featured in prostate cancer articles in Canadian newspapers from 2001-2006 (Halpin, Phillips, & Oliffe, 2009). For example, men with prostate cancer were described as stoic and courageous, particularly when the case was a male in the sports and entertainment industries (Halpin et al., 2009).

1.3 The Movember Campaign

The Movember campaign began as a moustache growing contest in November 2003. The four co-founders-Travis Garone, Adam Garone, Luke Slattery, Justin Coughlin- named the contest, "Movember", which played on the Australian slang 'mo' for moustache and the eleventh month in which the contest would take place. After seeing how popular the contest was among friends, the co-founders decided to pair the contest with fund-raising for men's health issues, and specifically, for prostate cancer (Jeffcott et al., 2012). In the last ten years, the organizers of the Movember campaign have worked towards the goals of raising awareness about men's health issues and stimulating conversations about men's health on a global level (Movember, 2015b).

In 2007, the Movember Foundation partnered with Prostate Cancer Cancer and launched the campaign into Canada. The success in fundraising has been remarkable. In

2012, Canada was the top fundraising country internationally (raising over $42 million CAD) and in 2013, Canada took second place to the U. K. after raising over $34 million CAD (Movember, 2015e). This is in comparison to fundraising in other English-speaking countries where Movember has been rolled out (e.g., for 2013: the U.K.- $35 million CAD; Australia- $25 million CAD; the United States-$24 million CAD). The Movember campaign has grown globally to include twenty-one participating countries. The success of the campaign in Canada has been attributed to adopting a grassroots approach and the use of social media to share messages (Jeffcott et al., 2012).

Though the campaign started with a focus on prostate cancer, opinion leaders such as men's health consultant, Peter Baker in the United Kingdom, urged the campaign leaders to incorporate a range of men's health issues apart from prostate cancer and broaden the list of beneficiaries of the funding (McCartney, 2012). The evolution of campaign health topics is documented in the annual Movember reports. In the 2009-2010 Canadian Country Movember Report, the focus of the campaign was men's health with an emphasis on prostate cancer (Movember Canada, 2015d). The Movember team launched a Global Action Plan, with a goal to foster collaboration amongst members of the global prostate cancer community (Movember, 2015b). Following the lead of Movember Australia and Movember New Zealand, Movember Canada added men's mental health, particularly depression, as a focus to the 2012 Canadian campaign. Mental health is an important topic for men's health since the suicide rate for men is higher than for women; for example, in 2011 the rate for individuals aged 50-54 years (the age range with the highest rate of suicide for both sexes) was 24.2 per 100,000 in men compared to 9.1 per 100,000 in women (Statistics Canada, 2014). In 2013, the Movember Global

Action Plan for cancer research was expanded to support testicular cancer research and awareness, again re-emphasizing a focus on men's reproductive cancers (Movember, 2015f).

The Movember campaign presents the act of growing a moustache as a powerful tool for raising awareness about men's health issues. The Movember marketing team plays on people's desire to participate in altruistic action (Robert, 2013) by pairing messages such as "donate" and "fight the good fight" with "changing the face of men's health" (Movember, 2013b). Growing a moustache is associated with "real men" and is referred to as a "catalyst" for creating conversations with messages such as "real men growing real moustaches, talking about real issues" (Movember, 2015f). These real issues are implicitly aligned with "Knowledge is power, moustache is king" and frames health education as a powerful message for social change. Accordingly, knowledge and conversation are presented as the solutions to changing the way men think about their health, including men's cancers.

Creating conversations about men's health is one of the main goals of the Movember campaign. In March 2014, the Movember team announced that the previous year's Movember campaign prompted 1.7 billion conversations worldwide on social media and email (Movember Canada, 2014). As a result of these conversations, the Movember campaign leaders claim that participants became more aware of their cancer risks, encouraged others to take action to improve their health, and sought medical advice to improve their health (Movember, 2014). Mark Hedstrom, the Movember director for the U.S.A chapter, was quoted saying that, "each moustache generates more than 2,400 conversations about men's health" (Drell, 2014). Popular platforms for such

conversations are social networking sites, such as *Twitter* and *Facebook*. According to the Movember Foundation Annual Report for 2013/2014, there were over 1.6 million Movember mentions on *Twitter* during the 2013 Movember campaign (Movember, 2015c). Social media sites allow participant users to connect with one another, share stories of participation, and ask supporters for pledges (Robert, 2013).

1.4 Social Media and Health Communication

Social media is broadly defined as a group of web-based applications that allow users to modify content in a participatory and collaborative fashion resulting in the creation and exchange of user generated content (Kaplan, & Haenlein, 2010). With the rapid increase in the use of social media over the last decade, the dissemination of messages about health is not restricted to traditional media outlets such as print, radio, and television. One of the core principles of social media that makes it different from other forms of media is the ability to share content such as personal opinion, links, images, and audio or video files (Osterrieder, 2013). Social media sites provide an online platform for individuals to take up and share such content (Lee & Ma, 2012; Lyles, López, Pasick, & Sarkark, 2013).

In 2010, the Canadian Internet Use Survey found that more than half (58%) of survey participants used social networking sites, with most users under the age of thirty-five (Statistics Canada, 2010). Of these users, female users (62%) were more likely to use social networking sites than their male counterparts (54%) (Statistics Canada, 2010). Women were described as more engaging users of MySpace because they were more open to sharing positive emotions with peers on social networking sites than men

(Thelwall, Wilkinson, & Uppal, 2010). The average age of Canadian social media networkers (i.e., individuals who visit two or more social media websites in a month) was thirty-three years (Print Measurement Bureau [PMB], 2009). Moreover, 60% of Canadians in the highest quintile for traditional media use (e.g., magazines and television) were also more likely to be social media networkers (PMB, 2009). Thus, it seems reasonable to infer that high consumers of traditional media successfully make the transition to online media and social networking environments.

Social media use is increasingly a popular recreational activity in Canada. According to the Media Technology Monitor, there was an increase of 6% of individuals who reported regular social media use (logging in at least once a month) from 2011 to 2013 (Oliveira, 2013). Among the factors that motivated usage included information seeking, socializing, entertainment, and status seeking (Lee & Ma, 2012). The popularity of social media sites has created a great opportunity to leverage these new communication tools for effective health awareness and education purposes (Ratzan, 2011).

Though the number of social media platforms is still limited, the possibilities and applications for public health communication are vast. Researchers have explored *YouTube* as a source of health information for a range of health topics including prostate cancer (Steinberg et al., 2010), retinitis pigmentosa (Guthrie, Davies, Fleming, & Browning, 2014), and pediatric adenotonsillectomy and ear tube surgery (Sorensen, Pusz, & Brietzke, 2014). For example, Sorensen et al. (2014) assessed videos based on the categories of educational, testimonial, and news program as well as criteria such as quality of the video, accuracy of information, and ratio of "likes" to "dislikes." Patients

seeking information on *YouTube* about pediatric adenotonsillectomy and ear tube surgery were most likely to find a testimonial video with low quality information during their search (Sorensen et al., 2014). Although *YouTube* may be a promising source of visual content for health education purposes, researchers have also demonstrated that the general public does not typically engage with videos that are highly educational or of superior scientific suitability on this social media platform. The reason for the apparent lack of public engagement with *YouTube* videos is likely because credible organizations produced few highly educational and engaging medical videos (Desai et al., 2013).

Social network sites, an important category of social media, enable users to create a profile and interact with their social network online (Boyd & Ellison, 2008) and have become important platforms for investigating the role of social media in health education and communication. For example, *Facebook* has been studied as a source of health information (Zhang, He, & Sang, 2013). Additionally, *Facebook* has been identified as a potential instrument for communication in health promotion intervention designs (Byron, Albury, & Evers, 2013; Valle, Tate, Mayer, Allicock, & Cai, 2013). Some *Facebook* interventions have proven more successful than others. Thus, while *Facebook* interventions for diabetes groups have provided information and social support to the users (Zhang et al., 2013), others, such as the sharing of sexual health messages to youth, have been less effective (Byron et al., 2013). The reason for differences in the success of interventions may be because of topic sensitivity (e.g., stigma attached to sexual health problems), privacy concerns (e.g., record of personal information online), and age demographic (e.g., self presentation concerns among youth) (Byron et al., 2013). Nonetheless, *Facebook* has the potential to foster relationships and trust amongst patients

and health care providers and may be a useful vehicle for health care information sharing. For example, medical practitioners can interact with patients and offer medical advice via *Facebook* (Hawn, 2009). More recently, the social media site, *Twitter*, has been explored as a tool for communicating health information and creating social networks.

Twitter is a social network platform in which users sign up for an account, create a profile, and share messages, or "tweets", which are restricted to 140 characters maximum (Twitter.com). *Twitter* allows the user (tweeter) to connect with others, express himself through text or visuals, and become informed by reading tweets about global events and local trends (Twitter.com). Because each message is restricted to 140 characters, users communicate via "hash tags" to identify tweets with particular themes or topics. This *Twitter* syntax is particularly useful for researchers because it allows them to search for themes or topics that have been previously identified by the user. *Twitter* has many applications to health research, such as infoveillance and infoepidemiology (i.e., tracking levels of disease by monitoring key terms such as symptoms and matching it with the geolocation of tweets) (Eysenbach, 2009), health communication (e.g., health professionals tweeting information about dementia) (Robillard, Johnson, Hennessey, Beattie, & Illes, 2013), and health interventions (e.g., tweeting research protocol and providing social support to participants of a weight loss intervention) (Turner-McGrievy, & Tate, 2011). *Twitter* messages have been studied as a modality to share information and education about such diverse health topics as concussions (Sullivan et al., 2013), cervical and breast cancer screening (Lyles et al., 2013), antibiotics (Scanfeld, Scanfeld, & Larson, 2010), and glaucoma (McGregor et al., 2014). To date, there have been no

published analyses of *Twitter* information sharing among users about prostate or testicular cancer awareness.

Characteristics of social media sites, including the large volume of users reporting their current activity, thoughts, and location, allow capture of specific health issues and health behaviours of interest to researchers (Yoon, Elhadad, & Bakken, 2013). Tweets are a source of real-time, real-world data that can be mined (imported and organized using software) and analyzed to gain insights about the content of messages and the public's attitude (measured by sentiment) about important health topics (Yoon et al., 2013). Moreover, since users interact in a naturalistic fashion in the social media environment, candid feelings and attitudes among users about a specific issue can be identified (Burton, Tanner, Giraud-Carrier, West, & Barnes, 2012).

1.5 Media Theory: Agenda Setting as a Theoretical Framework

Agenda setting theory describes how the public interprets the importance of an issue depending on the emphasis that the media places on the issue (McCombs & Shaw, 1972). It has been argued that what the general public knows initially about an issue is a reflection of what they have learned through the media (Beyers, & Kerremans, 2007; Wallack, Woodruff, Dorfman, & Diaz, 1999). Consequently, agenda setting theory asserts that the "the news media can set the agenda for public thought and discussion" (McCombs & Reynolds, 2002, p.1).

McCombs and Shaw (1972) first explored the agenda setting capacity of the mass media when they conducted a content analysis of newspapers, magazines, and news broadcasts on television in order to investigate the media's influence on the public in a

1968 presidential election campaign in Chapel Hill, North Carolina. McCombs and Shaw (1972) found that the ranking of issues (e.g., foreign policy, law and order, fiscal policy, public welfare, civil rights) in the media agenda correlated with the ranking in the public agenda. They concluded from this research that the media has an influence on what issues are interpreted as important to the public (McCombs & Shaw, 1972). The introduction of agenda setting theory resulted in several studies in the 1980s that aimed to describe the agenda setting process and its three main components.

The three main components of the agenda-setting process include the media agenda, the public agenda, and the policy agenda (Rogers, & Dearing, 1988). The relationship between these three components is depicted in Figure 1. Gatekeepers (such as journalists, publishers, purveyors of knowledge) and influential media (such as newspapers, magazines, radio, etc.) create the media agenda by deliberately covering certain issues or events and not covering others, and framing these issues as events that should be important to the public and policy makers. Furthermore, there is a feedback effect whereby the public concern inspires news coverage (Behr, & Iyengar, 1985). The public agenda is concerned with the content and order of importance of topics to the public (Rogers, Dearing, & Bregman, 1993). Sources other than the media can also influence each of the three dependent variables (media agenda, public agenda, policy agenda) such as personal experiences, and real-world conditions (e.g., economic conditions, energy crisis, etc.) (Behr, & Iyengar, 1985). Once the agenda-setting process had been described, researchers turned to answer the following question: "What are the cognitive processes involved in the agenda-setting process at the individual level?" (Rogers, 1993).

The concepts of priming and framing have been explored as cognitive mechanisms to describe the process of agenda setting. Priming has been described as "making certain issues or attributes more salient and more likely to be accessed in forming opinions" (Weaver, 2007, p. 145). Thus, the more frequently a person hears about a topic, the easier it is to access that topic in memory. According to Hornik, priming occurs "when repeated exposure to a message affects the weight given to the message in deciding to engage in a behaviour" (p.34). While priming is more concerned with the accessibility of information on attitudes and beliefs, framing assumes that how an issue is characterized can influence the audiences understanding of the issue (Scheufele, & Tewksbury, 2007). Framing has been defined as "to select some aspects of a perceived reality and make them more salient in a communicating text, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation for the item described" (Entman, 1993, p. 52). Frames function to define problems, diagnose causes, make moral judgments, and suggest remedies (Entman, 1993). Frames emphasize certain "bits of information about an item…making a piece of information more noticeable, meaningful, or memorable to audiences" (Entman, 1993, p.53).

Lefebvre (2008) described agenda setting theory as an "under appreciated aspect of communication theory that supports marketing, and especially the creation of markets" since it considers to the role of the audience as a producer, rather than passive recipient, of health information. While most research that addresses agenda setting theory has focused on the impact of the media on issues surrounding politics and voters' opinions and attitudes (Jones et al., 2006), health education researchers have applied the agenda-setting function of the media to health behaviours and health policy. For example, Gollust

and Lantz (2009) used agenda setting theory and framing to describe how news media (newspaper articles) frame type 2 diabetes as an individualized behaviour, which presented implications for the public's likelihood of supporting policies that emphasize population health. Jones et al. (2006) studied the effects of mass media and interpersonal communication on breast cancer screening among college and middle-aged female participants. The researchers found that middle-aged women were influenced by exposure to mass-mediated information more than college-aged women (Jones et al., 2006). Sato (2003) also drew on agenda setting theory and coded newspaper articles to observe the relationship between the media agenda and the Diet agenda (Japan's legislative parliament) on smoking control policy (Sato, 2003).

Despite extensive documentation that media can influence priorities of issues in audiences, explanations for how agenda setting occurs have been debated (Weaver, 2007). For example, while some researchers have proposed that accessibility-based mechanisms can describe how agenda setting works (Scheufele, & Tewksbury, 2007), other researchers believe that trust of media is a more important moderator to explain the effects of media on the audience's prioritization of an issue (Miller, & Krosnick, 2000). For example, audience members who trust the media to be accurate and informative may be more inclined to believe that the news coverage of an issue is associated with the importance of the issue (Miller, & Krosnick, 2000). More research is needed to understand the mechanism by which the public agenda is set. Nevertheless, it is difficult to demonstrate relationships and prove causality when researchers are rarely able to control the independent variable (e.g., the media agenda) (Rogers & Dearing, 1988).

This thesis research is concerned with the public agenda, and is focused on the relative importance of prostate and testicular cancers compared to other topics in publically available Movember-related conversations. Investigating conversations on social media (e.g., *Twitter*) can help identify whether prostate and testicular cancers were important topics in the public agenda as it relates to the Movember campaign. Moreover, understanding what is communicated on social media during cancer awareness campaigns will reveal which aspects of the campaign (e.g., fund-raising, growing a moustache, sharing information about risks of prostate cancer) were emphasized and discussed more frequently in conversations generated by social media users and which ones were ignored.

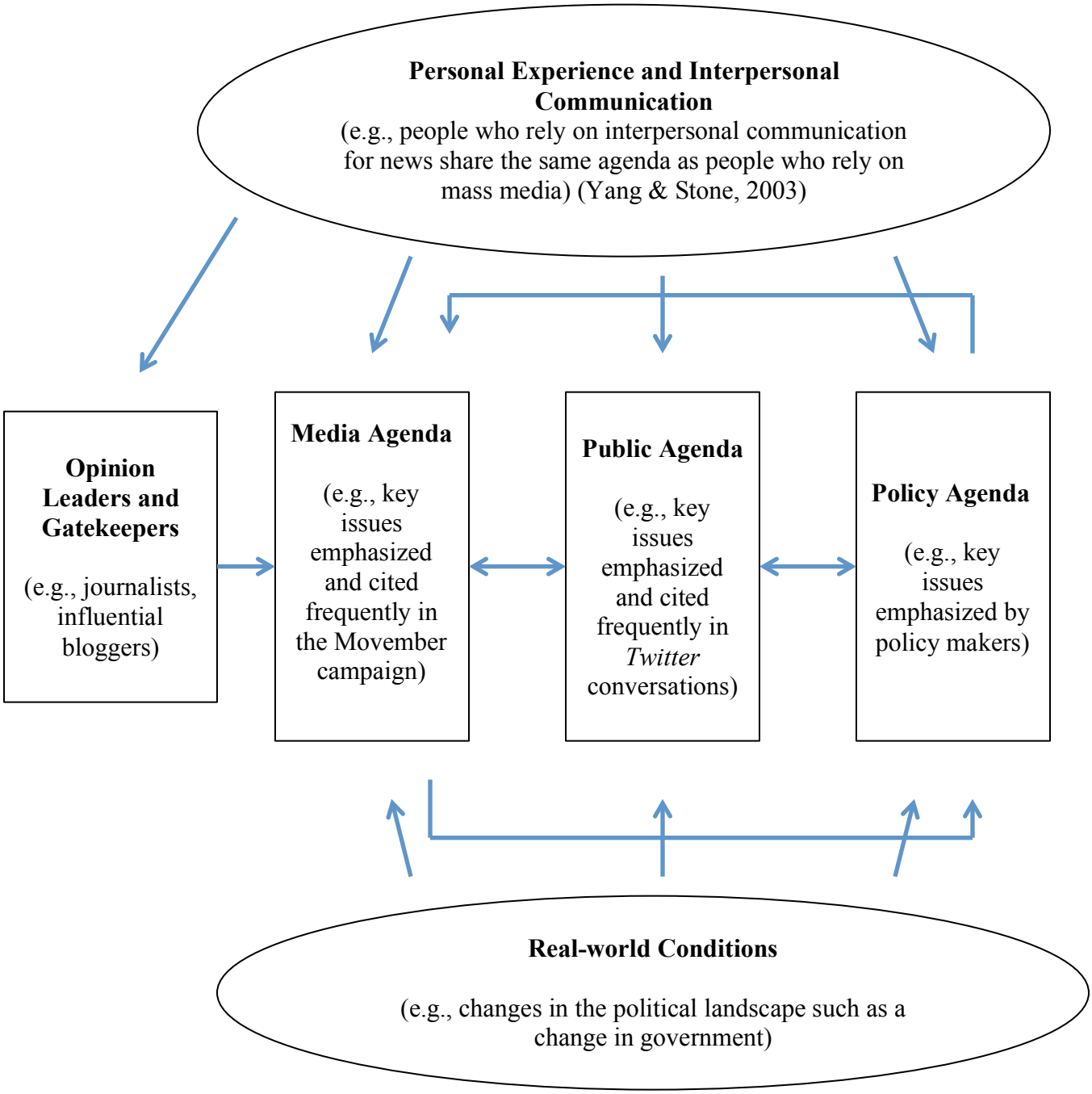

Figure 1. Modified from, "*The Relationship of the Three Main Components in the Agenda-Setting Process*" as it is depicted in Rogers and Dearing, 1988, p. 557 in J. A. Anderson (Ed.), Communication yearbook 11 (p. 557), Newbury Park, CA: Sage.

Chapter 2: Research Gaps, Objectives, and Rationale

Although there is an abundance of research on mass media campaigns and social networking sites (Noar, 2006), existing research on the Movember campaign is sparse despite receiving significant media attention. Analyzing conversations on social media can illuminate the influence of the Movember campaign on the public and the role of social media during awareness-related events. Given the influence of mass media campaigns on public agenda setting, understanding potential differences in campaign and audience values may improve the design and communication leading to more effective and impactful mass media campaigns in the future.

This research was composed of two studies, each with a set of specific research questions and testable hypotheses. The overall objective of this research was to describe the content of conversations about the 2013 Movember Canada campaign that occurred in the social media channel of *Twitter*. Underlying this overall aim was to determine whether the 2013 Movember Canada campaign accomplished the stated goal of creating conversations about men's health and about the dedicated health issues of prostate and testicular cancers. The relationship between each study and the overall objective of this research is depicted in Figure 2.

As a case study, the 2013 Movember Canada website and a sample of Canadian Movember-related *Twitter* conversations were analyzed in order to describe topics of discussion surrounding the Movember campaign, the frequency of topics, and the overt and latent themes that were present in *Twitter* messages. The following section details the

research gaps, research questions, and hypotheses from each of the two studies of this thesis.

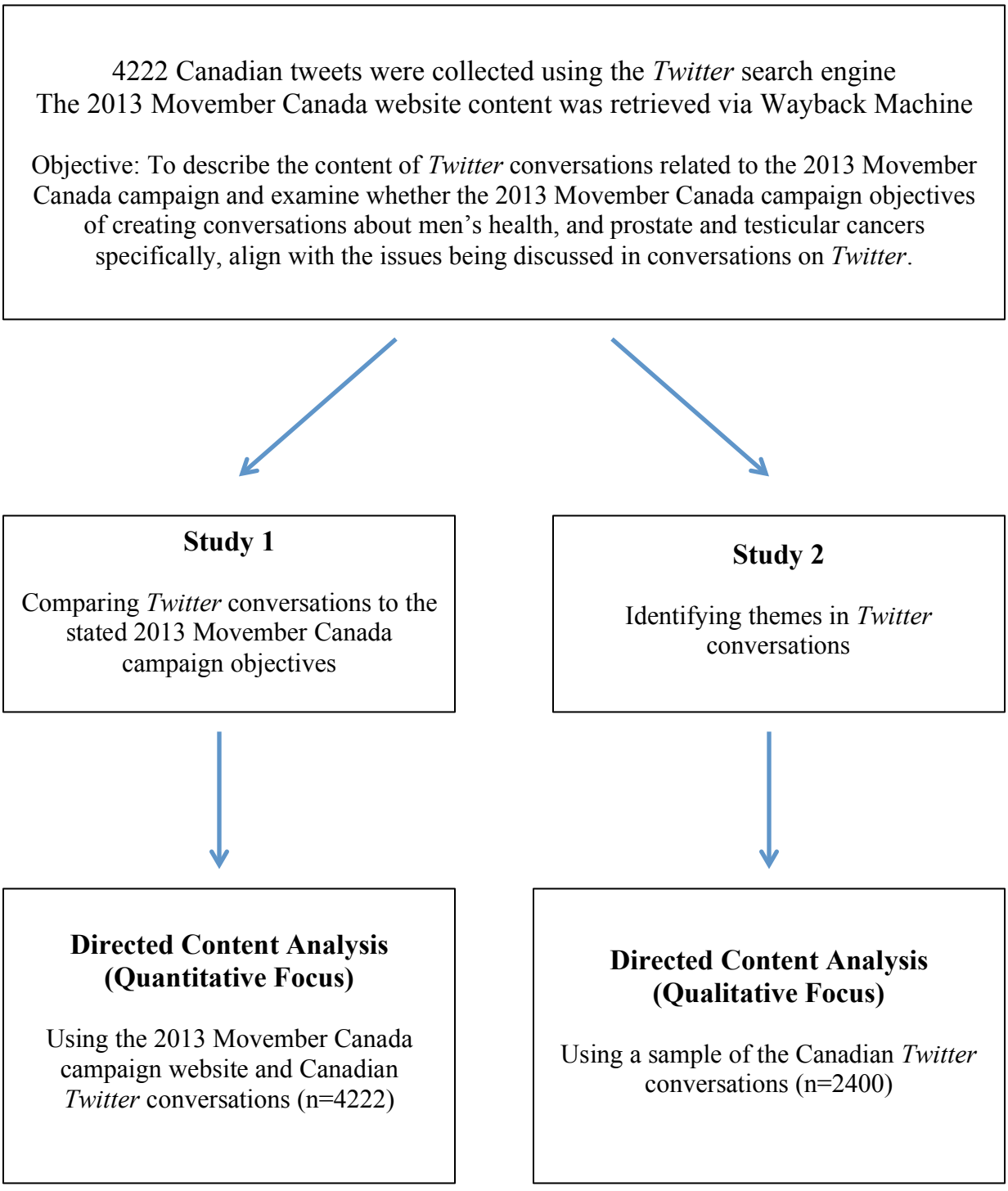

Figure 2. Brief Description of Each Study and their Relation to the Overall Research Question

2.1 Study #1

Movember has been described as a "phenomenon" that is "hard not to hear or see something about" (Jeffcott et al., 2012). Men are encouraged to grow moustaches while collecting pledges and sharing messages on social media sites. While fundraising for health programs is a major component of the Movember campaign, Adam Garone, Movember CEO and Co-Founder said, "what is equally important are the conversations and awareness about men's health created by the simple act of growing a moustache" (Movember, 2015b). In 2013, the Movember Canada campaign objectives included, "creating conversations about men's health that lead to awareness and understanding of the health risks men face, and men taking action to remain well" (Movember Canada, 2013d). Additionally, their stated vision included, "to have an everlasting impact on the face of men's health by supporting prostate and testicular cancer and mental health. We focus our efforts on: awareness and education, staying mentally healthy, living with and beyond cancer, living with and beyond mental illness, and research" (Movember, 2013d). In 2014, the Movember Foundation announced that the 2013 Movember campaign had prompted 1.7 billion conversations worldwide on social media and email (Movember Canada, 2014). To date, no academic analysis of the content of these conversations has been conducted. Therefore, there is limited knowledge of how social media is used to increase awareness and education of prostate and testicular cancers in the public during the 2013 Movember campaign.

The first study of this research focused on determining whether the conversations about Movember that occurred in social media reflected the stated focus and objectives of the 2013 Movember Canada campaign. Comparing social media discussions against

campaign objectives could help to inform cancer educators and health campaign creators of the impact of mass media campaigns on the public's knowledge and values, the role of social media as a platform for public engagement, and the success of the Movember campaign specifically in raising awareness for the beneficiaries of the campaign (e.g., Prostate Cancer Canada). The specific research question that directed this study was:

Did the 2013 Movember Canada campaign meet the objective of creating conversations (on Twitter) about men's health, and prostate and testicular cancers for the month of November (2013)?

Prostate and testicular cancers have been identified as health problems that require advocacy and awareness (Blanchet, 2011; Siemens, 2011). Both of these chronic diseases are identified as the main thrust of recent Movember campaigns. It is reasonable to expect that the public will also adopt the idea that prostate and testicular cancers are significant health issues for men. Additionally, agenda setting theory suggests the public will adopt the popular and relevant themes of the 2013 Movember campaign.

The hypothesis for this study was:

Agendas and themes identified in the 2013 Movember Canada campaign would be evident in the conversations on social media (Twitter) for the month of November (2013).

2.2 Study #2

The focus of study #2 was to describe the overt and latent themes that were present in the conversations related to the 2013 Movember Canada campaign in order to understand what ideas and concepts were prioritized in conversations about Movember. A qualitative content analysis methodology was used to identify overt and latent themes.

This study was informed by themes that were present in the 2013 Movember Canada website content as well as themes that were present in traditional media sources about prostate cancer and testicular cancers. Overt themes refer to the surface-level meanings of the message. The researcher does not look for meanings beyond what the participant is saying (Braun & Clarke, 2006). In contrast, latent themes examine the underlying assumptions and ideas of the data (Braun & Clarke, 2006). Latent content includes absence of themes and the deeper or unintended meanings (Clarke, Friedman, & Hoffman-Goetz, 2005).

Prostate and testicular cancers have been associated with the themes of sport, competition, war, and money in traditional mass media print outlets (North American magazine articles) published between 1996 and 2001; machismo was used to describe why men did not engage in early screening for prostate and testicular cancers (Clarke, 2004). Moreover, testicles were presented as representing manhood, masculinity, and sexuality and testicular cancer was frequently cited in contexts of sexuality, fertility and relationships with women. The use of euphemisms and humour was frequently used, suggesting embarrassment about testicular cancer (Clarke, 2004). Dominant stereotypes about masculinity and prostate cancer also frequently occurred in articles printed in the National Post and The Globe and Mail between 2001-2006 (Halpin et al., 2009). Characteristics such as competition and stoicism were associated with prostate cancer patients and survivors (Halpin et al., 2009). War metaphors that are common in cancer discourse were pervasive throughout prostate cancer articles with descriptions of the prostate cancer patient as needing strength to "fight" against cancer (Miele & Clarke, 2014).

Movember campaigns use similar appeals to masculinity strategies, by emphasizing the relationship between facial hair for a cause and entering a stage of manhood (Robert, 2013). The research question that directed this study was:

What are the overt and latent themes related to men's reproductive cancers appearing in social media (Twitter) during the 2013 Movember campaign?

The hypotheses for this study were:

1) *Social media conversations appearing in Twitter during the 2013 Movember Canada campaign would reflect the cultural themes evident in other traditional media*
2) *The theme of hegemonic masculinity (dominant stereotypes of masculinity such as strength, courage, war, toughness) would appear in conversations in social media (Twitter) in relation to prostate and testicular cancers during the 2013 Movember Canada campaign.*

Chapter 3: Methods

This research did not require ethics approval since it used website content and publically available archived *Twitter* content for analysis. The section below describes the general methods used in the studies. Additional methodological details are given in Chapters 4 and 5 where the results are described.

3.1 Data Collection

3.1.1 2013 Movember Canada Website Content: Wayback Machine

The Internet Archive: Wayback Machine (http://archive.org/web/) was used to collect captures of the Movember Canada website as it appeared during November in 2013. Wayback Machine allows users to search for the website of interest (e.g., ca.november.com) and view archived versions of the web pages. Appendix B shows the snapshot provided by Wayback Machine of the men's health web page on the Movember Canada website as it appeared on November 7, 2013. Evernote, a notetaking and archiving software (https://evernote.com/), was used to capture the screen for each web page of the Movember Canada website so that a PDF version of each web page could be imported into NVivo (v.10) for analysis.

3.1.2 2013 Movember Canada Conversations: *Twitter* Search Engine

Twitter has a dedicated search query called *Twitter Search* (twitter.com/search-home) which allows the user to conduct manual searches for keywords in tweets. One of

the key features of the *Twitter* advanced search engine is the ability for the user to search for tweets with specific parameters such as hashtags, language, and date range. The specific parameters for this research included: the "#movember" hash tag, English language, and posted between of November 1, 2013 to November 30, 2013 (inclusive). An example of the output generated by the *Twitter s*earch engine using the search operators: "#movember lang:en until: 2013-11-02" can be found in Appendix C.

Since the Movember Canada website has specific content and dedicated health issues that differ from other participating countries, it was important to identify tweeters who were from Canada in order to make comparisons between the Canadian Movember website and *Twitter* conversations. To classify tweets from Canada, the geographic location of the user was determined using the methodology for *Twitter* research described by Sullivan et al. (2013). Briefly, the geographic location was manually determined by clicking on the user profile and identifying where the *Twitter* account was registered; this information was dependent on whether the user shared this data. Users could choose to provide geographic identifiers and did not have to do so to tweet. Appendix D shows an example of where the geographic location appears on a user profile.

The *Twitter* search engine did not indicate how many tweets met the search criteria (#movember, English, November 1, 2013 to November 30, 2013, registered Canadian tweeter). Thus, it was not possible to calculate the total number of publically available *Twitter* messages that met the search criteria. Given the number of tweets, it was not reasonable to manually copy and paste all tweets that met the search criteria. Nevertheless, to address potential sampling issues, 1500 tweets were collected for 3 specific dates: November 1, November 15, and November 30. The first 1500 tweets were

divided into two sets of 750 tweets to determine if the groups were similar in the number of Canadians participating in the conversation. Appendix E shows justification for the sample size (e.g., number of tweets collected). Since there was no significant difference between the number of Canadian tweets in the two sets of data, 750 tweets were collected for all remaining days in November with the exception of November 10 (n =739 tweets), November 11 (n= 747 tweets), and November 28 (n= 587) due to technical difficulties with the *Twitter* search on these days. A total of 24,573 tweets that met the search criteria were imported into Excel for data organization. Appendix F shows how *Twitter* data was organized in an Excel spreadsheet. The following information was collected about each tweet: date of retrieval, date posted by user, content of tweet, location of user, code for location of user (where 0=not Canadian, 1 = Canadian, and 2 = not available), number of followers, presence of image (where 0 = no, 1 = yes), and code for organization/company/group (where 0= no, 1 = yes).

Only original tweets, rather than retweets, were analyzed. A retweet is a re-posting of someone else's tweet (Twitter.com). Retweets have been used as one of the criteria for determining influence of a tweet or tweeter (Xiao, Zhang, Zeng, & Wu, 2013). However, retweets do not represent original thoughts, attitudes, or opinions of the user. Thus, content that had been retweeted (indicated by "RT@username:") were removed. Additionally, duplicates of tweets from the sample user were removed in an effort to capture as many original tweets and themes as possible.

After retweets and duplicates were removed, 4,222 Canadian tweets were extracted from the data sample and imported into NVivo (v.10) for analysis in study #1. Analysis for study #1 is detailed in Chapter 4. Approximately 50% (n= 2400; 80 tweets per day for

each day of November) of this sample was analyzed for study #2. A 50% sample (n= 2400) of the total number of Canadian tweets collected (i.e., n = 4222) was chosen for qualitative analysis because tweets were short, and it was necessary to have a sufficient sample to reach saturation of themes. An initial analysis of approximately 25% of the total Canadian tweets (n= 1200 tweets; a random sample of 40 tweets per day for each day of November) failed to reach saturation by two researchers and hence the increase in sample was undertaken Again, a random sample of a further 40 tweets per day was obtained for the analysis. At 2400 tweets, theme saturation was achieved. Data saturation is used to determine appropriate sample size in qualitative research and refers to the point in data collection when no new data or themes emerge and concepts or categories are well developed (Francis et al., 2010). Analysis for study #2 is detailed in Chapter 5. Appendix G shows a snapshot of NVivo (v.10) coding for each study.

3.2 Data Analysis

Both studies in this research used a content analysis methodology to analyze *Twitter* content. Content analysis is a widely used research method "for making replicable and valid inferences from text (or other meaningful matter) to the contexts of their use" (Krippendorff, 2004, p.18) Content analysis can consist of transforming qualitative content into a quantitative form by establishing coding categories and counting the number of data units (e.g., phrases, messages, responses) that fall into each coding category (Wilkinson, 2000). However, content analysis goes beyond just counting words to examining language for categories that represent similar meanings and overt or inferred communication (Hsieh, & Shannon, 2005).

Content analysis has been applied extensively to health research on diverse topics and content. For example, Lyles et al. (2013) employed content analysis methodology to identify major discussion categories in cervical and breast cancer screening dialogue on *Twitter*. Additionally, content analysis has been used to identify content patterns of frames used in print news articles about type 2 diabetes (Gollust & Lantz, 2009), classify descriptions of health and fitness mobile application descriptions (West et al., 2012), and examine trends in the way newspaper articles and television transcripts presented the issues of rising health care costs in the United States from 1993 to 2010 (Foster, Tanner, Kim, & Kim, 2014).

Directed content analysis uses key concepts or variables from existing research to inform the preliminary codebook (Hsieh, & Shannon, 2005). In study #1, the main concepts from the 2013 Movember Canada website informed the preliminary codebook seen in Appendix I. The themes identified in the 2013 Movember Canada campaign were compared (mapped) to the themes evident in Canadian conversations on T*witter* to establish whether the campaign agenda (prostate and testicular cancer awareness) was integrated into the public agenda. In study #2, prior research about prostate and testicular cancers in traditional media (e.g., appeals to traditional masculinity, war metaphors) as well as themes present in 2013 Movember Canada website content (i.e., moustache growing) informed the preliminary themes. However, themes were not restricted to pre-existing categories and other themes emerged through an inductive process whereby open coding of data revealed categories that moved from the specific to the general (Elo, & Kyngäs, 2008).

Following the coding of tweets in NVivo (v.10) for topic categories in study #1, the count for each topic was imported into SPSS (v.22) for statistical analysis. Independent T-tests were conducted (as per statistical consulting from the University of Waterloo Statistical Consulting Service) to test statistical significance ($p<0.05$) between counts of topic categories for health-related and non-related groups. Representative statistical output from SPSS (v.22) data analysis for study #1 can be found in Appendix H. Further details of this analysis can be found in Chapter 4.

Chapter 4: Do *Twitter* Conversations and the 2013 Movember Canada Campaign Objectives Align?

The work presented in this chapter has been published in the Journal of Cancer Education as:

Bravo, C. A., & Hoffman-Goetz, L. (2015). Tweeting About Prostate and Testicular Cancers: Do Twitter Conversations and the 2013 Movember Canada Campaign Objectives Align? *Journal of Cancer Education*. The final publication is available at Springer via http://dx.doi.org/10.1007/s13187-015-0796-1

4.1 Introduction

In 2014, an estimated 23,600 new cases of prostate cancer will occur in Canadian men, with an estimated 4000 deaths (Canadian Cancer Society, 2014a). In the United States, 233,000 new cases of prostate cancer will occur in 2014, with an estimated 29,480 deaths (American Cancer Society, 2014). Testicular cancer is less prevalent and affects primarily young men age 15 to 29 years. In Canada, approximately 1000 men will be diagnosed with testicular cancer, of which 29 will die from this disease (Canadian Cancer Society, 2014d). In the U.S.A., an estimated 8820 of new cases of testicular cancer and 380 deaths will occur in 2014 (American Cancer Society, 2015b).

The public's awareness of cancer comes in part from the mass media (Kelly et al., 2010). Traditional print media, such as newspapers and magazines, have focused on prostate and testicular cancers to a lesser extent than on breast and female reproductive cancers (Clarke, 2004). Recently, however, prostate and testicular cancers have been

brought to the forefront of the public's attention with the introduction of global "Movember" campaigns.

The Movember campaign was first introduced into Canada in 2007 with participants urged to grow moustaches, collect pledges, and share messages on social media to raise awareness for prostate cancer. In 2013, the campaign health issues were expanded to include testicular cancer and men's mental health. The stated 2013 Movember Canada campaign objectives included "creating an innovative, fun and engaging annual Movember campaign that results in conversations about men's health that leads to greater awareness and understanding of the health risks men face, men taking action to remain well, when men are sick they know what to do and take action" and that "men living with prostate and testicular cancer have the care needed to be physically and mentally well" (Movember, 2013d). In a media release (March 2014), the Movember Canada team announced that the 2013 Movember campaign prompted 1.7 billion conversations worldwide on social media and email (Movember Canada, 2014). One popular mechanism through which individuals participate in conversations and share various user-generated content, such as news, thoughts, and images, is through social networking sites (Khang et al., 2012).

Twitter is a web-based service that allows users to create profiles, make connections with other users, and view content of those with whom they have connected (Boyd, & Ellison, 2008). Unlike other social media, *Twitter* content has a limit of 140 characters (www.twitter.com). Regardless of the type of platform (e.g., *Twitter, FaceBook, Pinterest, YouTube*, etc.), social media has changed the way people communicate about health information. For example, individuals may not automatically

accept the advice of traditional health experts, such as doctors or public health institutions, and instead look to what their peers are saying about health issues (Ratzan, 2011). This is especially the case among well-educated, young adults (Percheski, & Hargittai, 2011). Consequently, it is timely and important to examine the content of online public conversations through social media channels to identify whether the Movember campaign objectives of making prostate and testicular cancers a topic of conversation align with *Twitter* conversations.

The purpose of this study was to explore what *Twitter* users are discussing in Movember-related conversations within the context of the stated campaign objective of creating conversations about men's health, and prostate and testicular cancers specifically. We chose the 2013 Movember Canada campaign and *Twitter* conversations for that campaign year because of the focus on both prostate and testicular cancers and because the Movember Canada campaign achieved second place internationally for fundraising with approximately $33.46 million CAD raised (Movember, 2015f).

4.2 Methods

A quantitative content analysis methodology was used to analyze publically available Movember related tweets posted by Canadian users on the *Twitter* website. The *Twitter* website contains a dedicated search engine (https://Twitter.com/search-home) with *Twitter*-specific search operators to help users find tweets containing specified search criteria. Search criteria for this study included tweets with the hashtag '#Movember', published for November 2013 inclusive, and available in English. Geographical location information was collected from the user profile. No other user

information was captured. A total of 22, 323 tweets were collected for the month: 750 tweets for each day in November 2013, with the exception of November 10th (n = 740), November 11th (n= 745), and November 28th (n= 588) due to technical difficulties in recovering data by the *Twitter* website. Re-tweets, modified tweets, and duplicate tweets within each day were removed. Canadian tweets (n= 4222) were extracted from the data set for descriptive analyses.

The Movember Canada 2013 website content was used to develop a coding scheme for the *Twitter* content about Movember. The Movember 2013 website content was collected from an online web archive (*Wayback Machine;* https://archive.org/web/). Content of the Movember Canada 2013 website was categorized by page tabs and topic headings and informed the preliminary codebook. The #Movember tweets were categorized as health-related or non-health-related content. Health-related content was defined as a tweet that specifically contained term(s) reflecting the four main health campaign objectives or agenda items of the Movember Canada 2013: these were prostate cancer, testicular cancer, men's mental health, and men's health in general. Examples of health-related tweets are given below:

> "If detected and treated early, there is a 95 percent survival rate associated with prostate #cancer. #movember #IMAZ: http://ow.ly/qMulT" [November 13, 2013]

> "#HealthTip Testicular cancer is most common in American males aged 15-34 Know the #signs via @MayoClinic http://mayocl.in/U0NgIT #Movember" [November 19, 2013]

"Did you #Movember is to raise awareness for Men's Health AND Men's Mental Health? Here are some tips: http://dadsroundtable.com/health_lifestyle/2012/11/dads-mental-health/ … #DadsRT" [November 4, 2013]

"The average life expectancy for Canadian men (78) is four years less than for women (82). http://mobro.co/name #Movember" [November 24, 2013]

Non-health-related content was defined as a tweet that did not specifically reference any of the four main Movember health campaign objectives or agenda items. Examples of non-health-related tweets are given below:

"Help me fight the good fight and donate to my #Movember moustache http://mobro.com/name" [November 27, 2013]

"I'm supporting movember #nails #movember #support #lazysunday #girliegirl #mustaches #blackandwhite http://instagram.com/p/gjZ4iNEIwO/" [November 10, 2013]

"Style guide for #Movember!! What Stache are you growing? pic.Twitter.com/0BnoTSzzpG" [November 1, 2013]

Extraneous message content, such as images, websites, campaign pledge links or other contact information, was not analyzed.

Two independent researchers coded an initial 400 tweets to develop the initial codebook and for identification of additional topics of discussion not predicted by the content of the 2013 Movember Canada website. These additional topics were discussed iteratively by the researchers and informed the final codebook. The additional categories were: About the Movember Campaign (Vision, Values and Goals), Participation (Community Engagement Activities; Commercial, Contests and Giveaways; Moustaches); and Other (Celebrities or Opinion Leaders; Miscellaneous). To further ensure validity, a third researcher read a 20% sample (n= 845) of the tweets and inter-coder Cohen's Kappa scores were calculated. The inter-rater reliabilities were good to excellent with kappa scores ranging from 0.79 (e.g., Non-Health-Related Vision, Values, and Goals) to 1.00 (e.g., Health-related Prostate Cancer). Once the final codebook (Table 1) was agreed upon, one researcher read and re-read all tweets included in the study.

We identified an additional classification category called mobilizing information. Mobilizing information was defined as text that facilitates further health information seeking (Hoffman-Goetz, Shannon, & Clarke, 2003). Although not part of the 2013 Movember Canada campaign objectives, mobilizing information is, nevertheless, an important variable because it enables users to be proactive and learn more about the campaign health issues. To be considered mobilizing information, prompts (words or phrases) that explicitly indicated an information resource had to appear in the tweet. The prompts included words or phrases such as: "tips", "check it out", "know the signs",

"read more", "find out", and "here is information". External links (e.g., websites) associated with the mobilizing information prompts were not evaluated.

Tweets were entered into NVivo (v.10) for content analysis where tweets were coded into the appropriate content classification. The number of tweets per topic was imported into SPSS (v.22) for descriptive analyses. Independent sample t-tests were used to compare the number of tweets coded for each topic in the health-related versus non-health-related categories. A p-value of 0.05 was accepted as significantly different from chance alone.

Table 1. Coding scheme for analysis of Movember 2013 tweets on the Twitter social networking site

Coding Classifications	Coding Topics	Definition	Inclusion Criteria and Application of Definition	Example Tweet(s)
Health Information	Prostate Cancer	A tweet that contains health information about prostate cancer.	-Risk factors -Screening -Risk statistics	Prostate cancer is more common in men of African or Caribbean decent. #movember… http://instagram.com/p/glwZLpTSbC/ [November 11, 2013]
	Testicular Cancer	A tweet that contains health information about testicular cancer.	-Risk factors -Screening -Risk statistics	Testicular cancer is the second most common cancer, behind skin cancers, in young men aged 15 – 29 years. http://bit.ly/siP8G7 #Movember [November 22, 2013]
	Mental Health	A tweet that contains health information about mental health in men.	-Risk factors -Risk statistics -Specific mental health conditions (such as depression or anxiety)	Depression affects 840,000 men every year in Canada. #Movember #mentalhealth http://mobro.co/name http://shar.es/8rdxp [November 11, 2013]
	General Men's Health	A tweet that contains health information about general men's health.	-Risk factors and risk statistics for general issues in men such as general cancer issues, male fertility, diabetes, etc.	The average life expectancy for Canadian men (78) is four years less than for women (82). http://mobro.co/name #Movember [November 24, 2013] #Movember Fact: Did you know that a daily slice of #bacon can harm men's fertility? http://ow.ly/qK3jS [November 12, 2013)
About the Movember Campaign	Vision, Values, and Goals	A tweet that reflects the vision, values, and goals outlined by the Movember campaign on the Movember Canada website.	-"To change the face of men's health" -"To make change" -"To stand for change"	I've enlisted in #Movember to change the face of men's health. Donate & join the good fight… http://instagram.com/p/gMPImsTfYz/ [November 1, 2013] To make change we need to raise it, donate to my #Movember effort. http://mobro.co/name [November 12, 2013]

Coding Classifications	Coding Topics	Definition	Inclusion Criteria and Application of Definition	Example Tweet(s)
Participation	Community Engagement Activities	A tweet that describes activities such as fundraising, donating, supporting, joining, or participating in events to support Movember efforts.	-Calls to fundraise or donate -Incentives for donating -Call to support a team, participant, or the campaign -Call to join a team or the campaign -Fundraisers -Auctions -Bake sales -Tournaments	PLEASE show your support for cancer research & help me exceed my $1000 personal goal this #Movember!!! #Day1... http://fb.me/ZSLXLqzx [November 1, 2013] Join us by becoming #MoSistas this #Movember. @MovemberCA http://ca.movember.com/get-involved/mo-sistas … [November 15, 2013] Thank you to all who participated and donated in our Movember Shinny Fundraiser! #movember #hockey #shinny #thanks http://www.youtube.com/watch?v=pbuIguFFZUU … [November 12, 2013]
	Commercial, Contests and Giveaways	A tweet that references provision of goods or services, usually in exchange for money or a tweet that contains information describing a contest or a giveaway.	-Selling merchandise -Selling food or beverage at a restaurant -Donating proceeds of products or services to the Movember campaign -Chance to win or receive a product or service	Support #Movember men's cancer research & awareness! Get your mustache cookies today at @McBridesBakery. #medhat pic.Twitter.com/jXvOl70xti [November 12, 2013] The #movember bow tie: The Mo' Tie http://www.lielandlentz.com/collections/movember … All proceeds go to #movember #madeincanada #moustache pic.Twitter.com/nKvsadA2dC [November 11, 2013] #WIN an engraved Mustache flask for #Movember! Enter the @ThingsEngraved #contest here: http://blog.thingsengraved.ca/2013/movember-giveaway/ … [November 6, 2013]

Coding Classifications	Coding Topics	Definition	Inclusion Criteria and Application of Definition	Example Tweet(s)
Participation	Moustaches	A tweet that mentions moustaches or the growing, grooming, or styling of a moustache or facial hair.	-Participant expressing participating by growing, grooming or styling a moustache -Participant describing someone's moustache -Describing moustache -Tagging tweet with the hashtag "#moustache" or equivalent synonym	3 years with my babe and he's always had a beard, Today he shaved it all off! Happy Movember #Movember pic.Twitter.com/us90qDt098 [November 1, 2013] Mustaches: like mittens for your lips #Movember #MensHealth [November 19, 2013] One moustache for one month can save millions of men from prostate cancer. Read more and donate now! #Movember http://ow.ly/qUqLF [November 19, 2013
Other	Celebrities or Opinion Leaders	A tweet that mentions a celebrity or other key opinion leader.	-Celebrities with famous moustaches -Athletes -TV personalities -Politicians -Musicians	Rolling along with our #Sens week 1 #Movember update, here's Zack Smith. It's getting there….. http://instagram.com/p/ghNNxgo-vf/ [November 10, 2013 Happy #Movember! Here is a great video from Nick Offerman on how to grow a moustache http://ow.ly/p3ke0 #funny [November 1, 2013] Thank U @TSNDaveNaylor and @simmonssteve for opening up to me about how Mental Health has touched them. #class #mentalhealth #Movember. [November 29, 2013]

Coding Classifications	Coding Topics	Definition	Inclusion Criteria and Application of Definition	Example Tweet(s)
	Miscellaneous	A tweet that does not address content in any other category.	-Nonsensical -Vague	These ladies placed the winning bid for Hubert #yyc #movember #ntnl17 http://ow.ly/i/3Bocz [November 1, 2013]

4.3 Results

A total of 4222 Canadian tweets (November 2013) were analyzed. There were significantly fewer tweets (n= 673; 15.94%) in the health-related category compared with the non-health-related category (n= 3549; 84.05%) ($t= 25.171$, $p <0.05$). Within the health-related category, the coding categories (health information, about Movember, participation, other) occurred 1077 times in the tweets compared with the number of times these classifications occurred in the non-health-related category of 4297 times. This difference was significant ($t= 11.917$, $p < 0.05$).

Only 36 (0.85%) of the 4,222 Canadian tweets contained health information messages that specifically mentioned risk factors, susceptibility, screening, or other health facts about prostate, testicular, or men's mental health. Of the 36 tweets in the health-related category, 21 tweets (58.33% of the health-related tweets; 0.50% of all tweets) contained messages that specifically provided health information about prostate cancer. There were even fewer tweets containing specific health information about testicular cancer (n= 4, 11.11% of health-related tweets; 0.09% of all tweets) or men's mental health (n= 3, 8.33% of health-related tweets; 0.07% of all tweets). Approximately 22% of health-related tweets or 0.19% of all tweets contained specific health information about other health issues affecting men (n= 8 tweets). Examples of tweets about prostate and testicular cancers with specific health-information are illustrated below:

> *"In 2013, 26,500 new cases of prostate cancer will be diagnosed in men and 4,000 will lose their battle. #Movember http://Mobro.co/name"* [November 6, 2013]

"Prostate Exam Every 4 Years http://www.medicinenet.com/script/main/art.asp?articlekey=24521…#movember #menshealth" [November 25, 2013]

"#Movember stop using pesticides as they are linked to prostate cancer http://www.ncbi.nlm.nih.gov/pubmed/23171882" [November 4, 2013]

"Testicular cancer is the second most common cancer, behind skin cancers, in young men aged 15 – 29 years. http://bit.ly/siP8G7 #Movember" [November 22, 2013]

Few tweets contained mobilizing information that facilitated further health information seeking (n= 8, 22.22 % of health-related tweets; 0.19% of all tweets); these 8 tweets were distributed as: prostate cancer (n= 3 tweets), testicular cancer (n= 3 tweets), and men's mental health (n=2 tweets). Examples of tweets with mobilizing information are given below:

"Happy #Movember! Looking to learn more about #testicularhealth / #selfcare? Check out this fun educational poster http://bit.ly/mRROfL" [November 5, 2013]

"Useful tips and advice on prostate cancer #Movember http://www.prostate.org.au/articleLive/pages/Testing-and-Diagnosis.html …" [November 13, 2013]

"#HealthTip Know the #signs of #Testicular Cancer via @MayoClinic http://mayocl.in/U0NgIT #Movember" [November 19, 2013]

"Via @NAMIMass: You can't fix men's #mentalhealth with duct tape! Check out http://mantherapy.org http://ow.ly/qg3Yz #movember #tbay" [November 25, 2013]

Overall, the number of times the terms prostate cancer, testicular cancer, men's mental health, and men's general health were specifically mentioned in the 4222 tweets, regardless of whether these terms were linked or referenced to specific health information such as risk factors, were: prostate cancer (n= 79, 1.87%), testicular cancer (n= 10, 0.24%), mental health (n= 27, 0.64%), and general men's health (n= 11, 0.26%).

Table 2 shows the differences in number and percentage of topics in the 4222 Canadian tweets included in the health-related and non-health-related categories. There were significantly more tweets, identified as "About the Movember 2013 campaign" (vision, values, and goals) in the health-related category relative to the non-health-related category ($t= -3.762$, $p<0.05$). In contrast, the other coding topics (i.e., participation and other) occurred more frequently in the non-health-related Movember tweets than the health-related ones. The topics of community engagement and moustaches had the most tweets. There were more tweets in the non-health-related category versus the health-related category for both topics. About 39% of the community engagement topic occurred in the non-health-related category compared with about 13% of tweets in the

health-related category. Community engagement messages dealt with fundraising or donating, joining or supporting the movement, and events related to the Movember campaign. Examples of tweets with the community engagement topic in both non-health- and health-related categories are given below:

non-health-related: *"This is my tenth day growing a moustache! To make change we need to raise it, donate to my #Movember effort. http://mobro.co/name"* [November 10, 2013]

non-health-related: *"We have a new registration deadline for the #Kwantlen #Movember Dodgeball Tournament! Sign up before Wed @ 6pm at http://ow.ly/qiAvp!"* [November 11, 2013]

health-related: *"#UBC psychiatry prof John Ogrodniczuk talks men's #mentalhealth for #Movember kick off event #ThriveatUBC pic.Twitter.com/tmvhQAcjjU"* [November 4, 2013]

health-related: *"Support the cause. My father died of prostate cancer & my brother has it. Please donate to my #Movember effort. http://mosista.co/name..."* [November 16, 2013]

A second topic occurring frequently in the tweets was about 'moustaches'-growing, styling, grooming, and moustache-products - found in 32.76% non-health-related tweets

(n= 1383) vs. 1.97% in the health related tweets (n= 83). This difference was significant ($t= 26.616$, $p < 0.05$). Examples of non-health-related messages about moustaches and health-related messages in the tweets are illustrated below:

non-health-related: "Day: 5 I've got 99 problems, but this moustache ain't one. #movember #moustache pic.Twitter.com/9iVoxm9tFA" [November 8, 2013]

non-health-related: *"Today I took my moustache to the market. He was spoiled. #croissant #flatiron #movember @ Market Square http://instagram.com/p/gghtuFqitS/"* [November 9, 2013]

health-related: *"Check out how growing a #mustache can make a difference in the fight against prostate cancer! http://ow.ly/qQapb #Movember"* [November 16, 2013]

health-related: *"One week down! There's a moustache on the rise. Join the fight against Prostate and Testicular Cancer. #Movember http://bit.ly/16T64eW"* [November 8, 2013]

Table 2. Comparison of theme counts and percentages between health-related and non-health-related tweets.

Coding classification	Topic	Health-related			Non-health-related			t-value	Sig (2-tailed) value
		Number of tweets with topic	% of tweets in coding classification[1]	% of all tweets analyzed[2]	Number of tweets with topic	% of tweets in coding classification[1]	% of all tweets analyzed[2]		
About Movember	Vision, Values, Goals	459	61.86	10.87	283	38.14	6.70	-3.762	$p < 0.05$
Participation	Community Engagement	443	12.51	10.49	1,386	39.14	32.83	14.703	$p < 0.05$
	Commercial, Contests, and Giveaways	14	0.40	0.33	232	6.55	5.50	13.629	$p < 0.05$
	Moustaches	83	2.34	1.97	1,383	39.06	32.76	26.616	$p < 0.05$
Other	Celebrities and Opinion Leaders	7	0.66	0.17	139	13.18	3.29	11.115	$p < 0.05$
	Miscellaneous	35	3.32	0.83	874	82.84	20.70	19.201	$p < 0.05$
Total		673	---	15.94	3549	---	84.06	25.171	$p < 0.05$

[1] Percentage of tweets in coding classification for health-related and non-health-related tweets sums to 100%. For example, for the about Movember coding classification the percentage of health-related tweets (61.86%) added to the percentage of non-health-related tweets (38.14%) sums to 100%. Similarly, for the participation coding classification the percentage of health-related tweets (12.51% + 0.40% + 2.34%) added to the percentage of non-health-related tweets (39.14% + 6.55 % + 39.06 %) sums to 100%.

[2] Percentage of all tweets analyzed was calculated as the total number of tweets per topic divided by the total number of tweets analyzed (n=4222).

4.4 Discussion

A key finding from this study was the virtual absence of messages in 4222 tweets analyzed for the 2013 Movember Canada campaign that included specific health information about prostate or testicular cancers. In fact, most of the tweets did not even mention prostate or testicular cancers. These findings suggest that the 2013 Movember Canada campaign had little impact on creating conversations emphasizing prostate and testicular cancers. The majority of conversations were non-health-related and largely consisted of messages about fund-raising or donating, and moustache growing or grooming. There were few tweets that explicitly referenced the official health issues of the campaign (i.e., raising awareness about prostate and testicular cancers) and even fewer still that presented specific health information about men's cancers or men's health or mobilizing information to enable the reader to be proactive and learn more about the health issues. Given the limited references to the prostate and testicular cancers, findings from this study suggest that the Movember 2013 Canada campaign did not successfully create conversations on the social media platform of *Twitter* that would result in greater awareness and understanding of men's health issues. Though *Twitter* has been identified as a valuable source of information for other health issues (McGregor et al., 2014), users would not likely learn about prostate and testicular cancers in Movember-related conversations on this social networking site.

The tweets that explicitly mentioned one of the official Movember 2013 campaign health agenda items were mostly about prostate cancer. This may be indicative of the fact that the campaign has focused on prostate cancer since its launch into the Canadian market. Nevertheless, it was surprising that the number of times prostate cancer was

mentioned in the tweets (either with health-related information or without such information) were very few. Moreover, there may be a discrepancy between who is tweeting and the relevance of prostate cancer to those users. In a survey of Canadians social media usage, the average age of social media networkers (individuals who visit two or more social media websites in a month) was 33 years (PMB, 2009). Testicular cancer, more commonly diagnosed in men in that age demographic, would be a more relevant topic of *Twitter* conversation. The *Twitter* user cohort is more closely associated to the age group at risk of testicular cancer. Nevertheless, given that testicular cancer was only introduced as an official health agenda focus in the 2013 Movember Canada campaign, more years may be needed before testicular cancer diffuses into conversations on social media.

There are limitations of this study. First, we provide only a brief snapshot of one year of the Movember campaign, using the 2013 campaign in Canada as a case study. It is not possible, therefore, to extrapolate to other years of Movember Canada. Second, we limited our analysis to Canadian *Twitter* conversations; future research will be needed to situate the Canadian results within the U.S. and global *Twitter* conversations about Movember. Third, *Twitter* allows the user to share messages of up to 140 characters. Hence, the richness of the classifications is limited given the boundaries of this social media interaction. Moreover, the identification of information was limited since the external links to health sites or resources (either independently or associated with mobilizing information prompts) were not evaluated. We used the hashtag '#Movember' in the search to capture conversations about prostate and testicular cancers, and men's health; this could potentially contribute to selection bias and failure to identify messages

without this hashtag that may have content related to prostate and testicular cancers. Canadians who tweet in French were not included in the dataset. Finally, we did not evaluate whether *Twitter* users started conversations with their physicians about prostate or testicular cancers as a result of tweeting or reading tweets about the Movember Canada 2013 campaign; future research will need to examine the outcome of tweeting or reading about tweets regarding the Movember Canada 2013 campaign to evaluate the effect of participating in *Twitter* conversations about the Movember Canada 2013 campaign on health behaviors.

Evaluating conversations on social media such as *Twitter* provides insight into what messages are taken from the campaign by individuals and then disseminated to others on social networking sites. The findings suggest that the Movember 2013 Canada campaign did not appear to meet the objective of creating conversations about men's health that could lead to greater awareness and understanding of prostate and testicular cancer risk, screening, and ultimately, action. Targeted and persuasive health communication campaigns have long been a vehicle for cancer education and behavior change (Noar, 2006). As cancer educators, it is important to start cancer education efforts with clearly stated goals and later make careful considerations about how the design and messaging of the project align with the goals to ensure that the appropriate objectives of cancer education are achieved. Although socially and culturally relevant mass media campaigns can influence health attitudes and behaviors (Randolph, & Viswanath, 2004), this needs to be supplemented by cancer educators taking an active role in increasing prostate and testicular cancer awareness on social media by sharing health information and health resources to followers, as well as encouraging men to take action by speaking with their

doctors to determine whether screening is right for them. If the goal of the Movember campaign is to create public conversations to raise men's awareness and understanding of prostate and testicular cancers, it will be important to focus and frame the campaign messages on the key health issues rather than on other auxiliary elements.

Chapter 5: What are individuals saying in their discussions about the 2013 Movember Canada campaign?

The work presented in this chapter was accepted for publication in the Journal of Cancer Education as:

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5.1 Introduction

The Movember campaign is an international campaign organized each November in order to raise awareness and funds for men's health issues. The Movember campaign has been characterized as a "phenomenon" where men grow moustaches for the month of November in conjunction with raising awareness and funds for men's health (Jeffcott et al., 2012). In 2007, the campaign was introduced into Canada with the focus of raising awareness about the second most common malignancy in men worldwide, prostate cancer. In 2014, it was estimated that 23, 6000 Canadian men would be diagnosed with prostate cancer and an additional 4000 men would die of the disease (Canadian Cancer Society, 2014a). Similarly in the United States, it is estimated that there will be 220,800 new cases of prostate cancer and an estimated 27,540 deaths in 2015 (American Cancer Society, 2015a). Raising awareness about prostate cancer is important since early detection can increase the odds of positive treatment outcomes and reduce the probability

of death from this disease (Charvat et al., 2013).

In 2012, the Movember Canada campaign was expanded to include raising awareness and fundraising efforts for testicular cancer. Testicular cancer is less prevalent than prostate cancer with an estimated 1000 men diagnosed in Canada in 2014 (Canadian Cancer Society, 2014d) and 8430 new cases in the United States in 2015 (American Cancer Society, 2015c). However, the disease exacts high morbidity since it affects primarily young men age 15 to 29 years. Although testicular cancer is rare, a delay in treatment can increase the chance of spread of the disease (Shabbir, & Morgan, 2004). Thus, an effective campaign to increase patient awareness and self-examination is important in order to detect and treat the cancer in its early stages and reduce the chances of premature death in young men (Shabbir, & Morgan, 2004).

The 2013 Movember Canada described the moustache as *the* vehicle to raise funds and awareness in order to "combat prostate and testicular cancer and mental health challenges" (Movember Canada, 2013b). Additionally, the moustache growing participants of the campaign acted as "walking and talking billboards, bringing awareness about men's health issues and prompting conversations wherever they go" (Movember Canada, 2013b). To accomplish the goal of creating conversations about men's health, and prostate and testicular cancers specifically, the Movember campaign relies heavily on social media such as *Twitter* to share messages and promote campaign-related activities online. Analyzing conversations about the 2013 Movember Canada campaign on social media sites can inform whether the 2013 Movember Canada campaign accomplished the objective of creating conversations about prostate and testicular cancers and understanding what those conversations were about.

While the Movember Canada campaign welcomes participants of all ages, the graphics and cultural references embedded in the design and messaging of the campaign seem to be targeted at adults in their twenties and thirties (Robert, 2013). The average age of a Canadian social media networker in 2009 was thirty-three years (PMB, 2009). Thus, social networking sites such as *Twitter* are popular platforms amongst this target audience and can provide insight into what Movember Canada participants are discussing in regards to Movember as well as prostate and testicular cancers.

Twitter has been explored as a medium for breast cancer awareness and health promotion by community-based organizations. The majority of individuals tweeting about breast cancer shared messages about clothing (e.g., wearing pink) rather than early detection of breast cancer (Thackeray et al., 2013). Additionally, community based organizations were more likely to tweet about organization promotion (e.g. organization-specific news) than health education news (e.g., health tips) (Ramanadhan, Mendez, Rao, & Viswanath. 2013) There has been limited research on the frequency and type of *Twitter* conversations about men's cancers. A previous study using Canadian conversations about the 2013 Movember *Twitter* campaign revealed that few tweets mentioned prostate and/or testicular cancers in their messages; moreover, there were many more tweets about non-health topics than about health-related ones (Bravo & Hoffman-Goetz, 2015).

Understanding the underlying themes and messages in *Twitter* conversations is important for cancer educators who are utilizing social media for cancer prevention and promotion. Knowledge of what messages are shared and reinforced about prostate and testicular cancers can inform future campaigns and how to effectively create and disseminate messages that will be meaningful for an online audience in the digital age.

Accordingly, we asked what themes and messages were evident in public conversations on *Twitter* about prostate and testicular cancers, and men's health generally, in response to the 2013 Movember campaign. We focused on *Twitter* conversations during the 2013 Movember Canada campaign as a case study. Our aim was to inform cancer educators about the social media narratives that users are having about prostate and testicular cancers.

5.2 Methods

Data was collected using the *Twitter* search engine. Search criteria for this study included tweets with the hashtag "#Movember", published in November 2013 inclusive, and available in English. Geographical location was collected from the user profile to identify Canadian users. No other user information was captured. A total of 4222 publically available Canadian tweets were collected for the month. *Twitter* content yielded from the *Twitter* search engine was manually copied and pasted into an excel spreadsheet before being imported into NVivo (v.10) for qualitative analysis. Re-tweets, modified tweets, and duplicate tweets within each day were removed. A random sample of 80 tweets per day (2400 tweets in total) for the month of November were then analyzed qualitatively for themes and conversations.

A directed content analysis methodology was used to analyze the 2400 *Twitter* conversations. Existing research about prostate and testicular cancers in traditional media such as magazines informed initial themes and concepts in the tweets; these included appeals to traditional masculinity and war metaphors (Halpin et al., 2009; Miele, & Clarke, 2014). Additionally, researchers independently read and re-read the tweets to

become familiar with the content and allow other themes to emerge through an inductive approach (Thomas, 2006). Initially, one researcher read and coded 1200 tweets for overt and latent themes. Overt themes referred to content that was explicitly stated in the text, while latent themes were underlying ideas or assumptions within the text (Braun, & Clarke, 2006). Table 3 identifies the overt and latent themes found in the tweets. To verify coding and reduce bias, a second researcher read and reviewed the tweets and checked the themes against the data set; additional themes were added to the coding by the researchers as they emerged from the data set. Themes were then refined by discussion between the researchers and applied to the tweets in an iterative fashion. Tweets were analyzed until saturation of themes occurred (Sandelowski, 1995).

Extraneous message content, such as images, links, campaign pledge links, or other contact information, was not analyzed for themes. However, the researchers reviewed extraneous message content if required to make sense of the tweeted text: for example, when text provided a caption or reference that could only be understood by viewing the attached content (e.g., image).

5.3 Results

Table 4 displays representative tweets for the themes found in the 2400 Canadian Movember 2013 campaign tweets. The narratives and themes are described below.

We Can Make Change With Money

Money, Money, Money. A dominant theme in the tweets was fundraising (n= 819 tweets; approximately 34% of the 2400 sample). *Twitter* was used as a platform to reach

out to followers for support in the form of donation. Tweeters incentivized their followers to donate by offering rewards such as cookies, allowing the highest donor to choose the moustache style of the Movember participant, and completing tasks after the completion of specified fundraising goals. Additionally, tweets mentioned fundraising events such as sporting events or bake sales that encouraged participation or goods in exchange for donation. However, the purpose of the donation was not always explicit or clear. Repeatedly, the Tweeter called for donations to benefit the Movember campaign, their "Movember effort" or "the cause." Indeed, few fundraising tweets referenced prostate and/or testicular cancers. Only 2% (n=18) of total 819 fundraising tweets clearly identified prostate cancer or testicular cancer as health causes that motivated their philanthropic efforts. Given the overwhelming number of tweets that referenced fundraising, it is clear that Tweeters prioritized fundraising as one of the main goals of the Movember campaign but not explicitly or directly in relation to prostate or testicular cancers.

Make Change. Alongside an emphasis on the importance of raising funds, many Tweeters also shared the idea of a change for men's health, albeit not specifically for prostate or testicular cancers (n=442; 18% of the 2400 sample). Messages described the Movember campaign as a "movement" and referenced Movember campaign rhetoric such as "to change the face of men's health." Tweets about Movember portrayed a change to men's health as a group effort. Tweeters used "we" language and called on others to help, join and support the movement. It is important to note, however, that the concept of change stems from the Movember campaign goal "to change the face of men's

health." Furthermore, upon registration with the campaign, participants are provided with messages from the campaign that they can post on social media to drive their followers to their campaign pledge websites. Thus, many (n= 427; 97% of 442) Tweeters posted the same message with little variation or personal reflection. Messages equated monetary donation with facilitation of change.

The concept of change was often juxtaposed with donation (n=339; approximately 14% of the 2400 sample). The association between donating and a change to men's health suggests that men's health initiatives have not received a sufficient amount of funding in the past, and that money is required to make a change to improve men's health. Tweeters were also more likely to mention men's health rather than prostate or testicular cancers. Only 4 tweets (approximately 1%) that referenced change (n= 442) mentioned prostate and/or testicular cancers in any way.

Moustaches and Other Facial Hair

The Moustache as a Vehicle to Raise Money or Awareness. Several tweets (n=117; approximately 5% of the 2400 sample) discussed the moustache as vehicle to raise money or awareness. While many tweets referenced raising money or awareness for "the cause", only 32 Tweeters explicitly linked growing a moustache for the purpose of men's health. Growing a moustache was understood as one of the means by which Tweeters could fundraise or raise awareness about men's health. Only 7 tweets (approximately 7% of 76 tweets) described moustache growing as a means to "support", "raise awareness," "put an end," "fight against," or "save millions from" prostate and/or testicular cancers specifically.

"Movember" Objects. Most Tweeters linked the moustache with the Movember campaign rather than with prostate cancer, testicular cancer, or men's health issues. Inanimate objects, such as clothing and food items with the moustache image or shape, were associated with Movember and tagged accordingly with the hash tag "#Movember" (n= 92; 4% of the sample). Only 1 Tweeters (1% of 95 tweets) associated the moustache image or shape with prostate cancer awareness, and did so by including a hash tag of the health issue. No messages referenced testicular cancer.

The Moustache as The Cause. Messages that requested donations for the participant's moustache rather than targeting prostate and testicular cancers, or other men's health issues, presented the moustache as the reason for fundraising (n= 150; approximately 6% of the 2400 tweet sample). The messages suggested that growing a moustache, rather than benefiting men's health initiatives, or improving awareness of men's cancers, motivated fundraising efforts.

The Moustache Contest. Moustache growing and styling was a primary concern for many Tweeters, often not referencing fundraising or raising awareness of prostate and testicular cancers, or other men's health issues at all (n= 615; 26% of the 2400 tweet sample). Tweeters shared the progress of their moustache growing online and content related to styling and grooming moustaches. Focus on the moustache growing alone suggests that these Tweeters were more concerned with Movember as a moustache contest, rather than with Movember as a charity for prostate and testicular cancers.

Masculinity

War Metaphors. War metaphors are commonly cited in cancer campaigns since President Richard Nixon declared a "war on cancer" in the 1970's (Hanahan, 2014). War metaphors were used in the Canadian tweets to discuss Movember (n= 204; about 9% of the sample) as an "army" with participants as the soldiers who have "enlisted" and deserve to be "saluted" for their efforts. Followers were encouraged to join or "fight the good fight" in a "battle against cancer." 2% of tweeters (n= 4) who used war metaphors (n= 204) referenced the "fight" against prostate and/or testicular cancers. Messages combining war metaphors with fundraising suggested that the change for men's health, or the "good fight," can be won with money.

Traditional Appeals to Masculinity. Qualities traditionally associated with men, such as strength and stoicism, were also used in messages about Movember (n= 15; 0.6% of the 2400 sample). Moustaches were characterized as "manly" "strong" and "mighty." In many cases, moustaches needed "strength" in the form of donations. These messages focused exclusively on the moustache and did not reference prostate or testicular cancers.

The Role of Women

Women as Fundraising Sidekicks. Canadian women expressed participation in Movember by asking for donations (n= 50, about 2% of the 2400 tweet sample) in two ways: first, women shared messages that encouraged followers to support their male counterpart by donating to his campaign pledge; second, women became official

Movember participants, or a "Mo Sista," and asked followers to donate to their own Movember campaign profile. Only 3 tweets (6% of 50 tweets) where females requested donations referenced prostate and/or testicular cancers.

Women as Moustache Supporters. Tweets described how females support the campaign by "sporting" or "faking" – either by wearing a fake moustache or displaying the Movember symbol on their clothing or other accessories (n= 90; approximately 4% of the *Twitter* sample). Often, females were encouraged to consume products with the moustache image or shape, such as mugs or earrings, to show support. None of the messages describing women as moustache supporters made any references to prostate and/or testicular cancer.

Commodification of the Movember Campaign or Symbol

Explicit Commodification. Similar to the Pink Ribbon campaign (King, 2004), companies have turned Movember or moustache philanthropy into a profitable method to market products. Several messages (n= 74; 3% of the 2400 tweets analyzed) explicitly mentioned increased revenue as a result of advertising a product or service in association with the Movember campaign or moustache symbol. Companies practice cause-related marketing, such as the mention of a portion of proceeds going to the campaign, to make a profit during the month of November. One message specifically referenced prostate cancer in association with the sale of a company product ($1 for every crispy shrimp sold at Casey's grill bar will be donated to prostate cancer research).

Implicit Commodification. The majority of messages described a company or organization co-opting the campaign or moustache symbol for implicit commercial benefits (n= 168; 7% of the *Twitter* sample). Though a company may not express immediate profit from supporting the campaign through events and contests, the customer may be more likely to purchase a company product or service in the future because the company appears to be socially responsible by supporting the Movember campaign. No messages referenced testicular cancer, and only 2 tweets (1% of 168 tweets) that mentioned a product or organization also referenced prostate cancer.

Table 3. Themes present in conversations about the 2013 Movember Canada campaign and the percentage of tweets per theme*

Theme	Number of Tweets per Theme	Percentage of Tweets per Theme
Money, money, money	819	34
Make change	442	18
Moustaches as vehicle to raise money or awareness	117	5
"Movember" objects	92	4
Moustaches as "the" cause	150	6
Moustache contest	615	26
War metaphors	204	9
Traditional appeals to masculinity	15	0.6
Women as fundraising sidekicks	50	2
Women as moustache supporters	90	4
Explicit commodification	74	3
Implicit commodification	168	7

*Total number of tweets was 2400

Table 4. Themes present in conversations about the 2013 Movember Canada campaign and representative tweets

Theme	Representative Tweets
Money, money, money	"Time to decide! What style of 'stache am I growing this #Movember? Top donation decides! http://www.mobro.co/xxx… ~SRpic.Twitter.com/SbUrcfvK8N" "Wow, within an hour of launching my new #Movember campaign I've reached $1000 raised...which means I'm getting pied: http://mobro.co/xxx" "Thank you to all who participated and donated in our Movember Shinny Fundraiser! #movember #hockey #shinny #thanks http://www.youtube.com/watch?v=pbuIguFFZUU …" "Last day of #Movember – I want to earn your donation. Give to a good cause, I'll do a good deed: http://ow.ly/rk5ZW #yvr" "Help me make a brighter future filled with healthy testicles! Support my #Movember by donating at http://mobro.co/xxx"
Make change	"Check out who is changing the face of men's health for #Movember http://ca.movember.com/team/1157505 via @movemberca" "@RealRonHoward Would you support me with a tax deductible donation to the #Movember movement? http://mobro.co/xxx #chefdez" "You can make change happen by donating to my #Movember effort. http://mobro.co/xxx … http://ow.ly/i/3CEVm" "Help change the face of men's health this #Movember. Find out more about prostate, testicular cancer http://ow.ly/qmYki" "To make change we need to raise it! Donate to my #Movember effort. http://mobro.co/xxx #TEAMDUST Lets make it rain on Prostate Cancer!"
Moustaches as vehicle to raise money or awareness	"Growing my stache for the face of men's health. Donate & join the good fight http://mobro.co/xxx #movember #donatepleeease" "It's definitely growing now! #movember #raiseawareness http://fb.me/xxx" "You may(or may not) notice a light shadow on my upper lip this week...Help the cause, donate to my #Movember effort. http://mobro.co/jordanmcfarlen" "Moustache Madness continues! Make a donation and watch it grow as We try to put an end to prostate cancer #Movember http://mobro.co/xxx" "One moustache for one month can save millions of men from prostate cancer. Read more and donate now! #Movember http://ow.ly/qUqLF"

Theme	Representative Tweets
"Movember" objects	"Wearing my awesome #Movember shirt #Stachetastic pic.Twitter.com/O2OoyrcerR" "Celebrating #movember with a yogurt stash! ;) http://fb.me/2xHkBNM4I" "I mustache you for some cupcakes #movember #cupcakes #cupcake #november #prostatecancerawareness… http://instagram.com/p/gT6DWLIpFK/" "Came across moustache ties in the mall! Had to get one! #Movember #Mo #Moustache http://instagram.com/p/hMV6akn8C1/" "Moustached from the feet up #Movember #MoBro #happysocks pic.Twitter.com/gDBLQ4kBed"
Moustaches as "the" cause	"Join me and the boys grow a moustache for the 30 days of #Movember or donate to us at http://moteam.co/xxx" "Help me fight the good fight and donate to my #Movember moustache http://mobro.co/xxx … #HamOnt #Canada #cancer" "I've already raised 30$ for the moustache I have yet to grow. Woo keep donating http://ca.movember.com/mospace/xxx #Movember" "Calling all moustache supporters - Donate today and help us fly the flag for #Movember http://mobro.co/xxx" "Thank you all for the birthday wishes! I'm old, but I feel loved. If you would like to donate to my Mo --> http://ca.movember.com/mospace/xxx #Movember"
Moustache contest	"Style guide for #Movember !! What Stache are you growing? pic.Twitter.com/0BnoTSzzpG" "Day 3. Hey, look at that! Almost a five o'clock shadow... On day 3... #Movember #save$onRazors pic.Twitter.com/KN7NyaEEFQ" "Taking part in #Movember as you can tell by my icon my tache is coming along nicely" "Been growing my moustache for #Movember for 11 days now and I think it looks half decent! http://ca.movember.com/mospace/xxx pic.Twitter.com/5loP5SP06U" "Hmmmm #movember.... last week it was scruffy kinda hot... this week borderline… http://instagram.com/p/grHgykxUx5/"

Theme	Representative Tweets
War metaphors	"Are you growing an unregistered Mo! Make it official and join the #movember army at http://Movember.com ! Every Mo needs to count!" "I've enlisted in #Movember to change the face of men's health. Donate & join the good fight http://mobro.co/xxx …" "With #Movember ending boys are shaving. If you see a Mo-Bro tonight give him a salute & a thank you for making a difference for mens health" "For anyone who would like to donate to my #Movember page: http://ca.movember.com/mospace/xxx in a battle against cancer, anything makes a difference" "One week down! There's a moustache on the rise. Join the fight against Prostate and Testicular Cancer. #Movember http://bit.ly/16T64eW"
Traditional appeals to masculinity	"halfway through and my mo is strong! please donate to my #Movember effort. j.xo http://mobro.co/xxx #ThetaOmegaMo #GenMo" "The Mighty Moustache of #Movember! Help Dr.D knock out men's cancer with a donation #YGK http://instagram.com/p/gwJaDmJ7UL/" "The last week of #Movember and we're growing strong! Support men's heath - donate to our team! http://ow.ly/i/3PK7g http://ow.ly/raNxC" "#Movember is going well and the mo's are gaining strength with each passing day. http://moteam.co/xxx… | pic @ http://ow.ly/i/3Nqzg" "There is strength in numbers!!! http://mobro.co/xxx #movember"
Women as fundraising sidekicks	"My husband is taking #Movember challenge to help fight prostate cancer! Please donate or share https://ca.movember.com/mobile/#profile/xxx …" "That shadow above his lip will soon be a full blown Mo! Donate to my man's #Movember: http://ca.movember.com/mospace/xxx #ProudGF pic.Twitter.com/XluqtAyndd" "Official #MoSista. Please donate to my campaign to help support men's mental health! #Movember pic.Twitter.com/IJIxbZe0Yg" "My father died of prostate cancer & my brother has it. Please donate to my #Movember effort. http://mosista.co/xxxx #yyj" "Please send any last minute #Movember donations here http://mosista.co/TeeCarruthers #yegmo #mosista"

Theme	Representative Tweets
Women as moustache supporters	"Take a second to vote on our funny office ladies supporting #Movember. Which one sports a mo best? By choosing... http://fb.me/2RIwZ3EQU" "I can't grow a MO but I can fake it like a champ! #Movember pic.Twitter.com/2tGFQk0vIb" "#FSWO2013 Fire Service Women Ont in Muskoka 2night sporting (paper)mustaches in support of Movember. #Movember pic.Twitter.com/Co2iFo1Lqw" "Please vote for my hubs moustache! http://harleymovember.vice.com/look/the-freddie … #vice #movember #harley" "I may not be able to grow a #moustache but I can still support the cause! Thanks @_britknit! #movember pic.Twitter.com/xRZAiRKeAH"
Explicit commodification	"We just got some sweet #Movember toys from #MoodyPet. Get your pup a #HumungaStache today! http://ow.ly/qugWu pic.Twitter.com/hDQeMImLNC" "Aveda Men's product back in stock at all Diva locations!! Happy Movember! @aveda #yyc #avedamens #movember pic.Twitter.com/PANZSZ8yKO" "Are you supporting #Movember? The @VanCanucks are donating $5 per ticket purchased for home games until Nov. 25th: http://ow.ly/qzkpa" "Perfect night to get your @KEYLIMEclothing workout gear! Shopping party 6-8 with proceeds to #Movember! @MoSistasEdm will be there! #yeg" "$1 from every crispy shrimp sold at Casey's grill bar will be donated to prostate cancer research! #Movember pic.Twitter.com/A0W0reTEDZ"
Implicit commodification	"Flash your stash at Hooters for your chance to win a Molson beer fridge! Come support a great cause! #YEG #Movember pic.Twitter.com/9eAmw9zsEk" "To celebrate #Movember, @OperationSports is giving away a PS4! Check out the details and enter to win here http://bit.ly/1bUDXPj" "Are you growing a Mo-vember moustache? Check out BeWell's MoContest 2013 on Facebook! http://ow.ly/qUwPL #movember" "All dudes are in for FREE! On Nov. 12th for our #movember party reserve your spot today! Learn more here http://blog.barreworks.ca/" "The Mo'Burger has raised $600 towards @ProstateCancerC so far! Just over one week to go! #movember pic.Twitter.com/bBv9DcVJND"

5.4 Discussion

This study provides a snapshot of how Canadian *Twitter* users are talking about the Movember Canada campaign and its dedicated health issues, namely prostate and testicular cancer, in public conversations during the month of November 2013. Canadian tweets about Movember revealed themes related to what Robert (2013) describes as Movember's "philanthropic narrative." Tweets focused on a narrative that emphasized altruistic action by describing donation as the ultimate means for a change that can be accomplished by a collective group of change agents. Although the 2013 Movember Canada campaign set the goal of placing prostate and testicular cancers within this narrative, our findings suggest that prostate and testicular cancers are rarely discussed in association with philanthropic fundraising to change to men's health generally or raise awareness of prostate and testicular cancers specifically. Tweeters may have assumed that the reader had knowledge of the Movember campaign and dedicated health issues. In this case, Tweeters assumed that messages associating fundraising with "#Movember" was enough to compel the reader to donate. Alternatively, the lack of references to prostate and/or testicular cancer may be a result of the Tweeter being unaware of the Movember campaign's dedicated health objectives. The uniformity of messages is particular important for the latter case. Tweeters seem to be repeating messages offered by the Movember campaign rather than constructing unique and thoughtful messages. It is critical then that the Movember campaign create messages that emphasize prostate and testicular cancer in order to achieve their goal of creating conversations about these diseases.

While the Movember campaign has the potential of drawing attention to men's cancers that may otherwise be overlooked, tweets rarely associated their philanthropic efforts with prostate and testicular cancers. The moustache is seen as a symbol of the Movember campaign but with an ambiguous meaning rather than as a symbol of action against prostate and testicular cancers. This disconnect may reflect of the evolution of the campaign as a moustache contest first, and a charity second (Jeffcott et al., 2012). Typically, campaigns that have been successful at raising awareness about a particular disease over time have been designed with the initial purpose of raising awareness about a particular health problem. For example, the American Heart Association's "Wear Red Day" was created to raise awareness about heart disease in women (Jacobsen & Jacobsen, 2011).

Battle metaphors have been demonstrated in cancer articles in print media (Clarke, 2006). Despite a youthful platform (*Twitter*) and young demographic, the same warfare language is pervasive throughout the Movember Canada campaign such as "combat prostate and testicular cancer" (Movember Canada, 2013b). "We" language present in Movember tweets parallels the iconic "we can do it" slogan of World War II. War metaphors are problematic in cancer messages because they can reinforce the notion that the appropriate reaction to cancer is fear (Clarke, 2006), and fear may encourage men to be reticent about their health discourage them from taking action.

Research on prostate cancer narratives in traditional media outlets such as newspapers and magazines has demonstrated the linkage between dominant ideals of masculinity and prostate cancer (Halpin et al., 2009; Miele, & Clarke, 2014). Given that facial hair, a characteristic consistently associated with manliness (Chesebro, & Fuse,

2001), is central to the Movember campaign, it is not surprising that gendered stereotypes and terminology such as "strength" and "might" are associated with men and moustaches in the tweets analyzed. However, gendered language that associates moustaches with "strength" privileges notions of hegemonic masculinity and may exclude certain individuals who do not identify with those ideals such as men that cannot grow facial hair easily or women.

While women usually take on the role of caregiver in narratives surrounding prostate cancer (Miele, & Clarke, 2014), women have been described as "para-participants" (Robert, 2013) for the Movember, campaign with roles consisting of fundraisers and cheerleaders for their male counterparts. Women can become official "Mo Sistas" and collect pledges for men's health or buy products with the moustache image that may or may not support the Movember campaign. In addition to providing support and raising funds, future Movember campaigns should emphasize the role of women as health educators so that they associate their role with disseminating messages about prostate and testicular cancers, and not just cheerleaders of moustaches.

Much like the Pink Ribbon campaign, companies have used Movember as a marketing strategy to make a profit. Hash tags are unregulated and any company or organization can use the Movember hash tag ("#Movember") to sell products or improve their brand image. Cause-related marketing is a particularly persuasive way to market products because the donation to the cause acts as a purchase incentive to customers (Harvey, & Strahilevitz, 2009). Few tweets referenced prostate and testicular cancers in their marketing to encourage sales. This suggests that "the cause" has been framed as a

general campaign (Movember) rather than as a specific campaign about prostate and testicular cancers.

One important caveat to this work is that it only provides a snapshot of *Twitter* conversations about the Movember Canada campaign for one year. Since each Movember chapter has its own dedicated health issues, it is not possible to extrapolate these findings to other chapters of the campaign that occurred globally. Additionally, this study looked at only one social media site, *Twitter,* to capture conversations about Movember. Future research will be needed to understand how individuals discuss Movember on other social media platforms in order to determine whether these findings are consistent across all social media platforms or if the lack of conversations about prostate and testicular cancer can be attributed to the use and limitations of *Twitter* (e.g. the 140-character limit). Such research will be important for determining what platforms are most appropriate for facilitating health discussions and evaluation of campaign impact on public discourse. The search criteria included the use of the hash tag "Movember"; this could potentially contribute to selection bias and failure to identify messages that discussed prostate and testicular cancer during the 2013 Movember Canada campaign but did not have the hash tag. Finally, we did not evaluate the stated outcomes of the 2013 Movember Canada campaign such as, "greater awareness and understanding of the health risks men face, men taking action to remain well, when men are sick they know what to do and take action" (Movember Canada, 2013d); future research will be needed to examine whether dialogue about the 2013 Movember Canada campaign results in measurable increases in men's awareness of and taking actions against prostate and testicular cancers.

Targeted and compelling mass media health communication campaigns have long been a tool for addressing health knowledge and attitudes (Noar, 2006). Analyzing conversations on social media is an important step in evaluating whether the 2013 Movember Canada campaign accomplished their objective of creating conversations about men's health. It will be important for cancer educators to determine the impact of the Movember campaign in transforming public discourse about Movember from a campaign about a moustache contest to a campaign that promotes prostate and testicular cancer awareness.

Chapter 6: General Discussion

6.1 Key Findings

This chapter aims to more fully describe the research findings in Chapters 4 and 5 and integrate the key findings in terms of significance in the public agenda: fundraising, moustache growing, and commodification of the Movember campaign and moustache symbol. These findings have implications for how to effectively set the public agenda and use social media appropriately for raising awareness about prostate and testicular cancers in Canada.

6.1.1 Wealth Before Health

Approximately $33 million dollars was raised during the 2013 Movember Canada campaign (Movember Canada, 2015f). Thus, it is not surprising that fundraising was a pervasive topic in conversations about the 2013 Movember Canada campaign. In study #1, community engagement, which included tweets about fundraising, was one of the most common topics of discussion in both the health-related and non-health-related category (n= 1829; 43% of 4222 tweets). In comparison, only 36 tweets (0.85% of 4222 tweets) contained health information about prostate cancer, testicular cancer, mental health, or general men's health issues. In study #2, fundraising was a dominant theme with 34% of the 2400 tweets sample mentioning efforts to raise money. These findings were consistent with research about cancer portrayals in traditional media outlets. For example, fundraising was a common theme in Canadian newspaper articles about cancer published in 2008 (Henry, Trickey, Huang, & Cohen, 2012), as well as prostate cancer articles in Canadian national newspapers from 2001 to 2006 (Halpin et al., 2009). It is

clear that the emphasis on fundraising in the Movember Canada was adopted as an important topic in the public agenda as evidence in *Twitter*.

Charitable donations for cancer research have evolved over time from a focus on philanthropic donations for designated hospital wards, usually by one benefactor, to the creation of charitable foundations that collect funds from the broader public (Murciano-Goroff, 2014). Additionally, it has become more common for a benefactor to give indirectly by donating funds to a third-party intermediary (e.g., nonprofit organization) than to provide funds directly to a beneficiary (Saunders, 2013). Nonprofit organizations play a critical role in filling gaps in research funding that cannot be filled by government funding (Myers, Alciati, Ahlport, & Sung, 2012). Public health campaigns have been adopted by non-profit organizations to draw the public's attention to health issues and philanthropic efforts (Saunders, 2013). For example, the 'ALS Ice Bucket Challenge' marketing campaign aimed to increase awareness about and raise funds for research on Amyotrophic Lateral Sclerosis (ALS) (Koohy, & Koohy, 2014). The 'ALS Ice Bucket Challenge' challenged participants to pour a bucket of ice water on someone's head in order to promote awareness of the disease on social network sites; this campaign raised over $16 million for ALS Canada in 2014 (CBC News, 2014).

Advocacy groups that raise money to fund health programs often struggle to capture the public's attention long enough to donate to their cause amongst so many worthy causes that need funding (Collier, 2010). One may think that this would be especially true for the Movember campaign since it follows the high profile Breast Cancer Awareness Month in October. However, despite the likelihood that people may have been inundated with requests for donations from friends, families, and sponsors

during October for the Breast Cancer Awareness campaigns, Canada still remains a top fundraising country for the Movember campaign bringing in millions of dollars for men's health programs and research (e.g., In 2013 Canadians raised $33.46 million) (Movember, 2015f). Unlike fundraising during October where philanthropy efforts are undoubtedly linked to breast cancer (King, 2004), prostate cancer and testicular cancer are not always associated, at least by mention in *Twitter* messages, with fundraising endeavours. Tweeters were more likely to fundraise for their "Movember effort," "the cause" or "their moustache", than they were to explicitly collect pledges for prostate cancer and/or testicular cancers. This raises the question of, 'What motivates Canadians to donate so much money to Movember?'

The success of fundraising despite a lack of prostate cancer and testicular cancer references may be explained, in part, by the following: a) Movember has been so successful at framing prostate cancer and testicular cancer as important health issues of the campaign that a simple mention of Movember in a tweet is enough to motivate someone to donate, or b) individuals are motivated to donate by reasons that are not explicitly or directly health-related. For example, perceived moral obligation has been demonstrated as a predictor of intention to donate among young adults. Young adults are more likely to donate if they feel it is their personal duty and the morally correct thing to donate to charities (Knowles, Hyde, & White, 2012). Additionally, high social status individuals are motivated to donate if the charitable donation outcomes are framed in a way that emphasizes benefits to the self (e.g., personal happiness, anticipation of a reward) rather than benefits to others (Ye, b, Yu, & Wang, 2015). The limited number of health-related tweets compared to non-health-related tweets as well as the emphasis on

moustache growing and grooming in the data from this study suggests that individuals are motivated to fundraise for reasons that are not explicitly health-related.

6.1.2 Moustachery

Moustache growing and grooming was also a topic that infiltrated the public agenda. In study #1, moustaches were the second most common topic discussed in conversations. In study #2, moustaches were discussed as a vehicle to raise money and awareness, were constructed as 'the' cause and motivator of fundraising efforts, and the moustache contest was the primary concern for many Tweeters. The unique evolution of the Movember campaign from a moustache contest to an established global charity provides one potential explanation for why moustaches are a salient topic in the public agenda.

Health campaigns are often launched as a strategy to increase awareness and funds about important health issues. For example, the ParticipACTION campaign was launched in in Canada in the 1970s with the objective to "create Awareness (of the inactive and unfit nature of Canadians, the health implications, plus the purpose of this new ParticipACTION organization) and to Educate Canadians (on how to get started, plus how much and what kind of activity would be beneficial)" (ParticipACTION, 2013). The Movember campaign was not initially created as a solution to a lack of knowledge or funds about men's health issues such as prostate and testicular cancers. Instead, the Movember campaign began as a moustache contest in which four friends challenged each other to bring back the fashion trend in 2003. Inspired by their friend's mother who was raising money for breast cancer, the four Australian friends decided to pair the contest

with raising funds for prostate cancer and proceeds from contest participation were given to the Prostate Cancer Foundation of Australia in 2004 (Movember Canada, 2015b). In 2015, the Movember Foundation has campaigns running in 21 countries worldwide including the United States, the United Kingdom, Ireland, Norway, South Africa, Hong Kong, Spain, and the Czech Republic. Though each campaign has local and relevant partnerships (e.g., Movember Hong Kong partners with Hong Kong Cancer Fund), there is consistent messaging of moustachery mixed with the vision, values, and goals of creating conversations about men's health in order "to have an everlasting impact on men's health" (Movember Hong Kong, 2015). The focus of the campaign was initially the moustache, and thus it is not surprising that public conversations on *Twitter* place health issues second to moustache growing.

Though moustache growing may be a creative communication strategy that appeals to men that relate to traditional ideologies of masculinity, the focus on moustaches becomes problematic when it overshadows the opportunity for cancer education. The 2013 Movember Canada campaign website describes Mo Bros with moustaches as "walking and talking billboards, bringing awareness to men's health issues and prompting conversations wherever they go" (Movember Canada, 2013a). However, this statement may leave participations with the false belief that growing a moustache is enough to affect change to men's health knowledge, attitudes, or behaviours related to prostate and testicular cancers. The "unique ideology of the campaign" (Jeffcott et al., 2012) that reinforces the idea of the moustache as a "catalyst" for change may present a barrier to cancer education, with few conversations about prostate and testicular cancers. The 'ALS Ice Bucket Challenge' marketing campaign was also criticized for focusing on

self-indulgence rather than raising awareness about ALS (Mulcahy, 2014), and Atlanta's 'Strong4Life' campaign, which used images of overweight children in order to raise awareness about childhood obesity, was criticized for perpetuating weight-based stigma while having little effect on attitudes about the seriousness of childhood obesity (Barry, Gollust, McGinty, Niederdeppe, 2014).

Focus on moustache growing is also problematic because it excludes certain individuals from participation and, by extension, may exclude them from raising awareness about prostate and testicular cancers. In 2013, Mo Sistas were described as, "a woman who supports the power of the Mo, essentially doing everything a Mo Bro does, except without the Mo" (Movember Canada, 2013a). Additionally, women were urged to help with fundraising and "encourage the men in their lives to get involved" (Movember Canada, 2013a). Findings from study #2 indicate that women were described as fundraising sidekicks and moustache supporters. Oftentimes, women (Mo Sistas) were encouraged to show their support by consuming products with the moustache symbol (e.g., coffee mugs with moustaches on them, or earrings in the shape of a moustache). These results suggest that moustache growing is a dominant topic in the public agenda and potentially can lead to the overshadowing of the seriousness of prostate and testicular cancers. It also may exclude females from efforts related to awareness and education about these male cancers.

6.1.3 Commodification of the Moustache and Movember Campaign

There are many comparisons that can be made between Breast Cancer Awareness Month and the Movember campaign. Both campaigns use gendered symbols to appeal to

the target audience (e.g., a pink ribbon and a moustache) (King, 2004; Robert, 2013). Both campaigns aim to transform public discourse about their respective diseases from a stigmatized disease best dealt with privately and independently to a disease that requires public attention (King, 2004; Robert, 2013). For example, Rethink Breast Cancer in Canada, a breast cancer awareness campaign, aims to eliminate the taboo associated with discussing breast cancer by holding arts events that share images and movies of breast cancer patients during their treatment journey meant to stimulate open dialogue among event attendees (Kukaswadia, & Huynh, 2014). No comparison is more obvious than the presence of commercial activity linking product sales to support of a charity. Similar to the way breast cancer was a favourable charity to attract female consumers (King, 2004) because the pink ribbon symbolized hope, strength and a gateway to discuss the disease (Harvey, & Strahilevitz, 2009), the Movember campaign presented an opportunity for commercial sponsors to brand themselves in association with Movember philanthropy. In study #1, commercial activities (i.e., selling products such as beard balm), contests, and giveaways were important topics of discussion. Again, prostate cancer and testicular cancer were rarely mentioned in tweets and there were significantly more non-health related tweets (n= 232) than health-related tweets (n= 14) in this sample. Furthermore, in study #2, the majority of messages presented a company or organization co-opting the campaign or moustache symbol without explicit reference to prostate or testicular cancers.

The motivation for corporations to use cause-related marketing is clear: once a campaign obtains a high profile, organizations take the opportunity to improve brand image by linking commercial activities with charitable donations (Demetriou,

Papasolomou, & Vrontis, 2010). Cause-related marketing is a particularly useful strategy for marketing targeted at the Generation Y population (individuals born between 1977 and 1994). The Boston Consulting Group released a study that found that Millennials (Generation Y) identify more personally and emotionally with brands, and listed "support causes" as one of the most important ways that brands can engage and interest them (Barton, Koslow, & Beauchamp, 2014). Long-term support (e.g., one-month each year) was associated with a positive evaluation of the sponsor among this population since it conveys information that the sponsor wants to make a difference and not just a profit (Cui, Trent, Sullivan, & Matiru, 2003).

What is less clear is the motivating factor for consumers to buy products or services when there is no explicit reference to benefiting prostate and/or testicular cancers programs. Cornwall and Coote (2005) administered questionnaires to participants in an annual running race that supported breast cancer research. Their research revealed that the intent to purchase sponsor's products was positively associated with consumer's identification with a non-profit organization. Thus, participants were more likely to buy products if they identified it with a non-profit organization. This suggests that individuals may consume sponsor's products because of its affiliation with Movember (a non-profit organization) rather than because of the affiliation to prostate and testicular cancers. Donating to charity may be enough of an incentive to buy a product; however, these findings reinforce the idea that Movember has been constructed as 'the' cause in the public agenda, rather than the cause of prostate and testicular cancers.

6.2 Summary of Key Findings

The analysis of conversations on *Twitter* revealed that few tweeters share health-related content in conversations about the 2013 Movember Canada campaign. There were significantly fewer health-related (n = 673) than non-health-related (n= 3549) tweets ($p < 0.05$). Moreover, few tweets (0.6% of all tweets) referenced prostate or testicular cancers. Fundraising, moustache growing, and commodification of the Movember campaign were dominant themes in discussions, with tweeters rarely associating campaign activities with prostate and/or testicular cancers. Figure 3 summarizes the methods, key findings, and implications for public health from each of the studies in this thesis research.

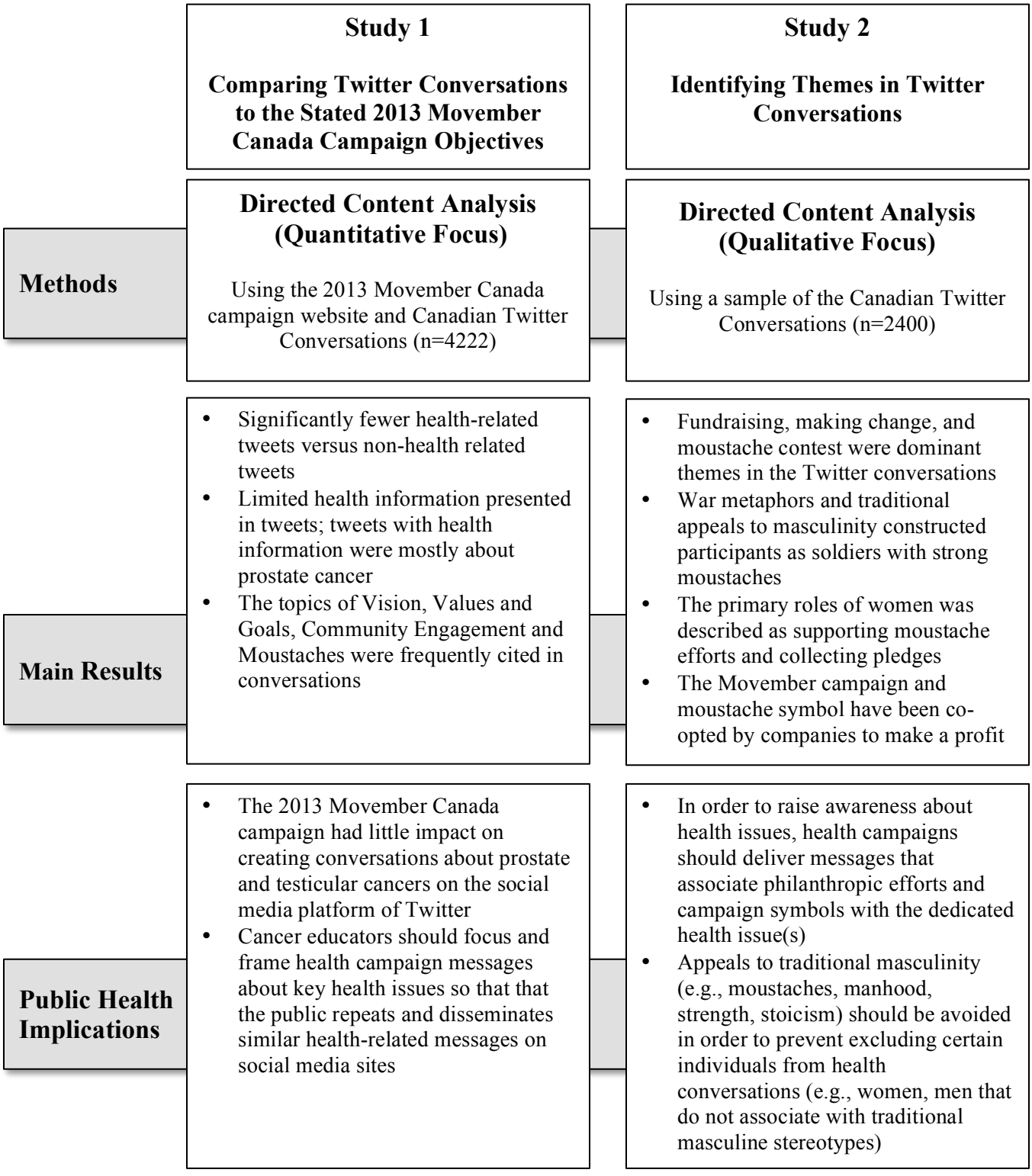

Figure 3. Key Findings Summary

6.3 Implications of Findings for Public Health Communication

This section will discuss how the findings can inform public health communication in the future. Public health professionals should consider the public agenda since consumers are actively participating in information generation and consider how to communicate prostate and testicular cancers on social media. Additionally, the findings can inform how to effectively integrate social media into the social marketing model.

6.3.1 Setting the Public Agenda

Mass media health campaigns can influence the public agenda by making certain issues relevant and framing the issues in a way that is meaningful and persuasive to the target audience. The findings from conversations on *Twitter* suggest that the 2013 Movember Canada campaign was not successful at creating conversations about men's health. Moreover, prostate and testicular cancers were not important topics in the media agenda (topics emphasized on the 2013 Movember Canada campaign website) or the public agenda (topics emphasized by users on *Twitte*r). In order to make health issues important to the public, cancer educators, public health practitioners, and campaign creators should emphasize health information in their health communication strategy (e.g., media releases, radio spots, TV commercials). Furthermore, cancer educators hoping to affect change at the policy level should consider the role of the public agenda in influencing policy change.

6.3.2 Communicating about Prostate and Testicular Cancers on Social Media

Choosing the appropriate communication channel for message dissemination that is considered credible and influential by the intended audience is an important step in creating an effective health communication campaign (National Cancer Institute, 2001). According to research conducted by the Pew Research Center, social network sites are becoming a significant source of health information with 11% of U.S. adults reporting following a friend's personal health experience online, and 7% reporting getting health information on the site (Fox, 2011). Additionally, social network use is increasing among U. S. men and women in all age brackets between 18 and 65 plus years (Pew Research Center, 2015). Hence, it seems that social network sites have the potential to reach the target audience for testicular cancer (men aged 15 to 29 years) and prostate cancer (men over 50 years) as the popularity of these sites as sources of health information increases. However, it is more likely that older men (aged 65 years and over) will seek health information from their health care providers (e.g., physicians) since this is the most trusted source of health information among older adults (Donohue, Huskamp, Wilson, & Weissman, 2009). Younger men (aged 15 to 29 years), in contrast, may use and trust health information from Internet and social networking sites to a large extent.

Tobey & Manore (2014) suggest the following best practice guidelines to create effective social media campaigns: 1) Conduct a needs assessment (e.g., What does the literature say about the health issue and target audience?); 2) Select social media sites (e.g. What sites are appropriate for your target audience given their age and usage behaviours?); 3) Create a plan (e.g., What theory informs your campaign design and messaging? How often will you post messages?); 4) Integrate the social media team (e.g.,

the Web designer, content coordinator, and graphic designer should all work together to create a consistent message that is desirable on the social media site); and 5) Regularly collect, track, and use social media measurement data to evaluate whether objectives are being met (e.g., social media analytics can provide an understanding of the demographics of your followers). These best practice guidelines can help cancer educators and health campaign coordinators in the development of tailored and persuasive messages on social media. It is also important to recognize which individuals are being excluded when communicating health information on prostate and testicular cancers using social media sites. For example, non-Internet users are more likely to be ethnic minorities, older, less educated, less healthy, more distressed, and to report a history of cancer diagnosis (Chou, Hunt, Beckjord, Moser, & Hesse, 2009). Thus, it will be important for cancer educators to consider how social network sites alone can present a barrier to reaching audience members who would benefit from cancer education interventions.

6.3.3 Integrating Social Media into Public Health Practice: A Social Marketing Perspective

Social marketing is the application of commercial marketing techniques and concepts to promote long-term behaviour modification in a targeted audience (Daniel, Bernhardt, & Dogan, 2009). Social media platforms such as *Twitter* provide the opportunity for health promotion professionals to engage with audiences in a collaborative and dynamic fashion. Social media allows companies to share messages with consumers and, perhaps more importantly, it enables consumers to talk to one another (Mangold, & Faulds, 2009). This second role can be considered an extension of

traditional word-of-mouth communication (Mangold & Faulds, 2009). However, thinking of these new social media as simply replacements for traditional dissemination channels (e.g., newspapers, television) misses "the essence of what the new revolution is all about: using media in new ways NOT using new media" (Lefevbre, 2007). It is important that Internet-based media does not replace traditional media but rather expands public health practitioners' ability to move consumers from awareness to engagement, loyalty, and advocacy (Hanna, Rohm, & Crittenden, 2011).

An important decision in social marketing is audience segmentation. Audience segmentation usually consists of targeting messages to individuals with certain sociodemographic, cultural, and behavioural characteristics that are associated with the intended behaviour change (Evans, 2006). The 2013 Movember Canada campaign generated messages to registered participants with their individual pledge link. Participants on social media platforms shared these messages to make friends and followers aware of their donating efforts. However, these messages rarely associated donation or other campaign activities with prostate and testicular cancers. Hence, there is an opportunity for social marketers to generate relevant cancer messages based on the registered participant's information (e.g., age). For example, to encourage young men to create conversations about testicular cancer on social media, a 20-year old male could receive a message about how to conduct testicular self-exams to share with followers.

Utilizing new communication technologies such as social network sites effectively to achieve long-term health behaviour change (e.g., men aged 15-29 years conduct regular testicular self-exams, or men aged 50 years or older visit the doctor regularly for prostate cancer screening such as digital rectal exams) requires a shift in how public

health professionals think about how to communicate with the audience (Lefebvre, 2007). For example, Lefebvre (2007) offers five 'E's that public health professionals should consider when designing health interventions such as media health campaigns: "1) Education: Do we harness the ability to educate people about issues and problems that are relevant to them (not us); 2) Engagement: Is what we do engaging them in positive and meaningful ways; 3) Entertainment: Is there an entertainment value to our offerings; 4) Empowerment: Do people believe and feel empowered as a result of their experiences with our programs (products and services); and 5) Evangelism: Do we take advantage of every opportunity to let our customers and clients become our evangelists?" (p.42). Public health professionals should consider these five 'E's along with traditional social marketing elements (e.g. price, promotion, place, product) when creating health campaigns in order to take advantage of the interactive feature of social media and accomplish health behaviour change in the digital age.

6.4 Limitations

Many of the limitations to this thesis research have been described in Chapters 4 and 5 (e.g., measures used to ensure inter-rater reliability of coding; tweets limited to 140-character limit). In this section, additional limitations regarding data source and sample, the novelty of testicular cancer as a campaign focus, 2013 Movember Canada campaign as a case study, and limitations of agenda setting theory will be considered.

The research in this thesis used the 2013 Movember Canada campaign and Canadian conversations on *Twitter* because the Movember Canada campaign has achieved high participation rates and ranked second globally in fundraising for 2013

(Movember Canada, 2015c). In order to map the Movember Canada campaign objectives to discussions about Movember on *Twitter*, it was important to identify Canadian tweeters. The accessibility of the geographical location of the *Twitter* user depended on the registered user to make this information public. Tweets from Canadian users who did not self-identify as being from Canada would be lost to the study. This may have led to underreporting of the number of Canadian tweeters during the Movember 2013 campaign. However, a large sample size was chosen to ensure that the *Twitter* data was representative of Canadian conversations.

Currently, the collection of historical tweets can be done by using the *Twitter* search engine, purchasing the tweets from a company that has a partnership with *Twitter* (e.g., gnip.com), or using software that has access to the *Twitter* archives (Kim et al., 2013). This research used the *Twitter* search engine to collect a total of 24, 572 tweets posted during November 2013. The first 1500 tweets were collected to determine the appropriate sample size of 750 tweets for each day of November (Appendix E). The *Twitter* search engine generated a list for each day with the same time stamp for the first tweet generated (e.g. the first post always had a time stamp of 7:59PM). There is a chance tweets further down the list of generated may differ from those collected (e.g., by the number of Canadian tweets or the themes present in conversations). The inclusion of the first 750 tweets generated by the *Twitter* search may potentially contribute to selection bias and failure to identify themes that were present earlier in the day in Movember-related conversations.

A random sub-sample of approximately 50% (n= 2400) of the Canadian tweets collected was analyzed for themes in study #2. There is a chance that themes related to

prostate and testicular cancers, as well as men's health and the Movember campaign, did not emerge from this sub-sample. However, 2400 tweets were read and re-read until theme saturation occurred to ensure that the data enabled the development of meaningful themes and useful interpretations of conversations about the 2013 Movember Canada campaign.

Another limitation in this study is related to the novelty of testicular cancer as a campaign focus. Testicular cancer became a focus of the Movember Canada campaign in 2013. Roberts, Wanta, and Dzwo (2002) suggest that a longer time (extended coverage of an issue) may be necessary before the issue will be appear in the public agenda. However, there is no research that documents the time required for a health issue to diffuse into the public agenda. Hence, it is possible that more time and more campaign years are necessary for testicular cancer to permeate into the agenda of public conversations on social media.

The research presented in this thesis did not include other social media sites, such as *Facebook*, or traditional media outlets such as television, newspapers, magazines, or radio. Each of these media outlets contributes to media agenda setting and could be explored to identify themes related to prostate and testicular cancer during the Movember campaigns. For example, content from popular blogs for men's health could be compared to comments on blog pages to understand the influence of the blog's on the public's attitudes and beliefs about important men's health issues. Finally, characteristics of the Tweeter (e.g., gender) were not considered. However, further research could explore the most influential sources of prostate and testicular cancers (e.g., characteristics of influential tweeters using a diffusion of innovations model) or the impact of influential

organizations such as Prostate Cancer Canada on social media during the Movember campaigns.

Agenda setting theory informed this research by providing an explanation for how topics emphasized by media campaigns become prevalent in public conversations. However, agenda setting theory does not provide a comprehensive understanding of the mechanisms by which health issues become important topics to the public. Additionally, agenda setting theory assumes that once the media identifies and frames an issue as important, the public will automatically adopt the issue as salient. Notwithstanding, there are other theories to guide social media studies such as the uses and gratification theory whereby the audience is described as "active, discerning, and motivated in their media use" (p. 351) and the focus is more on what people do with media rather than media effects on the individual (Quan-Haase, & Young, 2010). For example, the uses and gratification theory has been applied to studies of understanding the preferred medium for health communication among college students (Baxter, Egbert, & Ho, 2008). Alternatively, diffusion of innovations theory describes how some innovations diffuse quickly and widely among members of a social system while others that do not (Glanz et al., 2008) depending on characteristics of the adopters, characteristics of the innovation, and features of the environmental context (Rogers, 1983). Diffusion of Innovations Theory may be a useful theory to explain who is driving the agenda and how it diffuses across social networks. For example, hash tags can be used to track trending topics (Chang, 2010) and the number of followers or retweets may be helpful for identifying who is influential in driving the agenda.

6.5 Future Research

Findings in this thesis research represent a first step in documenting public discourse during the Movember campaign. As there is limited research about the Movember campaign, there remains opportunity for further research from various theoretical and methodological perspectives. Further research on other social media sites is needed to provide a comprehensive look at the impact of the 2013 Movember Canada campaign on health communication and education. For example, Ramanadhan et al. (2013) assessed the social media presence and patterns of usage of community-based organizations engaged in health promotion on *Facebook*, *Twitter*, and *YouTube.* Similar research can be conducted about Movember to understand the extent to which the public, health organizations, and health charities utilize popular social media channels during health campaigns.

The 2013 Movember Canada campaign was a case study for this research. Using this data set for comparisons of global conversations with Canadian conversations can be done to determine if the same public agenda is present in conversations from other Movember campaigns. A preliminary analysis of non-Canadian tweets versus Canadian tweets can be found in Appendix K. There appears to be a significant difference ($p < 0.05$; $t = 4.790$) between the number of health tweets in Canadian (n= 673) versus non-Canadian groups (n= 1047). A content analysis of the non-Canadian tweets will reveal what topics are prioritized in these conversations versus the Canadian tweets. It would be useful to compare Movember campaigns and conversations across countries in order to understand the global impact of the Movember campaign on social media, and identify which campaigns have been successful, if any, at making prostate cancer, testicular

cancer, and other important men's health issues a priority in conversations on social media.

Regional differences (e.g., by province, by Canadian region) in tweets about Movember Canada were not analyzed since the number of tweets for some provinces (e.g., Northwest territories) was very low. Statistical tests would be problematic with potentially unreliable data. The distribution of tweets across Canadian provinces can be seen in Appendix J. As more health organizations utilize social media for health education, it is important to consider potential communication inequalities across provinces. For example, in 2007 provinces with a high percentage of rural population (e.g., 53% of Prince Edward Island's population resided in rural area in 2011) (Statistics Canada, 2011) are less likely to use the Internet (i.e., 76% of urban compared to 65% of rural Canadians). Hence, health campaigns on social media may not be an effective tool for disseminating health information about prostate and testicular cancers for provinces with a high percentage of rural population. Future research with a larger sample of data may reveal regional differences in trends related to tweeting practices during the Movember campaign. This sample would be best collected using real-time data collection software (e.g., NVivo Capture) since historical data collection is cumbersome.

Since testicular cancer was a new health issue to the Movember Canada campaign in 2013, it will be interesting to explore how it will develop as an important health issue in conversations over time. A longitudinal study to understand the charitable trajectory over time and social media responses would provide insight into how the public plays a role in shaping messages for successive campaigns. Additionally, further study designs, such as surveys or interview methodologies, will be necessary to identify the potential

influence that the Movember campaigns and activities on social media (e.g., tweeting about prostate cancer, reading tweets about Movember) may have on a reader's behaviour. Research that examines the impact of participating in Movember-related conversations on men's health outcomes will be necessary in order to evaluate media effects on health behaviour change (e.g., health knowledge, attitudes, and behaviours). Examining media effects of social media campaigns is important as health organizations continue to utilize social media to engage with consumers and provide health education in the social media space.

6.6 Conclusions

Mass media campaigns can affect how the public interprets the importance of an issue depending on the emphasis that the media places on the issue (McCombs & Shaw, 1972). Health campaigns such as Movember have the potential to draw attention to important men's health issues that may otherwise be overlooked such as prostate cancer and testicular cancer (King, 2004). The aim of this thesis research was to determine whether the 2013 Movember Canada campaign accomplished the objective of creating conversations about men's health, and prostate and testicular cancers specifically. One of the key findings of this research was that health information about these male cancers was limited in *Twitter* messages about the 2013 Movember Canada campaign. There were significantly fewer health-related (n= 673) than non-health-related (n= 3549) tweets ($p < 0.05$). Conversations emphasized moustache growing and grooming with few references to prostate and testicular cancers. Additionally, tweeters discussed fundraising as a priority, making a change to men's health, the campaign as a moustache contest

rather than a charity, and the role of women as moustache supporters using traditional appeals to masculinity and war metaphors that are common in messages about cancer (Clarke, 2006).

Social media presents an opportunity for health education and understanding how individuals communicate about health issues (Lyles et al., 2013). The general public uses social media platforms such as *Twitter* for health interventions, health promotion and health education (Moorhead et al., 2013). Findings from this thesis highlight the importance for health campaign coordinators to communicate a philanthropic narrative that explicitly associates campaign activities, such as fundraising and raising awareness, with the health issue so that the general public will view the health issue as an important issue. Future research that considers methodological approaches such as surveys or interviews will be necessary to collect data about the impact of discussing social media health campaigns and their related health issues on health behaviour change (e.g., health knowledge, attitudes, behaviours).

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Appendices

Appendix A: Infographic of the Impact and Results of the Global 2013 Movember Campaign Released in March 2014 by the Movember Foundation

Appendix B: Representative Snapshot of the 2013 Movember Canada Campaign Website Taken from Internet Archive: Wayback Machine

Appendix C: Representative Output from the *Twitter S*earch Engine using the Search Operators: "#movember lang:en until: 2013-11-02"

Appendix D: Identifying Geolocation of Tweeter Using *Twitter* Profile

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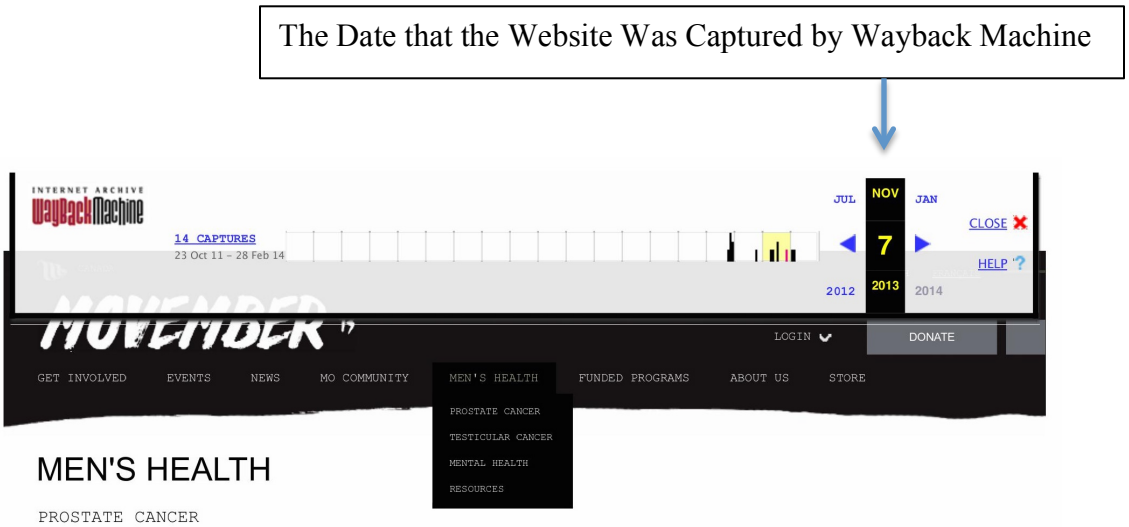
Appendix A

Infographic of the Impact and Results of the Global 2013 Movember Campaign Released in March 2014 by the Movember Foundation

Appendix B

Representative Snapshot of the 2013 Movember Canada Campaign Website Taken from Internet Archive: Wayback Machine



MEN'S HEALTH

PROSTATE CANCER

Prostate cancer is the most common cancer in Canadian men and is the second largest cause of male cancer deaths in Canada. Each year around 23,600 new cases are diagnosed in Canada and close to 4,000 Canadian men die of the disease every year, which exceeds the number of women who die from breast cancer annually. Despite these figures, the level of awareness, understanding and support for prostate cancer lags significantly behind that of women's health causes.

- 1 in 7 men will develop prostate cancer during his lifetime and 1 in 28 will die of it.
- A man dies from prostate cancer every 22 minutes.
- In 2013, 23,600 new cases of the disease will be diagnosed and 3,900 men will die of prostate cancer.
- Prostate cancer is the most frequently diagnosed cancer in men.
- The incidence rates are nearly double in African Canadian men.
- If detected and treated early, there is a 95 percent survival rate associated with prostate cancer.

OVERVIEW TESTING NAVIGATING PROSTATE CANCER RESOURCES

OVERVIEW

What is the prostate?

The prostate is a gland forming part of the male reproductive system. It is located immediately below the bladder and just in front of the bowel. Its main function is to produce fluid that protects and enriches sperm. In younger men the prostate is about the size of a walnut. It is doughnut shaped as it surrounds the beginning of the urethra, the tube that conveys urine from the bladder out through the penis. The nerves that control erections surround the prostate.

What is prostate cancer?
Prostate cancer occurs when some of the cells of the prostate reproduce far more rapidly than in a normal prostate, causing a tumour. If left untreated prostate cancer cells may eventually break out of the prostate and invade distant parts of the body, particularly the bones and lymph nodes, producing secondary tumours, a process known as metastasis. Once the cancer escapes from the prostate, treatment is still possible but a "cure" becomes impossible.

Provided appropriate treatment commences while the cancer is still confined to the prostate gland, it is possible to prevent the progression of the disease.

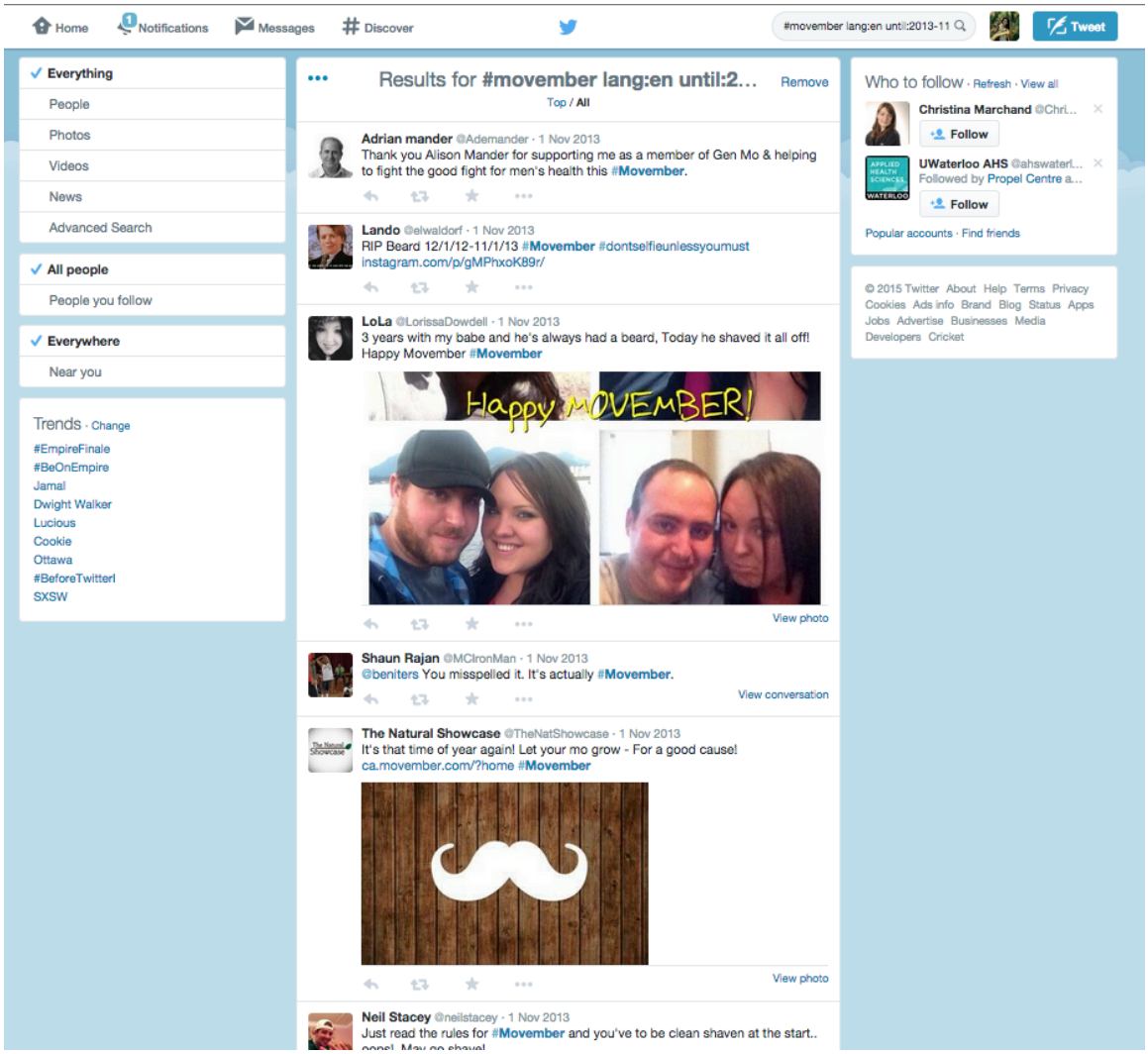
One of the most worrying aspects of the disease is that most prostate cancers develop without men experiencing any symptoms.

What are the risk factors?
- **Gender:** prostate cancer affects men only as women do not have a prostate gland
- **Age:** the older a man is the more likely he is to be diagnosed with prostate cancer
- **Family History:** a man with a father or brother who developed prostate cancer before age 60 is twice as likely to develop the disease
- **Ethnicity:** increased occurrence in black African males
- **Lifestyle**: poor diet and lack of exercise

What are possible symptoms?
Note: the majority of prostate cancers have no symptoms, and it is really only advanced cancers that have spread throughout the prostate (and beyond) that cause urinary symptoms such as:
- **Slow flow**: urine flow is slow and difficult to stop
- **Hesitancy**: difficulty starting flow of urine
- **Frequency:** need to urinate more frequently
- **Nocturia**: need to urinate during the night
- **Urgency**: urgent need to urinate
- Blood in the urine or semen
- Reduced ability to get an erection

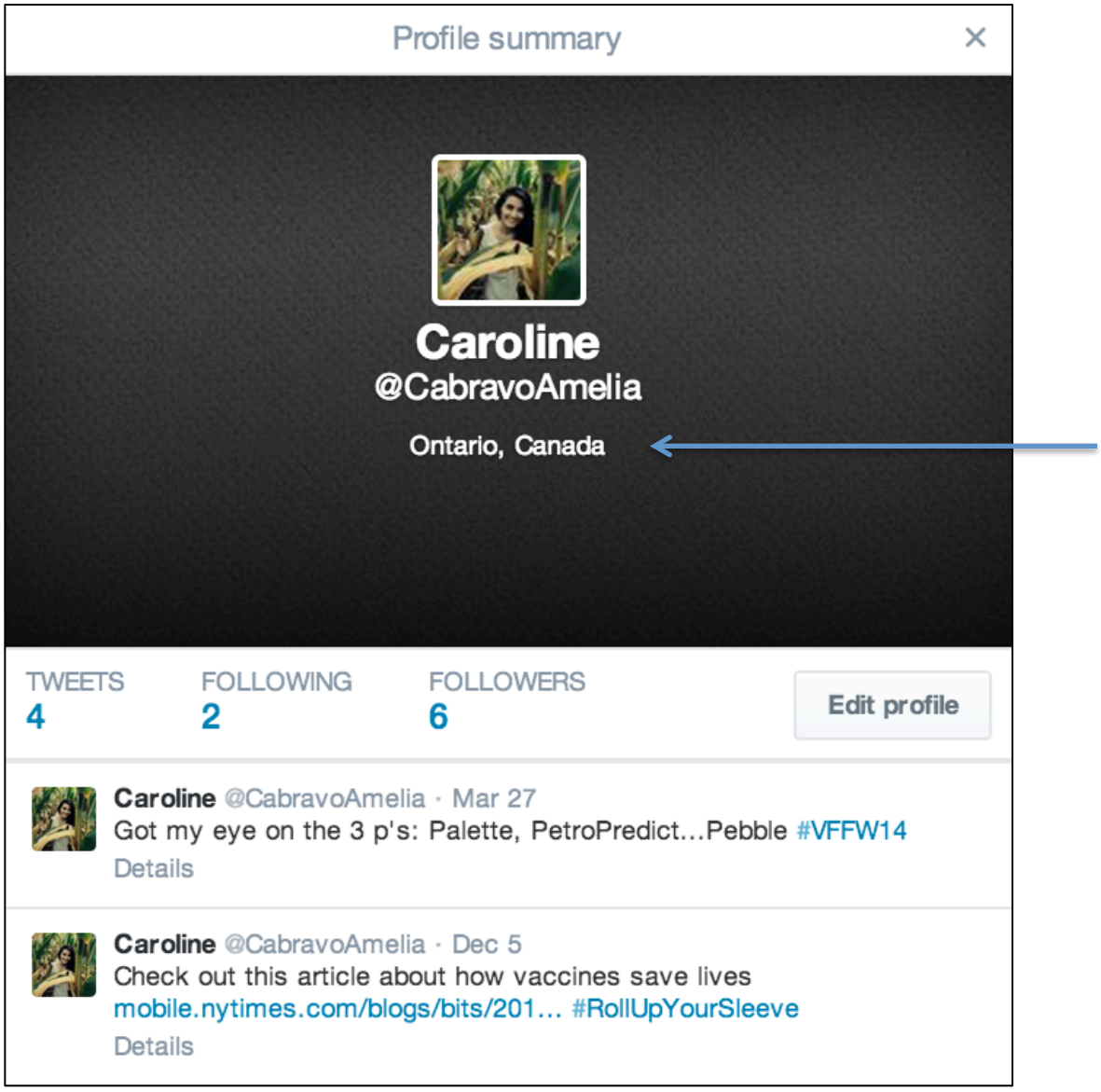
Appendix C

Representative Output from the *Twitter* Search Engine using the Search Operators: "#movember lang:en until: 2013-11-02"



Appendix D

Identifying Geolocation of Tweeter Using *Twitter* Profile



Appendix E

Testing Sample Size of *Twitter* Data For Online Activity of Canadian Users

Question 1: How many tweets were collected using the *Twitter* search engine?

Table 2. The number of tweets collected each day of November 2013

Date	Number of Tweets Collected	Date	Number of Tweets Collected
November 1, 2013#	1500	November 16, 2013	750
November 2, 2013	750	November 17, 2013	750
November 3, 2013	750	November 18, 2013	750
November 4, 2013	750	November 19, 2013	750
November 5, 2013	750	November 20, 2013	750
November 6, 2013	750	November 21, 2013	750
November 7, 2013	750	November 22, 2013	750
November 8, 2013	750	November 23, 2013	750
November 9, 2013	750	November 24, 2013	750
November 10, 2013*	739	November 25, 2013	750
November 11, 2013*	746	November 26, 2013	750
November 12, 2013	750	November 27, 2013	750
November 13, 2013	750	November 28, 2013*	587
November 14, 2013	750	November 29, 2013	750
November 15, 2013#	1500	November 30, 2013#	1500
TOTAL			**24, 572**

***** November 10th, 11th, and 28th do not have 750 tweets due to either a) 750+ tweets were collected initially but after duplicates and RTs were removed, the total number of tweets collected was less than 750; b) limitations with the *Twitter* search engine did not allow collection of 750 tweets.

#1500 tweets were collected on November 1st, 15th, and 30th for comparison purposes to establish significance for the sample size of 750 tweets.

Question 2: Is there a difference between the number of Canadians and non-Canadians for the first set of 750 tweets collected and the second set of 750 tweets collected?

Table 3. The number of Canadian and Non-Canadian tweets for November 1st, November 15th, and November 30th 2013

Date-Set	Number of Canadian Tweets Collected (Code= 1)	Total	% of Canadian Tweets Collected (per total number of Canadian Tweets collected per day)	Number of Non-Canadian Tweets Collected (code = 0)	Total	% of Non-Canadian Tweets Collected (per total number of Non-Canadian Tweets collected per day)
Nov 1 (A)*	168		47.9	452		50.6
Nov 1 (B)*	183	351	52.1	442	894	49.4
Nov 15 (A)	141		49.3	506		50.7
Nov 15 (B)	145	286	50.7	492	998	49.3
Nov 30 (A)	147		50	424		48.6
Nov 30 (B)	147	294	50	448	872	51.4

*(A) represents the first set of 750 tweets (1-750) presented by the *Twitter* search engine and (B) represents the second set of 750 tweets (751-1500)

Table 4. Chi-Square Test. Ho: no significant difference in the code for location (0= Non-Canadian; 1= Canadian) between Group A and Group B ; Ha: there is a significant difference in the code for location (0= Non-Canadian; 1= Canadian) between Group A and Group B. alpha = 0.05

Test Variables (Groups)	p-value	Conclusion
Nov 1 (A) vs. Nov 1(B)	0.653	Ho is accepted; there is no significant difference between groups
Nov 15 (A) vs. Nov 15 (B)	0.699	Ho is accepted; there is no significant difference between groups
Nov 20 (A) vs. Nov 30 (B)	0.303	Ho is accepted; there is no significant difference between groups

Appendix F

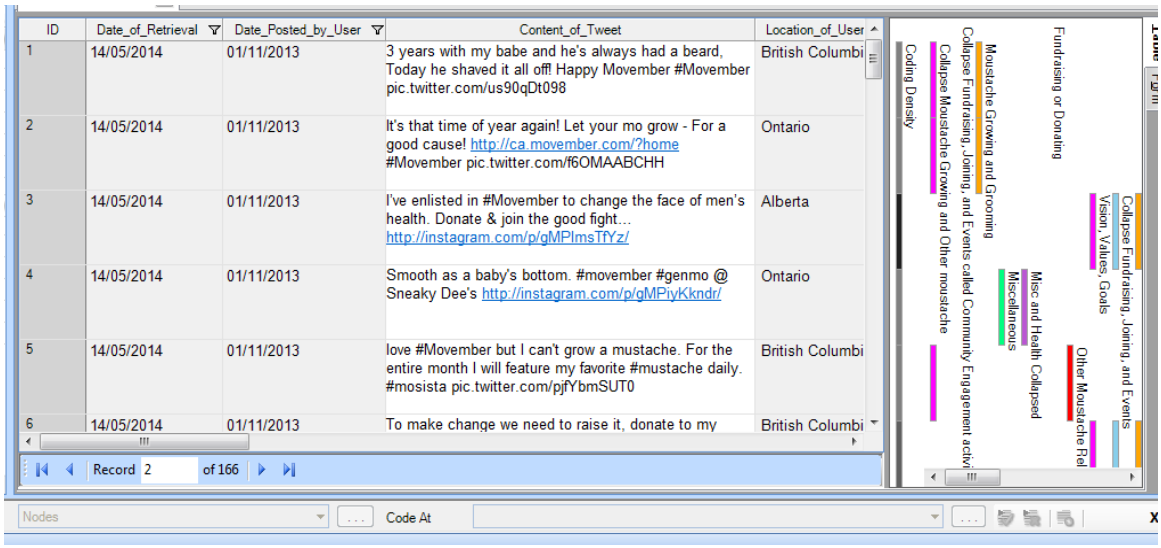
Snapshot of Excel Spreadsheet for Organizing *Twitter* Content

	A	B	C	D	E	F	G	H	I
1	Date of Retrieval	Date Tweet Posted by User	Content_of_Tweet	Location_of_User; if province is named then province is listed; if only city is named then only city is listed	Code for Location where 0=not canadian; 1= Canadian; 2=N/A	#_of_followers of user at time of retrieval	Image; where 1 = yes and 0=no	Organization/Company /Group where yes=1 and no=0	
2	12-Jun-14	03-Nov-13	Shaving everyday is not optimal for me. But for movember I'll do it! Give generously **#Movember**… http://instagram.com/p/gRZGgUGBTP/	Quebec	1	143	0	0	
3	12-Jun-14	03-Nov-13	Check out who is changing the face of men's health for **#Movember** http://ca.movember.com/team/974933 via @movemberca	Ontario	1	47000	0	1	
4	12-Jun-14	03-Nov-13	To make change we need to raise it, donate to my **#Movember** effort. http://mobro.co/cristiangodoy	Canada	1	1475	0	0	
5	12-Jun-14	03-Nov-13	It is time to get talking about **#Movember**, and we've done just that over on our website. Help us raise awareness... http://fb.me/12Banbq4F	Ontario	1	47000	0	1	
6	12-Jun-14	03-Nov-13	I've enlisted in **#Movember** to change the face of men's health. Donate & join the good fight http://mobro.co/mattsmo	Ontario	1	579	0	0	
7	12-Jun-14	03-Nov-13	To make change we need to raise it, donate to my **#Movember** effort. http://mobro.co/scoop	Ontario	1	657	0	0	
8	12-Jun-14	03-Nov-13	Doing **#Movember** AND #NaNoWriMo. Join the elite #NaNoWriMovember circle. Novels that kill cancer!	Ontario	1	2481	0	0	
9	12-Jun-14	03-Nov-13	Who's #MOing this **#Movember**? CFLPA & fans are Mo'ing 2gether this @MovemberCA! http://bit.ly/1h1T1Si JOIN OUR TEAM & you could win prizes!	Canada	1	5062	0	1	
			Ever wonder where **#Movember** came						

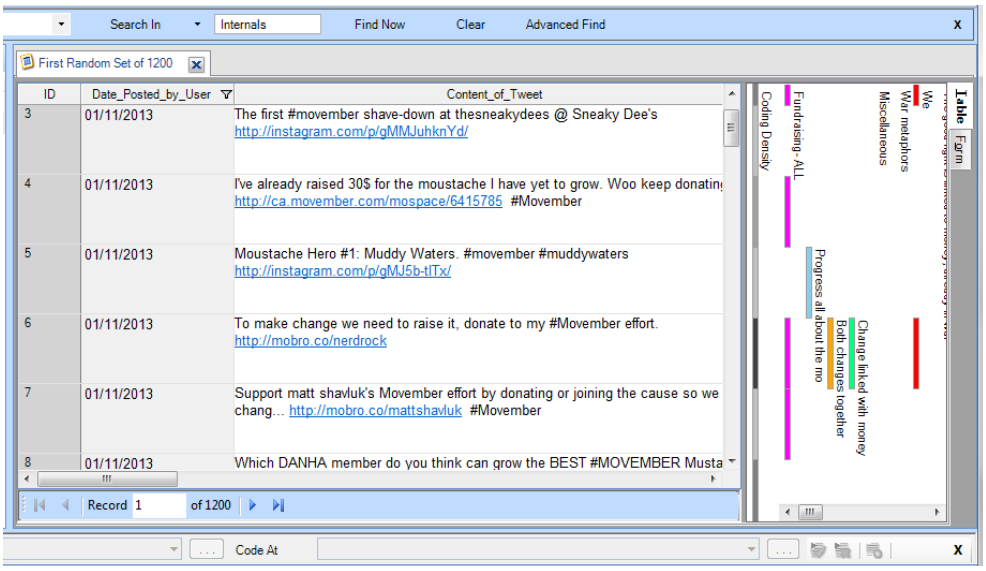
Appendix G

Representative NVivo (v.10) Coding

Study #1



Study #2



Appendix H

Representative Statistical Output from SPSS (v.22) Data Analysis for Study #1

Study #1. Independent T-Tests to Calculate Significant Difference Between the Number of non-health-related tweets (group 0) and health-related tweets (group 1)

Group Statistics

	Health_NonHealth	N	Mean	Std. Deviation	Std. Error Mean
Count	0	30	118.30	19.345	3.532
	1	30	22.43	7.807	1.425

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Count	Equal variances assumed	10.468	.002	25.171	58	.000	95.867	3.809	88.243	103.490
	Equal variances not assumed			25.171	38.202	.000	95.867	3.809	88.158	103.575

Appendix I

Preliminary Codebook of 2013 Movember Canada Website Content

Table 5. 2013 Movember Canada website codebook

Main Topics	Sub-categories	Description	Representative Text
Men's Health	General Men's Health	Text that provides information about general health in men (such as healthy living, staying active, eating in moderation) and does not mention a specific disease, illness or condition.	On average, men die at a significantly younger age than women – the average life expectancy for Canadian men is four years less than women (presently 78 compared to 82), however there is no biological reason for this.
	Prostate Cancer	Text that provides information about prostate cancer (such as incidence, risk factors, symptoms, treatment, cure, etc.).	1 in 7 men will be diagnosed with prostate cancer in their lifetime.
	Testicular Cancer	Text that provides information about testicular cancer (such as incidence, risk factors, symptoms, treatment, cure, etc.).	Testicular cancer is the most common cancer in Canadian men between the ages of 15 and 29.
	Mental Health	Text that provides information about mental health issues in men (such as incidence, risk factors, symptoms, treatment, cure, etc.).	1 in 4 cancer patients experience clinical depression.
	Other Health Issues	Text that mentions or provides information about other health issues such as obesity, heart disease, lung cancer etc.	1 in every 11 men will develop lung cancer.

Participation	General Participation/ Registration	Text that calls a participant to register and/or provides information about how to register for Movember and/or describes the benefits of participation.	Register to be part of the largest men's health movement in the world.
	Fundraising	Text that calls a participant to fundraise and/or mentions fundraising as a task of participants during the Movember campaign and/or describes how to fundraise.	Enlist your friends, family and coworkers to join you this Movember and together we can change the face of men's health.
	Moustache Grooming/Growing	Text that links moustache growing/grooming to men's health and/or health outcomes (e.g., raised awareness and education).	MOVEMBER IS ALL ABOUT BRINGING BACK THE MOUSTACHE, HAVING FUN AND DOING GOOD FOR MEN'S HEALTH.
	Role of Mo Sista	Text that mentions how females can participate to Movember and/or calls a female to contribute to the campaign by taking the role of a Mo Sista.	At Movember we acknowledge the Mo Sistahood and celebrate their role as men's health advocates.
	Events	Text that describes events hosted by Movember or a Movember participant and/or text that calls a participant to host or attend and event.	Sign up to MOVE this Movember by hosting or attending an active event.
	Challenges and Competitions	Text that describes challenges or competitions among Movember participants and/or calls a participant to participate in a challenge or competition.	In 2012 over 35,000 faculty, staff and students worked together in the BMOC challenge to raise over $2.95 million for men's health.
	Partners	Text that discusses or describes partners of the Movember campaign.	At a national level Movember partners with the PROSTATE CANCER CANADA (PCC), who's stated objective is to empower the world's top scientific minds by cutting red tape and encouraging collaboration to speed breakthroughs.

Movember Campaign-About	General Movember Information	Text that describes information about the Movember charity of campaign (e.g., the history of the campaign, the charity number, team members and advisors, etc.)	Each year, brave and selfless Mo Bros and Mo Sistas from companies across Canada come together as one, united by their commitment to have an everlasting impact on the face of men's health.
	Vision, Values, Goals	Text that describes the vision, values, and goals of the Movember Canada campaign.	Movember aims to change the face of men's health and reverse this way of thinking by putting a fun twist on this serious issue.
	Movember Financials	Text that describes how Movember Canada funds are allocated.	87 cents of every dollar raised goes towards programs supporting men's health initiatives.
	Funded Programs	Text that describes programs that are funded by the money raised by the Movember Canada campaign.	Additionally some funds are used to create and maintain engaging resources, which educate men on the health risks they face, how to stay healthy and how to take action if they become ill.
	Additional Information Resources	Text that guides the reader to additional health resources (e.g., a link to a health information website, or health association website, or additional resource).	DOWNLOAD THE PSA OVERVIEW HERE.
Other	Case Studies	Text that describes how a particular case (team, person, company) has participated in Movember.	Led by team captain Scott Wenz and their passionate CEO, Bill Doherty, over 150 Walton employees joined together in the name of men's health and along the way raised over $350,000 for the men's health initiatives.
	Comparison to Women's Health and/or Health Movement	Text that mentions comparison to women's health or references to the women's health movement.	Despite these figures, the level of awareness, understanding and support for prostate cancer lags significantly behind that of women's health causes.

	Miscellaneous	Text that does not fit into any other category.	Proof that there is still more work to be done to change the face of men's health.

Appendix J

Distribution of Tweets Across Canadian Provinces

Table 6. Total number of tweets and percentage of tweets for each province

Province	Total Number of Tweets in November 2013	Percentage of Tweets from Each Province (n=3564)
Ontario	1640	46.0
British Columbia	790	22.0
Alberta	558	15.7
Quebec	204	5.7
Manitoba	124	3.5
Nova Scotia	87	2.4
Saskatchewan	76	2.1
New Brunswick	51	1.4
Newfoundland	44	1.2
Prince Edward Island	16	0.5
Nunavut	7	0.2
Yukon	4	0.1
Northwest Territories	3	0.1

Appendix K

Preliminary Findings of Canadian vs. Non-Canadian Tweets

8,444 tweets were analyzed: 4,222 Canadian and 4,222 Non-Canadian.

Table 10. The number of health-related and non-health-related tweets in the Canadian and non-Canadian groups

Date (2013)	Total Number of Tweets	Canadian Tweets		Non-Canadian Tweets	
		Health-related N (%)	Non-health-related N (%)	Health-related N (%)	Non-health-related N (%)
Nov 1	332	25 (8)	141 (42)	48 (14)	118 (35)
Nov 2	354	37 (10)	140 (40)	55 (16)	122 (34)
Nov 3	312	32 (10)	124 (40)	47 (15)	109 (35)
Nov 4	368	42 (11)	142 (39)	64 (17)	120 (33)
Nov 5	268	22 (8)	112 (42)	50 (19)	84 (31)
Nov 6	270	27 (10)	108 (40)	42 (16)	93 (34)
Nov 7	286	23 (8)	120 (42)	48 (17)	95 (33)
Nov 8	306	26 (8)	127 (42)	36 (12)	117 (38)
Nov 9	284	23 (8)	119 (42)	35 (12)	107 (37)
Nov 10	212	14 (7)	92 (43)	30 (14)	76 (36)
Nov 11	234	27 (12)	90 (38)	25 (11)	92 (39)
Nov 12	322	35 (11)	126 (39)	51 (16)	110 (34)
Nov 13	284	32 (11)	110 (39)	45 (16)	97 (34)
Nov 14	282	17 (6)	124 (44)	39 (14)	102 (36)
Nov 15	306	20 (7)	133 (43)	29 (9)	102 (33)
Nov 16	276	20 (7)	118 (43)	28 (10)	110 (40)
Nov 17	232	19 (8)	97 (42)	20 (9)	96 (41)
Nov 18	222	21 (9)	90 (41)	33 (15)	78 (35)
Nov 19	262	30 (11)	101 (39)	30 (11)	101 (39)
Nov 20	238	19 (8)	100 (42)	29 (12)	90 (38)
Nov 21	260	13 (5)	117 (45)	31 (12)	99 (38)
Nov 22	268	16 (6)	118 (44)	33 (12)	101 (38)
Nov 23	264	11 (4)	121 (46)	19 (7)	113 (43)
Nov 24	206	9 (4)	94 (46)	24 (12)	79 (38)
Nov 25	332	23 (7)	143 (43)	35 (11)	131 (39)
Nov 26	276	19 (7)	119 (43)	28 (10)	110 (40)
Nov 27	266	17 (6)	116 (44)	23 (9)	110 (41)
Nov 28	234	18 (8)	99 (42)	20 (9)	97 (41)
Nov 29	400	22 (6)	178 (44)	30 (8)	170 (42)
Nov 30	288	14 (5)	130 (45)	14 (5)	130 (45)
TOTAL	8444	673 (8)	3549 (42)	1047 (12)	3175 (38)

Testing the Number of Health Tweets in Canadian vs. Non-Canadian (Global)

Group Statistics

	GlobalVS_Can	N	Mean	Std. Deviation	Std. Error Mean
Count	Global	30	34.90	11.929	2.178
	Canadian	30	22.43	7.807	1.425

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Count	Equal variances assumed	4.982	.029	4.790	58	.000	12.467	2.603	7.257	17.677
	Equal variances not assumed			4.790	49.990	.000	12.467	2.603	7.239	17.695

Since the sig. value (0.029) is less than 0.05, we look at the second row of the significance level (2-tailed) for the Levene Test. Since the value (0.0000) is less than 0.05, there is a significant difference between the number of health-related tweets between the Canadian and non-Canadian (Global) groups.